

## **EXPLORATION AND ASSESSMENT OF DIGITAL TECHNOLOGIES' IMPORTANCE AND ADOPTION ALONG THE VALUE-ADDED CHAIN**

**Raphaël G.D. Murswieck<sup>1</sup>, Jens Geldmacher<sup>2</sup>, Matthias Dünneweber<sup>3</sup> and Carsten Kirschner<sup>4</sup>**

*<sup>1) 2) 3) 4)</sup> The Bucharest University of Economic Studies, Romania*

E-mail: raphael@murswieck.de; E-mail: jens.geldmacher@gmail.com;  
Email: mduennweber@googlemail.com; E-mail: carsten.kirschner@ok.de

---

### **Abstract**

After the global “break-through” of the internet within the 2000s, today’s available technologies seem to “change” once more established business models completely by innovative digital technologies. Organizations using such new technologies expect to gain market advantages in terms of reduced operational costs, increased turnover, and simplified or even new business models respectively.

The present paper explores and compares the current mindset of business people within different business sectors regarding their estimated financial impact of digital technologies in general, their usage along the value-added chain as well as the current stage of existing digital skills for its adoption. Therefore, the authors performed a quantitative explorative study based on a questionnaire from 15<sup>th</sup> to 31<sup>st</sup> January 2017. The target of this research was to obtain information on how business insider's with different experienced background as well as sectors assess digital technologies in being mandatory key factors for (financial) outperforming on the one hand as well as to evaluate the organization’s current grade of digitisation and hence to evaluate unused potential.

The analysis shows clearly that age and job experience plays a major role on how digital technologies are being evaluated from a financial impact point of view. Furthermore, the study indicates that over almost all business sectors it is not really known if the own grade of digitisation is higher or lower than the one of the competitors. However, despite this the majority states that the digitisation has a strong impact on their business and further efforts needs to be done for adoption.

### **Keywords**

digital technologies, value-added chain, excellence, innovation, financial impact

### **JEL Classification**

M10, M13, M15, M30

---

## **Introduction**

Much more than in isolated economies the globalization has forced organization “to plan ahead and anticipate coming developments if they are to be successful in the future” (Stern, 2008). One development is for sure the digitisation of businesses which is part of six so-called “megatrends” companies are facing still today (Rothlauf, 2010, p. 31): internationalization of the competition, increased environmental challenges, changed company cultures, demographic and social change, increased customer expectations, increased importance of the communication and information technology. Organizations which are managing and even leading these challenges with innovative market-oriented solution can be understood as excellent companies.

### **1. Increased importance of the IT and business digitization**

The crucial phase of the IT began already in the late 1960s: administrations as well as private companies invested in costly computer systems to process data in order to automate information flows which lead to a rapid increase of commercial data activities (Fleischhack, 2016). In the end of the 1990s, large distances were no more a real challenge for any kind of interaction between companies worldwide in terms of knowledge exchange or communication. Products from almost all over the world could already be ordered online and shipped to any place. Furthermore, business processes were being automated with help of data processing systems out of e-commerce platforms and information were already shared internally as well as externally along the complete value adding supply chain of companies (Amman and Dickel, 1998).

Companies not using available technologies risk in being less competitive in future. Porter describes two ways in creating a competitive edge: either differentiation or cost-leadership. In this regard, he is pointing out that analyzing the value chain is more appropriate than analyzing the value creation itself (Porter, 2014, p.68). Latest research show that the usage of digital technologies does obviously have a positive financial impact (Strauss, 2013, p.19). The usage of digital technologies differs within different business sectors: “Digital leaders” such as software companies are more digitized than sectors such as construction companies which was confirmed by the McKinsey consulting company (2016).

### **2. Research targets**

This study focuses on the increased importance of digital technologies and its usage as a competitive edge: it shall provide feedback from the market on the (financially) expected return on investment and provide insight information on the sector-related usage within the value-added chain as well as identify how well the participant see their organization prepared for the digital time-age.

### **3. Research Methodology**

The present paper represents an explorative study based on a quantitative survey to identify tendencies as basis for possible further studies as well as to cross-check recent studies within bordering subjects. The characteristics of the study is shown in table no.1.

As the questionnaire was addressed only within online business networks it can be suggested that the participants have a basic digital mindset which shall be advantageous for the answers’ quality. Questions with graded assessments, evaluations or ratings were based on a 6-step-scaling to avoid indifferences by offering an average value. However, in most

cases the value “unknown” was also offered separately.

**Table no.1: Characteristic of the study**

Aspect	Characteristics
<b>Survey period</b>	Quantitative questionnaire from 15th January - 31st January 2017
<b>Form of collection</b>	Online survey with 131 fully answered questionnaire (out of 199 reached business people who opened and started the form) representing ~ 65% response rate.
<b>Regional focus</b>	German speaking countries (Germany, Austria, Switzerland)
<b>Execution of survey</b>	Performed by the authors with help of online <a href="http://sosciesurvey.de">sosciesurvey.de</a> - platform
<b>Addressee of the survey</b>	Business people within German speaking online business forums (XING)
<b>Data volume</b>	42 single questions (hereof 9 sociodemographic questions)
<b>Precursor studies (reference point)</b>	The search for Excellence in Digital, 2013 (Strauss, 2013); Digital Europe: Pushing the frontier, capturing the benefits, 2016 (McKinsey Global Institute 2016)

#### 4. Research Results

##### 4.1 Demographics

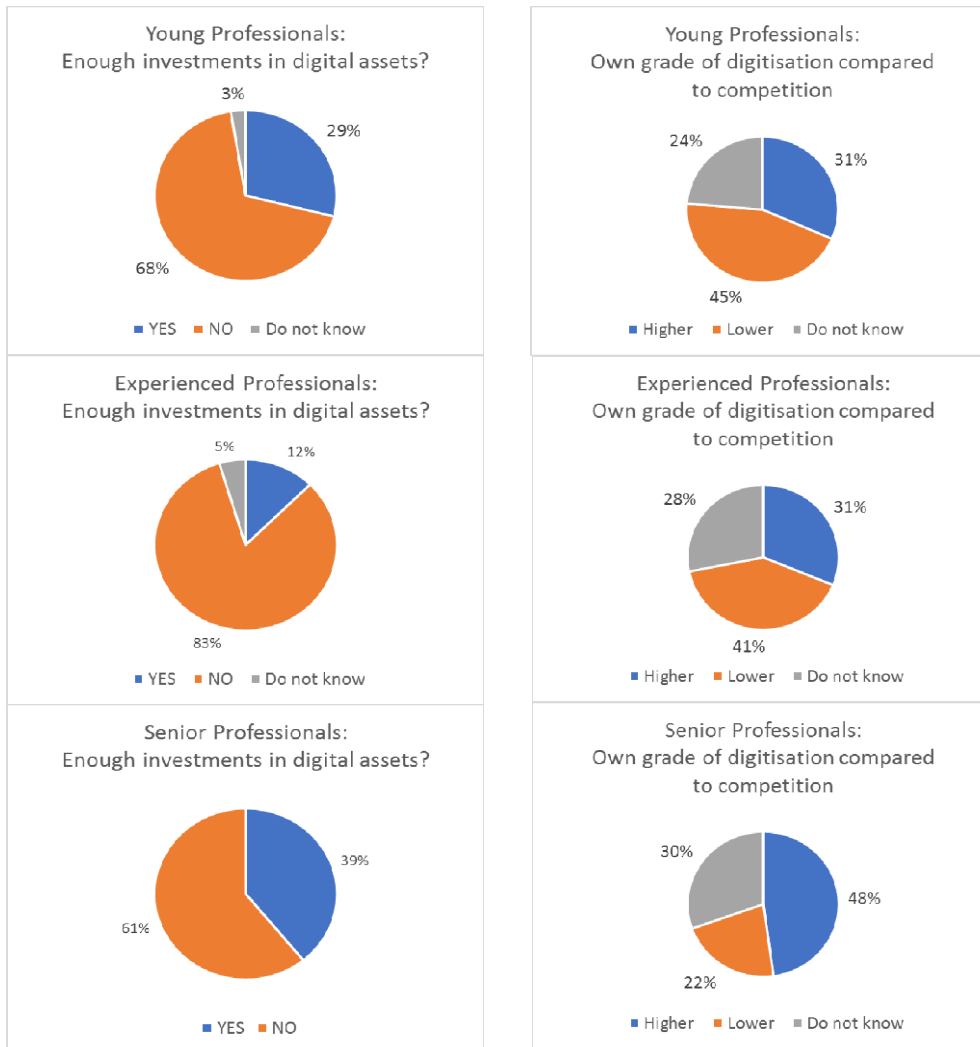
In total, 199 businesspeople could be reached to participate in the online-survey with a return rate of 131 representing ~65%. The age-spectrum of the interviewed professionals ranges from 20 to 67 years, while 30% are female and 70% male. 45% of the participants are executive employees, 43% are non-executive employees. The remaining participants are mainly students and trainees working within organizations. In total, a high academic level could be registered: more than 70% of the participants holds a university degree (Bachelor, Master’s Degree or PhD). Due to the fact, that the number of responses in the three sectors Professional Services, IT & Communication (ITC) and Basic goods manufacturing make up 49% of all 20 sectors, the information quality extracted here should be considered higher for all sector-inside information. Thus, the analysis of specific sector-related information will focus on these three sectors only.

##### 4.2 Assessment of digital technologies’ rated importance

###### 4.2.1 Digital technologies and financial evaluation

The research showed that by classifying the ages into three age-groups (young professionals up to 30 years old, experienced professionals from 31 to 50 years and senior professionals from 51 years on) and analyzing their answers to the question if enough investments have been made into digital assets, a clear correlation between age and the

knowledge of digital potential could be identified: while young professionals have a greater digital user experience (Paul and Stegbauer, 2005), their grasp of sector-specific know-how shall be less than of senior professionals because of less experience. Due to that, lower age groups might state digital investments into assets as not sufficient, while 39% of senior professionals tend to view them as adequate (Figure no.1).



**Figure no. 1: Investments into digital assets seen by different age groups**

**Figure no. 2: Grade of digitisation compared to competition**

Accordingly, experienced professionals have spent enough time in the sector to understand the business deeper while still being young enough to grow up with new technology and being aware of its potential. With 83% they show the highest interest in more investments

into digital assets and the lowest satisfaction with the digital status quo (12%). Investing into digital assets at a maximum efficiency concerning outcome translates into combining a senior professional with exceptional knowledge about the business with an experienced professional with a background in IT.

Irrespective the participants' age the impact of digital technologies on the economy in general is rated in being strong or very strong by over 80% of the participants.

It was also found, that the age has an impact on the view of the correlation between digitisation and an expected financial impact. While only 5% of all young professionals think that digitisation does not have a positive financial impact, 26% of senior professionals don't see the financial benefit. Linked to this outcome a Commerzbank (2016, p. 12) study points out, that more than half of all employees (56%) wants to uphold the status quo concerning digitisation while 40% have trouble identifying with new technology.

This data suggests, that the digital status quo of a sector or company isn't set by technological limits, but rather by appreciation and identification of employees.

In general, most participants (69%) state that digital technologies do have a positive financial impact and hence it is beneficial to invest in such new technologies. This points out that there is a gap between appropriate and existing investments in these technologies.

#### **4.2.2. Evaluation of competitions' grade of digitization**

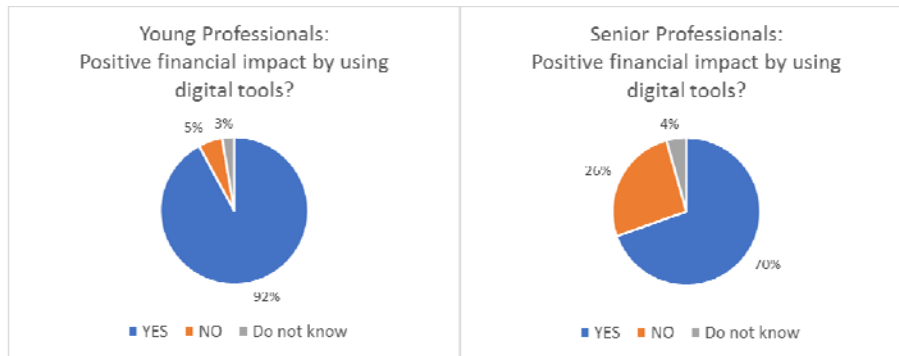
Another surprising result of the study was that all age groups young, experienced and senior professionals cannot clearly evaluate their own grade of digitisation in comparison to the competition (Figure no. 2).

This might result in different reason such as interviewed people are not familiar with digital potential which does not allow them to accordingly judge the issue at hand; or, the interviewed people are not familiar with the sector's or company's respectively internal grade of digitisation; or, the interviewed people are not familiar with the sector or company's respectively external grade of digitisation; or, the reason might be that the interviewed people do not have contact or access to market-related sources such as customers.

Especially the experienced and senior professionals shall be aware of their market's grade of digitisation in being able to setup the company's right strategy in this regard.

#### **4.2.3. Usage of digital tools and employees' digital skills**

The investment in digital technologies is for sure the first step in increasing the grade of digitisation. However, the adoption and real usage of the new technologies is naturally needed to ensure a positive business impact. Therefore, the study included a question if a positive financial impact could be assumed if the digital tools are being used within the company. This was confirmed by a vast majority (Figure no.3). Nevertheless, the young professionals do see a higher impact (92% of the young professionals) than the seniors (70%).



**Figure no. 3: Financial impact by using digital tools**

In addition to this results the study also showed that especially senior professionals rate the overall digital skills within their company as being rather strong/very strong (87%) contrary to the group of experienced professionals (52%).

At this stage, only assumptions could be undertaken why this spread of self-assessment is as high especially in comparison between both groups. However, it seems that digital skills are still missing to fully adopt the existing technologies and lever the digital potential.

### 4.3. Grade of digitisation

#### 4.3.1 Digital value-added chain

In contrast to the study “Digital Europe: Pushing the frontier, capturing the benefits” by the McKinsey Global Institute in 2016 the focus of this research paper aligns the grade of digitisation of every sector with the value-added chain after Porter. This allows for a more detailed analysis within each sector and provides an inter-sector comparison.

In comparison to McKinsey, this research has found the same gradation between the three sectors in focus (Figure no.4): ITC leads with an average grade of digitisation of 4,3 (of maximum 6), followed by the sector professional services (3,7).

Basic goods manufacturing ranges at 3,3. Looking at the primary activities of the value chain, the average grade of digitisation measured in the whole sector-panel ranges from 3,4 to 3,62. This marginal difference hints towards the thesis, that within a sector, the level of introduced technology is roughly the same and digital barriers are less likely.

Comparing the cross-sector average of digitisation within primary and secondary activities, HR-processes are clearly behind (3,18), while the infrastructure is rated at 3,9. This includes of course communication mediums like computers / smartphones which are found in almost any office nowadays.

The result can be interpreted in such a way that as for HR more interpersonal aspects dominate the processes as for the infrastructure of organizations where, e.g. Enterprise Resource Programs (ERP), processes are more related to human independent workflows.

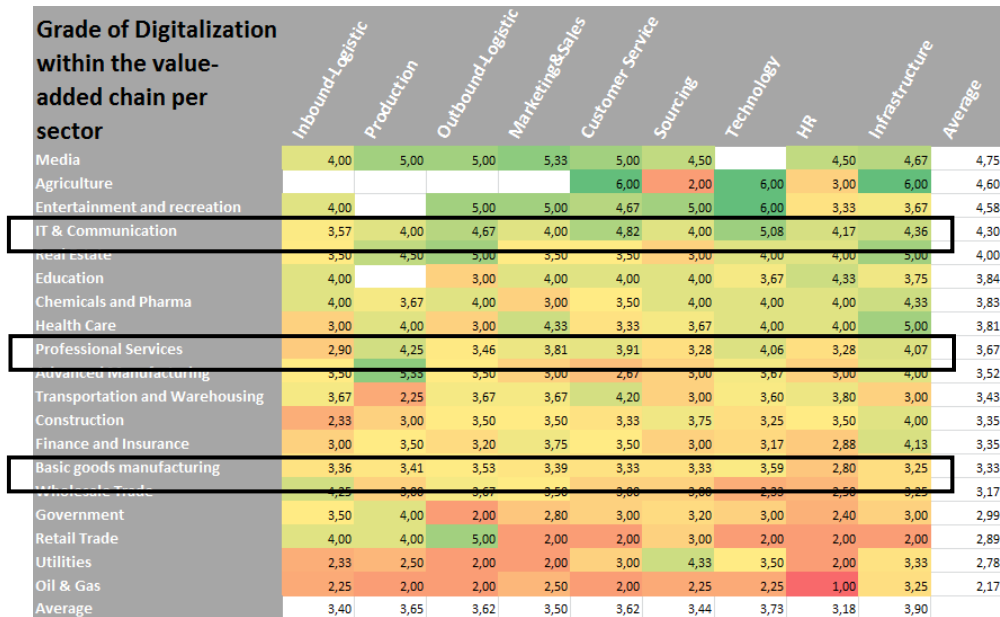


Figure no. 4: Heatmap of digitisation acc. to Porter's value-added chain with the three selected focus-sectors

### 4.3.2 Digital Technologies

The questionnaire included also questions which digital technologies are being used or in adoption: With exception to the wide usage of the email-technology (usage rate of 98% over all business sectors) specific digital technologies are more or less used depending of business sector or type of business (B2C vs. B2B).

It is noticeable that still many sectors do not use online shops within their marketing strategy even if this technology is well developed within the markets since long time. Having a look to the three focused sectors, 25% only of the participants within the Basic good manufacturer use e-shops (professional services 13% and ITC 8%). However, new digital services such as cloud-based services become more important: ITC 77% usage, professional services 50%, Basic goods manufacturers 35%. Far behind within all sectors are still Internet-of-things technologies and customized (mass-) manufacturing technologies.

### Conclusions and further research

The present study has shown that digital technologies are being seen as considerable and relevant for achieving positive financial results. Furthermore, the digitisation has an essential impact on the economy in general.

According to the research results more investments are still required within all analyzed business sectors to close the gaps along the complete value-added chain. However, the usage and adoption of existing technologies differs within the business sectors and digital skills are still missing within the employees. The study has also shown that young, experienced and senior professionals do not always evaluate digital facts the same way. Both extreme experience levels have different knowledge and views on the digital

potential, knowledge and skills within their organization. It seems that the intermediate experienced professionals build the bridge between both pole groups in terms of having enough business experience on the one hand and still being young enough in having enough digital affinity. Therefore, it could be beneficial for organizations to form inter-organizational teams on specific digital topics for increasing the level of excellence and to obtain a competitive edge.

In this regard the study has also shown that the own grade of digitisation could not be clearly evaluated in any case in comparison to the competition. The research illustrates, that both young as well as senior professionals cannot specify on this matter in a distinct way. This might lead to uncertainty and an unclear decision making processes.

As for any business strategy market knowledge is needed to gain contrast and to identify potentials and threats for strategically measures. However, existing and uprising digital technologies will still need to prove their worth within the value-adding chain itself. This analyze was not part of this study but might merit to be evaluated in a separate study.

## References

- Amman, P. and Dickel, J., 1998. Erfolgreiches Business-to-Business-Marketing mit Internet/WWW. *io Management*, iss. 4.
- Commerzbank, 2016. *Unternehmen Zukunft: Transformation trifft Tradition*. Frankfurt am Main: TNS Infratest
- Fleischhack, J., 2016. *Eine Welt im Datenrausch*. Zürich: Chronos Verlag.
- McKinsey, 2016. *Digital Europe: Pushing the frontier, capturing the benefits*. s.l: McKinsey Global Institute.
- Porter, M.E., 2014. *Wettbewerbsvorteile (Competitive Advantage) – Spitzenleistungen erreichen und behaupten*. 8th ed. Frankfurt am Main/New York: Campus-Verlag
- Rothlauf, J., 2010. *Total Quality Management in Theorie und Praxis. Zum ganzheitlichen Unternehmensverständnis*. 3rd ed. München: Oldenbourg Verlag
- Paul, G. and Stegbauer, C., 2005. Is the digital divide between young and elderly people increasing?. *First Monday*, 10(10).
- Stern, L. D., 2008. The Global Challenge. *Stern-Review*, iss. 3/2008.
- Strauss, R. E., 2013. *Digital Business Excellence. Strategien und Erfolgsfaktoren im E-Business*. Stuttgart: Schäffer-Poeschel-Verlag