

## ANALYSIS OF INFORMATION TECHNOLOGIES PENETRATION IN COMPANIES OR ORGANIZATIONS

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**Abstract:** *The goal of the paper is to analyze information technologies (IT) penetration in companies or organizations of the digital transformation (DT) era. The literature recherche selected a set of actual IT and specified them within the DT. The methodology of research included the quantitative method using the online questionnaire with questions oriented to discover IT state and situation in implementation of the new business method. The 60 companies and organizations took part in the survey; they came from 17 different countries. The research was limited in time; is not quite representative due to small group of respondents. It is primarily a verification of the methodology; research will continue in the future. From the IT point of view use 63% of companies or organizations information system (IS) and more than 50% document management system, any part of business intelligence, cloud computing, and social media. About 30% of companies or organizations implemented artificial intelligence and robotics, mobile access to IS, and internet of things; and about 10% use in memory computing and 3D printing. Companies and organizations that implemented IS and more than 50% of mentioned IT are sure at the high maturity level of the DT; the other are on the low level of the DT. The result of research in IT penetration divided companies and organizations into three groups; with high, middle, and low level of IT penetration. The hypothesis that levels of IT penetration companies or organizations are quite regularly has not been confirmed.*

**Key words:** *information technology, penetration, company and organization, digital transformation, quantitative research.*

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### 1. INTRODUCTION

Information technology (IT) impact on business innovation and effectiveness of companies and organizations by improving business processes, organizational structure, and decision-making is vital. The paper is focused on research results in penetration of current IT in companies and organizations. The set of IT in research includes:

1. Information Systems (IS).
2. Document Management Systems (DMS).
3. Business Intelligence (BI).
4. Cloud Computing (CC).
5. Social Media (SM).
6. Mobile Access to IS (MAtoIS).
7. Artificial Intelligence and Robotics (AI&R).
8. Internet of Things (IoT).
9. In Memory Computing (IMC).
10. 3D Printing (3DP).

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The research adopts a quantitative research methodology, using online questionnaire. The main goal of research in the paper is to investigate a penetration of the IT in companies and organizations. The hypothesis: "IT penetration is regularly divided into three groups of companies and organizations (low middle, and high), with respect to adoption full/half/non from the set of above mentioned IT. The paper includes the literature recherche with IT theme, definition of research methodology, research results, and conclusion with suggestions for future research.

## 2. LITERATURE RECHERCHÉ

The literature recherche was oriented to papers indexed on Web of Knowledge (WoK). The volume of relevant papers that contain in title of paper the key words "information technology" was 18 984 and in the topic of paper 233 728 (on February 16, 2018). The number of relevant papers and content of selected papers in literature recherche confirm that IT general and special selected types of IT are a often mentioned object of research, implementation and utilization in companies and organizations.

In a turbulent world, global competition and the uncertainty of markets have led organizations and technology to evolve exponentially, surpassing the most imaginary scenarios predicted at the beginning of the digital manufacturing era, in the 1980s. Business paradigms have changed from a standalone vision into complex and collaborative ecosystems where enterprises break down organizational barriers to improve synergies with others and become more competitive. In this context, paired with networking and enterprise integration, information systems (IS) interoperability gained utmost importance, ensuring an increasing productivity and efficiency thanks to a promise of more automated information exchange in networked enterprises scenarios. However, IS are also becoming more dynamic. Interfaces that are valid today are outdated tomorrow, thus static interoperability enablers and communication software services are no longer the solution for the future. The paper [1] is focused on the challenge of sustaining networked IS interoperability, and takes up input from solid research initiatives in the areas of knowledge management (KM) and model driven development, to propose and discuss several research strategies and technological trends towards next IS generation.

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United Kingdom local authorities have the responsibility for delivering a wide range of services to the public, which include a number of significant problems in many delivery areas. The IT field is arguably one of the most challenging. Consequently, a senior executive issue is transforming organizations through the deployment of IT. The paper [2] investigates via a case analysis, the rationale for the implementation of an organizational-wide, corporate DMS; and also identifies a set of lessons, enabling and risk factors together with a good practice framework for future DMS deployment, based on a case research to help improve deployment outcomes, information management and organizational transformation. These lessons include a feasibility study, senior executive commitment, aligned business strategy, project management, and improvements to user ownership, training, system utilization, information management processes, printing strategy and post implementation review. The contribution of the research will be of benefit to both academics and practitioners engaged in DMS research and implementation.

Decision support and business intelligence (BI) systems have been increasingly adopted in organizations, while understanding the nature of affecting factors on such adoption decisions need receiving much academic interest. The article [3] attempts to provide an in-depth analysis toward understanding the critical factors, which affect the decision to adopt BI; in context of banking and financial industry. In this regard, it examines a conceptual model that shows the impacts of different technological, organizational, and environmental factors in the decision to adopt BI by a firm. Structural equation modeling was used for data analysis and tests the relevant hypothesis.

Radiologists are among the first physicians to be directly affected by advances in computer technology. Computers are already capable of analyzing medical imaging data, and with decade's worth of digital information available for training. Will an artificial intelligence (AI) one day signal the end of the human radiologist? With the ever increasing workload combined with the looming doctor shortage, radiologists will be pushed far beyond their current estimated 3sec. allotted time-of-analysis per image; an AI with super-human capabilities might seem like a logical replacement. We feel, however, that AI will lead to an augmentation rather than a replacement of the radiologist. The AI will be relied upon to handle the tedious, time-consuming tasks of detecting and segmenting outliers while possibly generating new, unanticipated results that can then be used as sources of medical discovery [4].

Cloud computing (CC) has been established as a technology for providing needs-orientated and use-dependent IT resources, which now are being used more frequently for business IS. Particularly in terms of integration of decentralized cloud systems are providing a stable solution approach. Still, data security is one of the biggest challenges when using cloud systems and a main reason why many companies avoid using cloud services. The question is, how cloud systems for integration of decentralized IS have to be designed, in terms of technology and organization, so that privacy laws of the cloud user can be guaranteed. The contribution [5] summarizes the results of a system comparison of decentralized cloud systems in social networks, requirements analysis based on a literature analysis, and a model for organizational levels of cloud systems, derived from the requirements analysis.

Social media (SM) has become a widely adopted technology over the past decade, affecting organizations in myriad ways. One of the most important is the effect on organizational KM, in which social media overcomes many of the limitations of previous generations of KM. In paper [6] is explored the effects of SM on organizational KM. The SM is not a monolithic class of technologies, but a diverse and evolving technological infrastructure that supports and changes

the way people communicate and collaborate. Key aspects of SM have gone through a technological evolution over the past decade from cloud computing, to mobile technologies, and into analytics. Each of these shifts has distinct implications for organizational KM, many of which have yet to be fully realized. Furthermore, trends suggest that SM will continue to evolve with emerging technologies, such as AI, virtual reality, and augmented reality, which will further influence how organizational KM is practiced.

### **3. METHODOLOGY**

The research used a quantitative methodology that includes specification of the set of often used and relative new IT (see Introduction), using results of the literature *recherché*. The next step was suggestion questions for research questionnaire in the survey. The questionnaire was created using Google Forms and was distributed electronically to various respondents.

The data for the quantitative research are result of questioner with questions that include question about the basic characteristics of the company or organization; questions oriented to IT penetration and implementation new business method. The survey questions are divided into two broad categories - demographic and digital transformation (DT) specific questions. The section on demography had questions that captured company name, number of employees, and location of the respondent. The DT specific questions captured availability of information strategy, availability of IS, and adoption of selected IT and implementation of the new business method.

The obtained data was analyzed using basic statistical analysis, and results are presented in the form of Bar and Pie Charts. The obtained data contains responses only from 60 companies and organizations; this is enough to verify the methodology of research (that will continue).

### **4. RESEARCH RESULTS**

The survey was prepared using an online questionnaire that was set up on platform [www.surveymonkey.com](http://www.surveymonkey.com). The survey ran for duration of 30 days, there was a total of 60 respondents who completed it. Respondents were selected based on the professional profile and work experience, which had to be inclined to persons especially in managerial positions with extensive work experience in the ICT functions of their respective organizations. Respondents were spread across the globe as follows: Netherlands (14), Nigeria (14), United States of America (7), Germany (6), Canada (3), Great Britain (3), Italy (2), South Africa (2), Albania (1), Bulgaria (1), Czech Republic (1), France (1), Kenya (1), Norway (1), Saudi Arabia (1), Singapore (1), and Switzerland (1); 17 countries together.

The survey was not biased towards a specific company size; it covered companies ranging in size from small and medium scale companies and organizations to large multinational corporations with global presence spanning several continents. The survey result indicated that about 70% of companies covered had some form of information strategy implemented, while those that had IS were 63%. The graph in Fig. 1 indicates which of the IT were more adopted within the companies and organizations covered in the survey.

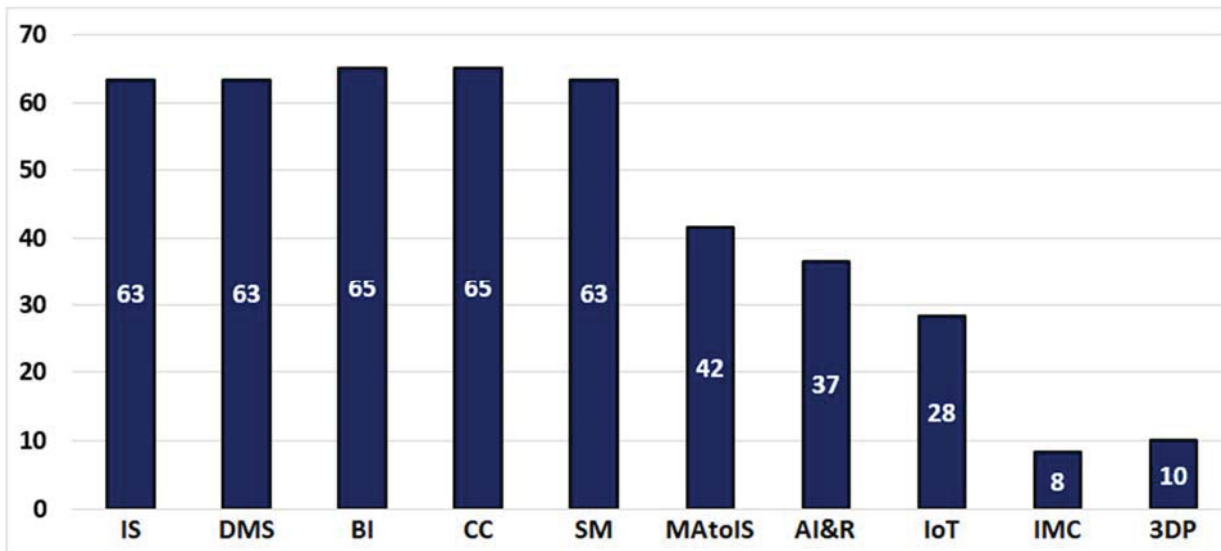


Figure 7: IT penetration in percentage of companies and organizations [Source own]

#### 4. DISCUSSION

With respect to goals of the paper and possibilities of data evaluation (result of questionnaires), was suggested three levels of IT penetration in companies and organizations, see Fig. 2:

1. **Low level:** The company or organization is without IS or has been adopted only one or two IT from analyzed set (17%).
2. **Middle level:** The company or organization adopted 2-5 IT from analyzed set (43%).
3. **High level:** The company or organization has been adopted more than 5 IT from analyzed set (40%).

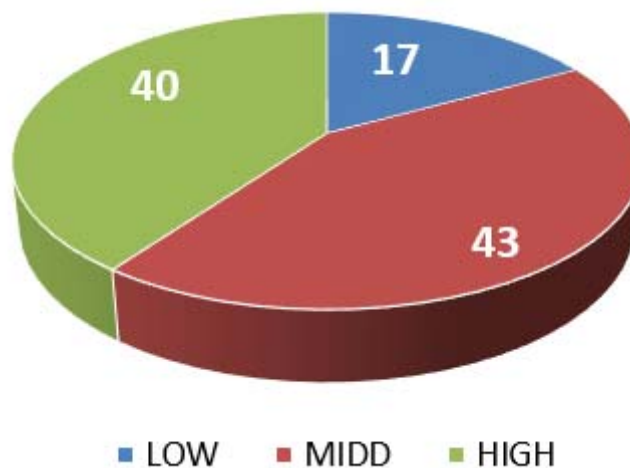


Figure 2: Levels of IT penetration in companies and organizations [Source own]

#### 5. CONCLUSION

In this paper, was aimed to explore IT penetration into companies and organizations in digital transformation era. The research methodology was oriented to quantitative research. The limitation of the research was with respect to volume and branch of the respondents that should not be involved due to small number of returned questionnaires. From the suggested methodology is possible to analyze the levels in IT penetration. The hypothesis of regularly

division respondents of research was not evaluated, see Fig. 2. The research will continue to get more response from the survey and prepare more sophisticated result.

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