

## **BI/ANALYTICS STRATEGY CONCEPTUAL FRAMEWORK: DEVELOPING AN ENTERPRISE-WIDE BI/ANALYTICS STRATEGY**

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### **Extended Abstract**

#### **Introduction**

As Business Intelligence (BI) and Analytics become more entrenched within organizations, it is imperative that organizations develop a well-conceived BI/Analytics strategy to fit their culture. Certainly, with the COVID-19 pandemic worldwide (Liebowitz, J. 2021c), the acceleration for digital transformation among enterprises has greatly increased; whereby, the use of BI/Analytics could help in the decision making process in order for organizations to be more nimble, adaptive, and productive.

Towards achieving this goal, the BI/Analytics strategy and resulting implementation roadmap should facilitate managers in applying their data-driven results and experiential learning (e.g., intuition-based decision making (Liebowitz, et al., 2019; Liebowitz, et al., (eds.) 2019; Liebowitz, (ed.) 2019; Liebowitz, et al., 2018) towards improved decision making. Unfortunately, to date, there doesn't appear to be a conceptual framework on which to develop such an enterprise-wide BI/Analytics strategy. The goal of this ongoing research is to provide such a conceptual framework so that others can further validate and apply this framework for crafting a successful BI/Analytics strategy for their organization.

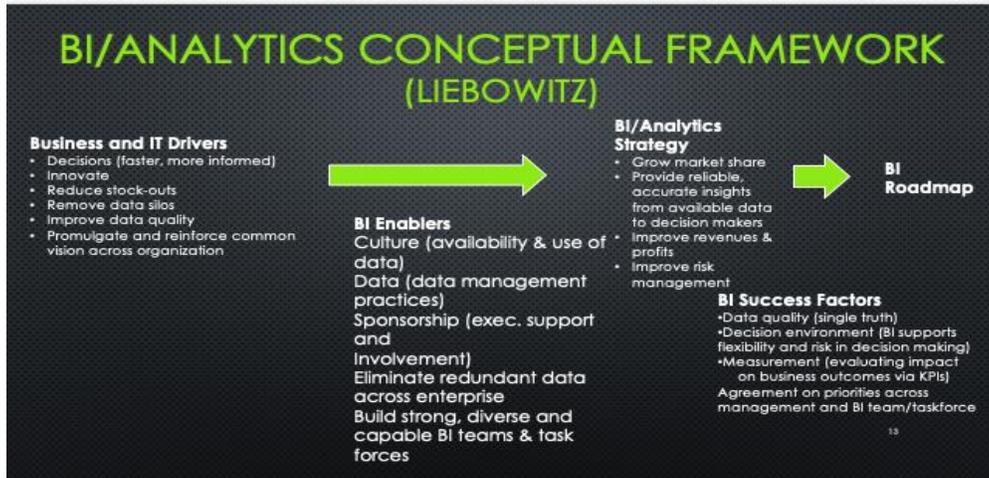
#### **Background**

Since 2012, we have seen a tremendous growth in the development and usage of business analytics in organizations. However, we also have seen many failures as well, pointed out by about 188 references per Reggio & Astesano (2019). Part of the difficulty may stem from not having a well-conceived analytics strategy and underlying conceptual framework (Liebowitz, 2021a, 2021b).

In Vidgen et al. (2017), they used a Delphi survey approach to address management challenges in creating value from business analytics. One of the major issues cited was the lack of a clear data and analytics strategy. Shanks and Sharma (2011) found that the impact of strategy is a key element in creating value from business analytics systems. Holsapple et al. (2014) emphasized the importance and need for a unified foundation for business analytics; hence, providing further fuel for filling the vacuum for a conceptual framework for developing an analytics strategy. Liu et al. (2018) emphasize in their research that actionable intelligence gained from business analytics can be utilized to improved strategic decision making. Rainbird (2019) found that aligning business strategy with business analytics is critical to create value for the firm. Sandosham (2017) discovered that the effective design of the BI/Analytics function in an organization is partly based on strategy considerations. Delen and Ram (2018), in the inaugural issue of the Journal of Business Analytics, indicate the need for further research in building a conceptual framework for developing business analytics strategies.

### Research Methodology and Findings

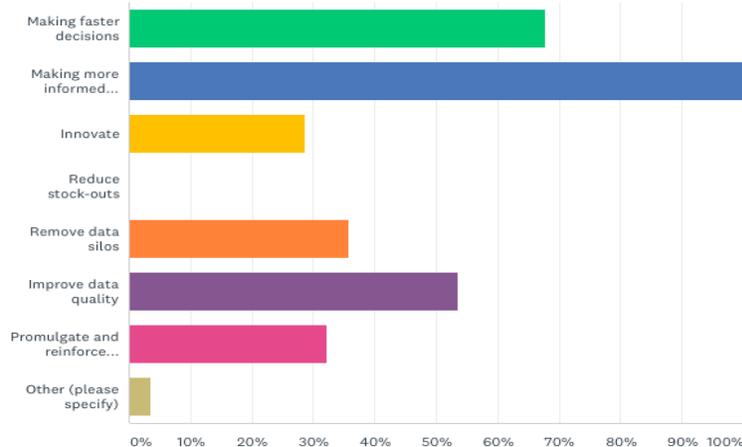
Based on a literature review, interviews with Chief Analytics Officers, and personal experience, the BI/Analytics Strategy Conceptual Framework was developed. To further refine the framework, a Delphi survey was conducted with 11 Analytics experts worldwide. The resulting framework is shown below.



In order to further validate the framework, some doctoral students are starting to apply SEM (Structural Equation Modeling). In the meanwhile, a survey was sent to organizations to gain their insights on their key business and IT drivers, BI enablers, BI/Analytics strategy, and BI success factors. The results are shown as follows:

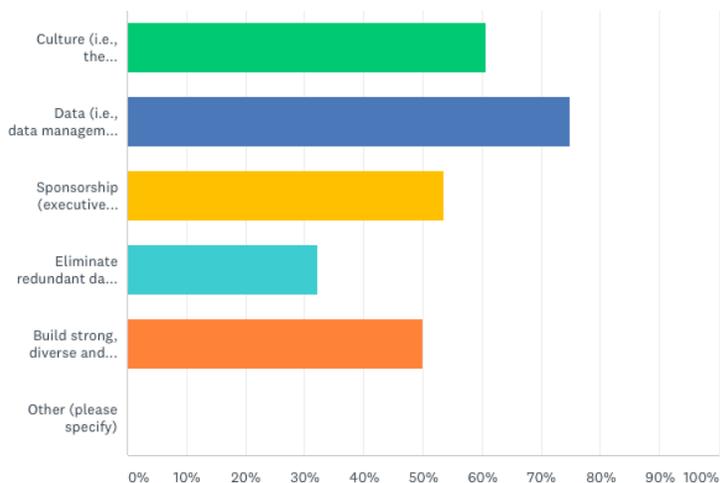
Please check the Business and IT Drivers for developing an enterprise-wide Business Intelligence/Analytics Strategy across your organization.

Answered: 28 Skipped: 0



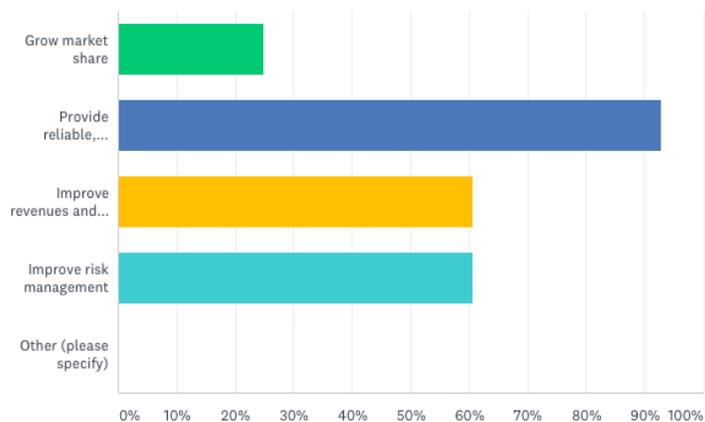
Please check the BI Enablers for developing an enterprise-wide BI/Analytics strategy in your organization.

Answered: 28 Skipped: 0



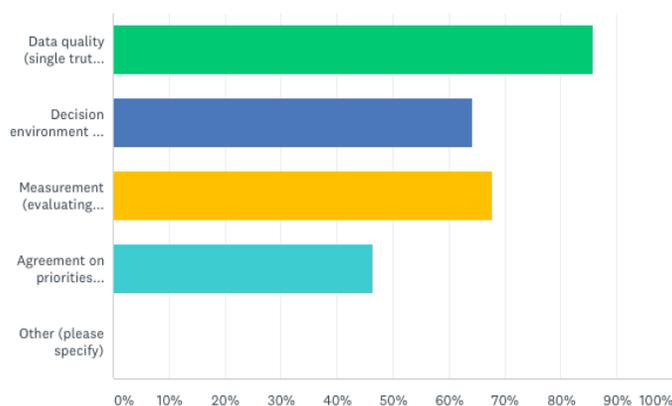
Please check the possible enterprise-wide BI/Analytics Strategy for your organization.

Answered: 28 Skipped: 0



Please check the possible enterprise-wide BI/Analytics Success Factors for your organization.

Answered: 28 Skipped: 0



Based on the survey results of 28 organizations, the leading response for the Business and IT Drivers is making more informed decisions. In terms of the BI/Analytics Enablers, the top response is data management practices, with culture close behind. The main BI/Analytics strategy adopted is providing reliable, accurate insights from available data to decision makers. And, the leading response for the BI Success Factors is data quality.

## Conclusions

The conceptual framework, as proposed, should aid organizations in developing their enterprise-wide BI/Analytics strategy. Further validation and implementation of the framework will be conducted in the near future.

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## **DIGITAL COMPETENCES AS KEY FACTORS IN THE DEVELOPMENT OF THE INDUSTRY 4.0 CONCEPT**

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### **Abstract**

Industry 4.0 is a term that defines changes in society, industry and technology that are related to the digitization of industry, automation, processing and exchange of unlimited data and modern production techniques. This concept in literature is often used alternately with terms such as The Fourth Industrial Revolution or Industry 4.0. and is largely based on a greater involvement of intelligent systems and robots in all sorts of sectors that are able to work longer and more efficiently than humans. The current pace of change and its impact on society is a challenge that humanity has not yet had the opportunity to face. It is precisely this pace of change, and the large-scale digitization, automation and robotization of all aspects of economic and social life, that imposes the obligation to constantly seek and develop the necessary competences during revolutionary changes.

The Fourth Industrial Revolution is not limited to changes in industrial production. Technological disruptions are changing our culture, questioning values that have been recognized for years, affecting trade markets, creating new channels of communication that have not yet been known. In other words, they are revolutionizing our environment and civilization in general (Głomb et al., 2019). Furthermore, due to constant social, economic and technological changes, companies are now competing in changing and unpredictable economic conditions, which means that they are forced to constantly seek and implement innovation (Zakrzewska et al., 2020). Under these conditions fundamental changes are taking place when it comes to the labour market.

The use of robots, artificial intelligence or digital transformation technologies (e.g., Internet of Things, 5G, blockchain, big data) will significantly reduce the demand for employees who perform routine, repetitive activities. It should be underlined, however, that artificial intelligence or robotics will change the characteristics of human tasks rather than make it useless (Davis and Schwab, 2018). It is anticipated that activities such as data collection and data processing have a great risk of automation. On the other hand, the most automation-resistant are the tasks related to managing others (Manyika et al., 2017). Nevertheless, this does not mean that the changes caused by Revolution 4.0 will bypass those in the field of management. Managers are and will be present in all sectors of the economy. Because of their dominant interactions with employees and human resources management, their tasks are difficult to standardize and automate. However, some of their routine activities, such as information collection, data analysis and reporting, are expected to be automated.

The "labour market 4.0" requires more and more effort. Due to the need for organizations to become more innovative, Revolution 4.0 will not only bring increased demand for highly skilled

workers, but will also require employees to continuously develop their skills and competences. Business-integrated technology will require employees to have skills such as advanced cognitive skills for problem solving, skills supporting teamwork as well as combinations of skills related to the ability to adapt quickly and advanced reasoning skills. It should be stressed that the ability to adapt and learn quickly is identified in many publications as one of the key skills of the employee in the era of Industry 4.0 (World Bank, 2019; FDP, 2020; OECD, 2018; Głomb, 2020). All these considerations lead us to the concept of digital competences, which are defined as a collection of knowledge, skills and attitudes necessary to live in the civilization environment around us. They combine basic IT competencies with a range of skills related to the use of devices, platforms and applications with a variety of applications. An important part of them are media competences, allowing to distinguish truth from falsehood on the Internet, critically assess data and information sources, or counter the dangers of using the web (Głomb et al., 2019). Recommendation of The European Parliament and of The Council of 18 December 2006 on key competences for lifelong learning stresses that digital competences are now as important as, for instance, communication in foreign languages or mathematical competence and basic competences in science and technology (2006/962/EC).

In view of such fundamental social changes and the change in the competence profile in many professions, it should be emphasized that the right set of skills and competences is a crucial issue in terms of their proper functioning in the labour market (Jarosz et al., 2020). An important problem is also the readiness of people entering the labour market to the challenges they face in the era of the Fourth Revolution (Deloitte, 2018).

Taking everything into consideration, Revolution 4.0 is equal to a change in approach and understanding the basic and so far, unchanging paradigms. Tasks at the workplace will be completely different, some professions may be completely different and others may cease to exist. The lack of adequate competences necessary for effective work in the digital environment will be a problem for individuals in the labour market, but also, by adopting a systemic approach, will turn into one of the key barriers to the development of Industry 4.0.

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## **SOCIAL RESPONSIBILITY AS AN ELEMENT OF SUSTAINABLE DEVELOPMENT - ON THE EXAMPLE OF THE SMALL AND MEDIUM-SIZED ENTERPRISE SECTOR**

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### **Abstract**

Global companies have long been creating their image as socially responsible acting towards sustainable development. CSR is a holistic concept that includes economic, sociocultural and environmental responsibility, it is a specific element of sustainable development [Ketola 2010, p. 321]. The factor of success in achieving the goals of sustainable development is the attitude and awareness of the importance of the topic. The key is to know and, above all, to understand and be convinced of the benefits and barriers of incorporating strategies into everyday practices. We can distinguish a reactive and proactive approach to the implementation of the CSR concept. Reactive CSR consists in undertaking short-term, scattered, random, unmonitored activities detached from the company's core activities, which are mainly guided by the image-related purpose. On the other hand, a proactive approach to CSR is based on the implementation of carefully planned, long-term, coordinated and targeted activities, the effects of which are monitored. These initiatives are aimed at achieving both social and business goals (Teneta-Skwiercz, 2016).

The aim of the study is to assess the interest of the small and medium-sized enterprise sector in achieving the goals of the SDGs. The work is based on a critical analysis of the literature and empirical research. The specific objectives of the conducted research are to learn about:

- recognition of the approach to the implementation of social responsibility activities in enterprises from the SME sector;
- determination of the degree of implementation of the sustainable development goals in enterprises from the SME sector.

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**COMPARING INTUITIVE THINKING STYLES IN IT AND ENERGY INDUSTRIES\***

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**Abstract**

Intuitive type of decision-making has increasingly fascinated researchers from different disciplines. The role of intuition is significant especially now, in the era of big data with access to large volumes of information, where the decision must be made rapidly. Using intuition can be beneficial to people. It can help make a better decision, develop trust and faith of managers, and strengthen confidence in their judgment and perceptiveness.

One of the hypotheses in the debates on the effectiveness of intuitive decision-making styles in the management literature assumes certain professions have different intuitive styles (Launer, Svenson, and Ohler, *in press*). According to this hypothesis, the interactions of the work environment and the purpose of tasks in the job make intuitive decision-making styles differentiate across professions. In the business, intuition has not been discussed widely in its application to executive decision-making, especially in the Energy and IT industries. For example, the increase of the complexity and uncertainty in the IT industry may require quicker and more intuitive decisions when comparing with the Energy industry with the long term oriented and bureaucratic business conduct which may relatively involve more rational and unconscious decisions.

Thus, the main purpose of this study is to validate a new six-dimension intuition scale (*i.e., rational, intuitive, emotional, unconscious, quick, anticipation*) and explore its structural invariance across Energy and IT industries, intending to test the hypothesis that decision-making styles differ across industry types. The sample was 598 employees working in organizations in the IT and Energy industries from different countries worldwide. To test the measurement invariance, the multigroup confirmatory factor analysis was used. The results indicated that the six-dimensional scale structure is validated and confirmed for the sample. The full configural, partly metric, and partly scalar invariances are ensured for Energy and IT industries, referring that latent factor structures are the same, but factor loadings and factor means are different to a certain extent. Ultimately, with supporting the hypothesis, employees from the IT industry employ more quick, emotional, intuitive, and anticipative, and less unconscious decision-making styles than employees from the Energy industry.

**Keywords:** intuition, intuitive thinking, IT, Energy Industry

## CONSUMER SATISFACTION WITH AESTHETIC MEDICINE SERVICES BASED ON INNOVATIVE TECHNOLOGIES

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### Abstract

In recent years, the aesthetic medicine market is the one of the most continuously developing segments of medical services all over the world. Aesthetic medicine is the interdisciplinary medical science that involves treatments of individual medical specialties such as dermatology, surgery, plastic and reconstructive surgery, gynecology, endocrinology, dentistry, ophthalmology, and many more. The main aim of aesthetic medicine is giving the possibilities to increase the physical attractiveness of the patients and also has a very deep impact on patients' self-esteem and quality of life. Thanks to using innovative medical techniques aesthetic medicine has the possibilities to correct individual facial and body defects by combining comprehensive methods in the diverse medical disciplines.

This article shows the results of the empirical study on consumer's determinants and preferences involves innovative procedures that are being used in aesthetic medicine services in Poland. An individual interview has been used for this study which involves 745 patients of aesthetic medicine clinic in the big city in Poland. Chosen Poland's clinics have more than 500 patients' database. The results of the study enabled to indicate the determinants of the selection and purchase of aesthetic medicine services in Poland. The focus was also on patients' approach to innovative methods and technologies used in aesthetic medicine services, and assessment of the effectiveness of the used technological solutions. Moreover, the results of the study required to select the key determinants affecting the level of the patients' satisfaction after using aesthetic medicine innovative solutions. The key conclusions also concern the relationship between satisfaction and loyalty of consumers using innovative aesthetic medicine services.

**Keywords:** innovation; innovative technologies; aesthetic medicine; satisfaction; innovative aesthetic medicine services; aesthetic medicine services in Poland; medical service; consumer behavior

## INTUITIVE DECISION-MAKING STYLES OF DIFFERENT LEVELS OF MANAGEMENT POSITIONS IN A DIVERSIFIED SAMPLE

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### Abstract

Even though decision-making is the essential element of the management, the types of decisions and their implementations in the organizations entail different thinking styles depending on the requirements of the task, social and physical contexts. In this respect, managers from different hierarchical positions in the organizations may use variety of thinking styles for fulfilling their conceptual, interpersonal, or technical/administrative role requirements. The management literature lacks explanation about management levels and their intuitive decision-making types. The first purpose of the study is to test the reliability and validity of multi-dimensional intuitive decision-making types (*i.e., rational, intuitive, emotional, unconscious, heuristic, anticipation*). Then, the second purpose of this study is to explore the differences of management positions in terms of intuitional decision-making styles in a culturally and industrially diverse sample. The sample was 4119 managers working in organizations in diverse industries worldwide. The main results indicated that the six-dimensional scale structure is valid and reliable instrument for the sample. Furthermore, the findings have presented that the intuitive decision-making styles differ according to management levels. The first-level managers are at the highest level in rational and anticipative decision-making, and use more intuitive, unconscious and emotional styles than middle managers. The middle-level managers use more quick heuristic style than first-level managers. Top managers are at the highest level in slow unconscious decision-making, and use more intuitive and emotional than middle managers. All these results have indicated that decision making styles differ to the degree of management positions in the organizations.

## COVID-19 PANDEMIC, CHALLENGES OF DIGITAL TEACHING SKILLS: A CASE STUDY OF ACADEMICIANS IN KOSOVO

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### Abstract

**Purpose of the study:** In this study we aim to evaluate the experience of teachers with e-learning converted from face-to face into IT based education and how this situation affected their research and scientific engagement as well as their administrative tasks.

**Research problem:** Due to the pandemic Covid-19 teachers in Kosovo and worldwide educational and training institutions had to shift their methodology exclusively online. Although many teachers were actively teaching on IT fields, they were not well equipped to react to the new situation, which obliged them to adapt to an entirely online reality and provide to their students online teaching and learning on online platforms. Covid-19 as a “new normality” represented a challenge to the education sector as one of the most affected area from the Covid-19 pandemic accompanied by the economy.

**Methodology:** We used a cross-sectional, structured, self-administered online questionnaire distributed to secondary and tertiary education institutions.

**Preliminary findings:** The preliminary data (consisting of a 100 teachers sample) indicate manifold results: there is an overall satisfaction with the online teaching and willingness to keep using digital platforms after the pandemics yet teachers reflect hesitation in continuing to work remotely. Concerns were expressed in terms of socialization and that their participation to research and scientific events is impeded. While the majority of academicians are satisfied with the technology used in online teaching the teachers unanimously state that the sudden change in shifting from physical classes into online education was difficult and a challenging event. Finally, we offer comprehensive suggestions to restore and compensate the destruction caused to the students’ learning experience.

## CULTURAL TRANSFORMATION IN THE DIGITAL WORLD - LITERATURE REVIEW

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### **Abstract**

Nowadays, digital technologies, e.g. mobiles, social networks, big data, etc., have become an essential part of our lives. They play a crucial role in our daily lives, even in important areas such as banking or education. Unfortunately, the majority of research remains largely silent on the specifics of culture change in the context of digital transformation. Therefore, this research wants to fill a gap in management theory and practice. It provides insights and derives a characterization of digital culture change as a theoretical basis for future research.

## ANTECEDENTS OF DIGITAL TRUST IN THE CONTEXT OF ONLINE SHOPPING INTENTION

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### Abstract

Despite the many benefits of online purchasing some consumers are unwilling to shop online because of their lack of confidence in retailer fairness as well as all other risks associated with online shopping (Reichheld and Schefter, 2000, Verhoef and Langerak 2001, Shergill and Chen 2005). The purpose of presented study is to examine the relationship between antecedents of digital trust and consumer online shopping intention.

A structured questionnaire using the adopted nine scales was prepared to collect data from the respondents. A total of 475 respondents participated in the study. In order to explore predictors of online purchase intention and predictors of digital trust a multiple linear regression was calculated. An analysis of variance (ANOVA) was conducted to examine the differences in the constructs due to levels of frequency of online shopping.

The findings indicate that Knowledge Based Familiarity; Website Design; Perceived Benefits and Word of Mouth were significant predictors of online purchase intention. The results also reported that high Digital Trust enhanced online shopping.

This study has managerial implications for online retailers and e-marketers. The findings could help the e-commerce to gain better knowledge about the antecedents of digital trust in online shopping in Poland and hence to help to formulate appropriate online sales strategies.

As this is the first such research conducted in Poland, it has set the groundwork for further research.

**Keywords:** digital trust, antecedents of trust, online shopping, online purchasing intention

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**EFFECT OF COMPETENCIES, KNOWLEDGE-ORIENTED LEADERSHIP, AND INNOVATION ON ORGANIZATIONAL PERFORMANCE**

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**Abstract**

The purpose of this paper is to build a model that focuses on components of competencies, knowledge-oriented leadership, innovation, and performance within manufacturing companies to find out, through path modeling, 1) the effect of competencies on innovation, 2) the effect of knowledge-oriented leadership on innovation, and 3) the effect of innovation on performance. Hypotheses were developed and stated. The instrument consisted of four constructs, i.e., competencies, knowledge-oriented leadership, innovation, and performance. Subjects were 377 employees from ten different manufacturing companies in Poland. They were from a pool of lower, middle, and senior management. Collected data were analyzed through SmartPLS 3.0, a partial least square structural equation modeling (PLS-SEM). The results included the assessment of the reliability (indicator reliability and internal consistency) and the validity (convergent validity and discriminant validity) of the research model followed by evaluation of the structural model. The research hypotheses were examined followed by the assessment of mediation between the variables in the model. The theoretical and practical implications of the findings are presented. Conclusions, limitations, and future directions complete the paper.

**Keywords:** competencies, knowledge-oriented leadership, innovation, performance

## A HOLISTIC APPROACH TO E-HRM - AN ATTEMPT TO CATEGORIZE THE BASIC ELEMENTS AND RELATIONSHIPS

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### Abstract

Electronic human resource management (e-HRM) is the latest approach to the implementation of the personnel function of an enterprise. It is a response to changes that take place in the functioning of individual organizations or even entire societies. These changes are shaped by a set of various factors, which include, for example, development of information, and communication technologies (ICT). The use of the latest ICT solutions in the area of human resource management fundamentally changes the way organizations communicate with future employees or making personnel decisions. From this point of view, e-HRM is treated as a kind of "umbrella," covering all possible mechanisms integrating human resource management within ICT technology (Thite, 2019).

Here will be an attempt to categorize the elements that make up contemporary e-HRM systems. Based on the available literature, they include goals, types of e-HRM, and effects (Ruël et al. 2004). In each element, various approaches can be identified, which results in many combinations of e-HRM functioning in practice. For example, e-HRM goals include increasing the strategic role of the HR department, improving employee service, or increasing the efficiency of HR processes. On the other hand, most common types of e-HRM are operational, relational, and transformational. However, the most numerous groups is the effect of implementing the e-HRM concept. They can be classified according to various criteria.

The analysis of the literature on this subject shows that the above elements form the foundations for e-HRM systems, and their discussion should take place before making a decision regarding the purchase of computer hardware, software, or establishing cooperation with an HR service provider. The free selection of elements, in turn, has its consequences in practice, as individual e-HRM systems can be very different, precisely because of the heterogeneous structure. These elements allow, however, one to propose an appropriate classification to e-HR systems, which will greatly facilitate decision-making, e.g., in the area of software selection.

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## ANALOGUE DOCUMENTS METADATA EXTRACTION MODEL BUILDING - A MACHINE LEARNING APPROACH

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### Extended abstract

**Theoretical background:** There are several utilities aimed at publications' content and metadata extraction, such as CERMINE (Tkaczyk, Szostek, Fedoryszak, Dendek, & Bolikowski, 2015) or GROBID (Lopez, 2009). These tools employ machine learning to process digital files; unfortunately, there is no robust solution available for bibliographic metadata extraction from publications, which are only in their analogue form (non-digital).

**Our proposition:** We propose and test the model of procedure that employs neural networks (NN) for the digitisation of photographed pages, conditional random fields (CRF) for data segmentation, and backward and forward snowballing for bibliographic database creation based on data extracted.

**Findings:** Our results are highly suggestive and reveal the applicability of the proposed model consisting of database search to find seed documents, and snowball their references, including analogue documents.

**Implications:** Our solution allows researchers to take full advantage of rigorous literature-based study (e.g., bibliometrics or systematic literature reviews), not restricted by the coverage of extant bibliographic databases. As many currently available bibliographic databases inherit characteristics of the core-periphery model of scientific production (see: Bar-Ilan, 2017), or are unbalanced in their thematic structure, the need for a model for metadata extraction from analogue documents, and subsequently, custom bibliographic databases creation arises, and our model contributes greatly to the development of the research methods based on bibliographic data, including bibliometrics and systematic literature reviews.

**Conclusions:** The adoption of machine-learning is apparent throughout science, technology and business, as we learn how to maximise its usefulness (Jordan & Mitchell, 2015). This is seen in the performance of machine learning in citation parsing (Tkaczyk, Collins, Sheridan, & Beel, 2018). Researchers should take these opportunities automation provides, to rediscover research currently unavailable in bibliographic databases, by extracting data and creating their own purpose-driven databases. This should lead to a more multi-faceted framing of the problem in social sciences, as well as the plurality of possible solutions.

**Funding:** This work was supported by the National Science Centre, Poland, under research project "Exploring social and information networks of Polish management sciences methodology scholars" [grant number 2020/37/N/HS4/01542].

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**THE ADOPTION OF TECHNOLOGIES IN EUROSTAT MEMBERS – HOW AN ORGANIZATIONAL NETWORK DEALS WITH THE BIG DATA CHALLENGE**

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**Abstract**

This article analyzes how the National Statistics Offices (NSOs), Eurostat members, are adopting Big Data technologies (BDTs). Using an exploratory approach, the study uses secondary data and proposes an analytical instrument to identify the earlier and later adopters of BDTs in the Eurostat group. Additionally, propositions to determine the adoption stage of the BDTs in NSOs are discussed. Furthermore, this research's background is the rise of data as a strategic asset in the last ten years before the COVID-19 pandemic (2009-2019). Many terms, such as data science, data-driven, “new petroleum,” took part in organizations' operations around the world. A specific group of organizations, NSOs, was affected by this phenomenon, also called the data era. Those official data providers had to adopt different technologies to access, store, analyze, and disseminate vast amounts of data, commonly defined as Big Data. In Europe, the Big Data hype affected the NSOs, members of the Eurostat. In a world submitted by lockdowns and restrictions to social movements, Big Data technologies are one alternative to NSOs keep working their primary surveys and the census operations. However, EUROSTAT's NSOs are dealing with Big Data adoption in different stages. This reality can influence the following EUROSTAT results, like an organizational network, and its users, the European citizens. This article is organized into six sections: introduction, literature review, methodology, cases and analysis, discussion, and conclusion.

## AN OPPORTUNITY TO BREAK A BARRIER OF INFORMATION GAP WITHIN SCIENCE-BUSINESS COLLABORATION IN POLAND

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### Abstract

In Poland, a country with population of almost forty million people, exist several hundred higher education units employing in total over 65 thousand R&D personnel representing different scientific fields, like: natural sciences, engineering and technology, medical and health, agricultural and veterinary, social sciences or humanities and arts. Currently, every significant research centre is seeking cooperation with business. One of the key problem in this process, is information gap. Universities are trying to fill this gap on their own but with different effects. Business interest in collaboration with science sphere is still low. Recently, as a result of a bottom-up initiative, a nationwide cooperation network was established under the name of the Polish Association of Centres for Technology Transfer (PACTT). The main purpose of this paper is to analyse process of PACTT functioning as an efficient mechanism supporting technology transfer in Poland. The results of desk research and in-depth individual interviews with representatives of studied Association allow to confirm that its activity significantly contributes to reducing information gap in science-business relationship. However, it does not solve a number of other key problems that hinder the dynamic commercialization of scientific results, such as: difficulties related to institutional environment in running R&D business, deficiency of human resources or imperfection of motivation system. An attempt to find the answer on how to meet these difficult challenges requires a separate detailed analysis. Author of the paper proposes to root further research in the New Institutional Economics theory. Such an approach would allow for a comprehensive examination of the significance and mutual correlation of formal and informal conditions, dependent and independent on the entrepreneur, which determines success of implementing new knowledge into the economy.

## TAKING CARE OF DIGITAL INITIATIVES: MANAGERS APPROACHING INDUSTRIAL DIGITALIZATION

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### Extended Abstract

In the context of industrial digitalization, access to Industry 4.0 technologies (I4.0), such as AI, Internet of Things, and cloud computing, can no longer be considered a source of competitive advantage in itself (Skog, 2019). Instead, the competitive advantage is described stemming from the combined effects of numerous digital innovations (Hinings *et al.*, 2018), realized through manager's trajectories. Digital innovations do however not occur in a vacuum within organizations, they often stem from grass-roots initiatives which allow for creativity, trial and error, and shop-floor experiments, etc. (Kohli and Melville, 2019). Hence, innovation appears to play an important role, given that most organizations are no longer subjects to restricted access to technology (Nylén and Holmström, 2015). Although, the role of digital initiatives in leveraging I4.0 technology is consolidated on strategy literature, this article addresses the mediating role of dynamic capabilities in environments where industrial digitalization is an urgent phenomenon to approach.

The development of a deepened understanding of dynamic capabilities concerning innovation may constitute the differentiating factor when firms need to overcome the challenges of an industrial sector that is elusive (Lasi *et al.*, 2014; Zheng *et al.*, 2020). The Dynamic Capability Framework (Teece, 2007) is applied to reveal organizations' capabilities addressing industrial digitalization concerning strategy formulation takes place (Teece, Pisano and Shuen, 1997; Teece, 2007; Warner and Wäger, 2019). The framework consists of three broad core organizational capabilities: sensing opportunities, seizing opportunities, and transforming opportunities. Lately, an emergent stream of researchers has applied the framework for mediating the understanding of innovation in relation to digitalization (Forsman, 2011; Kindström, Kowalkowski and Sandberg, 2013; Hanchi and Kerzazi, 2020).

This paper primarily aims to contribute to an understanding of the relationship between managers perception of digital initiative and the leverage of I4.0 technologies as a means of innovation (Lundh Snis *et al.*, 2019). Given that initiative has become a key element in industrial digitalization, the research question that permeates this extended abstract is: To what extent the dynamic capability framework can mediate the relationship between digital initiatives and the perceived performance of manufacturing companies within the context of industrial digitalization?

To answer the means of this paper a qualitative case-study approach was applied (cf. Kohlbacher, 2006), interviewing 20 managers within a global gas turbine company located in Sweden. The

company was in its early stages of the industrial digitalization process. Thus, giving prevailing study access to postulating understanding of industrial digitalization.

Early findings show most of the managers perceived seeking operationalized examples of how digitalization could be an opportunity for more prosperous production. They described digitalization as elusive and abstract. Managers tended to speak process-oriented focusing on business cases, forcing initiatives too fast into existing structures. Some managers were not willing to capture digitalization initiatives if not benefits and values were specified in means of a business case. They described it as necessary to avoid an overload of different unfitting initiatives. On the other hand, the need for a formal business case was by others described as hindering and thus not cultivating small-scale or bottom-up initiatives. Initiatives seemed to challenge traditional ways of working and transcend organizational structures. For example, some managers described it easier for blue collars to avoid formal procedures when one wanted to be creative or try out an initiative. Further, it was also described as being unclear whom or which function was responsible for being the receiving part for initiatives.

Tentative conclusions point towards a relationship between perception of digital initiatives within the organization and reinforcement of dynamic capabilities in the context of industrial digitalization. The dynamic capability framework recognized organizational capabilities as both limiting and supporting. Early conclusions suggest traditional structures oppose an organization's ability to take care of initiatives in terms of capture, cultivate and initiate. In other words, the organization may not lack recognizing digital innovation as a successive independent factor. Instead, prevailing organizational capabilities seemed to impede managers' ability to address and act upon digital initiatives. In other words, the organization struggled taking care of digital initiatives.

This article contributes to the literature and development of dynamic capabilities related to industrial digitalization. Further, it contributes insights about the necessity of accommodating digital innovation by taking care of digital initiatives within the digital strategy formulation.

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**Keywords:** Initiative, Digital Innovation, Industrial Digitalization, Dynamic Capability framework, Management

## GENDER AND EQUITY CROWDFUNDING: THE EFFECTS OF PRIOR FUNDING SOURCES

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### Abstract

Equity crowdfunding has emerged as an important mechanism for entrepreneurs to obtain funding. Recent research suggests that women-led equity crowdfunding campaigns receive less funding than men-led campaign funding. Expanding this research, this study examined whether the percentage of women in an entrepreneurial team impact campaign funding while controlling for the gender of the equity crowdfunding campaign leader. Drawing data from an equity crowdfunding site, preliminary analyses show that as the percentage of women in a team increases, the amount of raised funding reduces even if the gender of the entrepreneur lead were controlled. Further, we examined the moderating influence of the amount of funding from distinct sources (investors, own and friends) on the relationship between the percentage of women in an entrepreneurial team and funding raised in equity crowdfunding campaigns. Results show that the amount of prior funding from investors facilitated funding obtained regardless of the percentage of women in an entrepreneurial team. However, the amount of prior own and friends funding exacerbated the negative effect of women percentage in an entrepreneurial team on raised funding in equity crowdfunding. By contrast, for men, there was no effect of prior own funding on funding. In addition, there was a smaller negative effect of prior funding from friends on raised funding in equity crowdfunding for men than for women. These results suggest that biases toward women in raising funding via equity crowdfunding persist. This research provides implications for women and men entrepreneurs as they attempt to raise funds for their ventures in an equity crowdfunding platform.

**Keywords:** gender, sources of prior funding, funding raised, equity crowdfunding

## DIFFERENT TYPES OF INTUITION AT THE WORKPLACE - A LITERATURE REVIEW

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### Abstract

Today intuition is beginning to be seen as a widely accepted decision-making approach. People working in the private sector and public administration, emergency doctors, firefighters, police officers as well as priests, yoga and meditation teachers, seem to have a peculiar propensity to use intuition. Inquiries on the use of intuition often leave out people's occupational context. This paper aims at describing the underlying principles and theoretical underpinnings of the research on intuition in the workplace. A new combinational, multi-dimensional approach is used based on theories and common principles such as rational choice theory (deliberation), intuitive decision-making, emotional decisions (e.g. gut feeling), quick heuristic decisions, slow unconscious thinking, and anticipation (RIEHUA approach). The methodology is a systematic literature review. It analyses English-language publications from recent years, mainly from Elsevier, Springer, Wiley, and EBSCO research databases. The management literature lacks an explanation of different intuitive decision styles in an integrated model, to facilitate applied research at the workplace. The theory is based on the newly developed intuition model by Marcial/Launer (2019), Launer/Svenson/Ohler/Ferwagner/Meyer (2020), and Launer/Fatih (2021). The purpose of this article is to provide a solid foundation for the EFRE research project "Rationality, Heuristics, Intuition and Anticipation (RHIA)" financed by the European Union and the State of Lower Saxony, Germany.

## EMPLOYEE WELLBEING AND DIGITAL WORK DURING COVID-19 PANDEMIC FROM THE PERSPECTIVE OF POLISH EMPLOYEES

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### Abstract

Corporate Social Responsibility (CSR) is oriented towards conducting business activities with the aim to pursue both economic results and social interests. A socially responsible enterprise responds to the expectations of its stakeholders, among which employees occupy a key position. Such a company strives to meet the needs of employees. Incorporating CSR into human resources management may be a way of integrating employee well-being within the workplace (Celma, Martinez-Garcia, & Rayaa, 2018). The digitalisation of work results in changes in the relationship between employees and employers and affects employee well-being. Information technology allows workers to perform tasks effectively when away from the workplace and away from colleagues and supervisors. In the COVID-19 pandemic, individuals whose could perform digital work were directed to home offices. This paper fills a research gap on the impact of remote work on employee well-being. The aim of this paper is to explore the dimensions of employee well-being and to analyse the relationship between remote work and the identified components of employee well-being.

### Basis of the study

Well-being, i.e., the state in which a person feels good, is healthy and happy, is associated with functioning in all spheres of life, among which work activity and professional functioning play a special role. A three-dimensional model (Van De Voorde, Paauwe, & Van Veldhoven, 2012) is used in research on employee well-being in human resource management. It includes the following components: health, happiness and relationships (Price, Grant, & Christianson, 2007). Diagnostic instruments targeting employees cover multiple dimensions: quality of life, meaning of work, likelihood of burnout, severe fatigue, work-life integration, suicidal ideation (e.g., Employee Well-Being Index (eWBI) (Dyrbye, Satele, & Shanafelt, 2016). The Gallup and Sharecare Well-being Index scale consists of the following five items: sense of purpose, social relationships, financial security, relationship to community, and physical health (Roy et al., 2018).

The research is conducted using data collected using the CAWI method in January 2021 on the sample of economically active Poles (N=1000). Exploratory Factor Analysis allows to isolate the three components of employee well-being: workplace relationships, physical and mental health, and work-life balance. Logistic regression models are estimated to determine the impact of remote working on the identified employee well-being factors.

### Findings

Research has confirmed that exclusive remote work negatively affects an employee's work-life balance. Employers seeking to support employees' work-life balance should avoid exclusive

remote working in favour of hybrid solutions - combining remote working with presence at the workplace.

Remote working performed fully or 1-2 days per week reduces the likelihood of a high-rating for workplace relationships. The situation is analogous in the case of hybrid work with a predominance of office work (remote work limited to 1-2 days per week). The conducted research showed that there was no relationship between physical and mental health assessment and remote working.

### **Implications and conclusions**

The conducted research filled the gap in proving significant relationships between digital work and employee well-being. They proved the significant impact of remote working on workplace relationships and the employee's ability to maintain a work-life balance. These findings provide important information of applied importance, indicating desirable ways to shape well-being programmes in organisations.

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**Keywords:** Corporate Social Responsibility, employee well-being, digital work, COVID-19

## A NEW INTUITION MODEL IN THE WORKPLACE: TESTING PSYCHOMETRICS OF AN INSTRUMENT ON A MULTICULTURAL SAMPLE

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### Abstract

In the management literature, there is a gap in empirically testing different intuitive decision-making styles simultaneously to verify how they interact. The proposed basic decision-making principles, forming the intuition model are rational, intuition, emotional, fast heuristic, unconscious, and anticipation. The purpose of this study is to explore the validity and reliability of a newly developed model for measuring intuition in the workplace. This model proposes to measure intuition in the workplace, emphasizing these six dimensions.

The sample was from a global study with 5,579 employees from different industries and countries worldwide. For the validity, the explanatory and confirmatory factor analyses were conducted for determining the latent factorial constructs. For reliability, internal consistencies were calculated based on the items loaded on the factors. The results showed that explanatory and confirmatory factorial constructs have confirmed the fit of six different thinking style dimensions. After excluding inconsistent items, a total of 16 questions described six dimensions. The factorial construct also ensured the reliability of the instrument by providing higher-level internal consistencies. All the findings have demonstrated that the proposed instrument is valid and reliable for testing multidimensional intuition thinking styles in the workplace.

The theory is based on the two EFRE research projects “Digital Trust & Teamwork (DigVert)” and “Intuition (RHIA)” of Launer et al (2020) financed by the European Union and the State of Lower Saxony, Germany. The database was from the empirical follow-up project “Digital Trust & Intuition at the Workplace” (n = 5.500) of Ostfalia University (Marcial / Launer, 2019). The model was pre-tested with a tesol test, test retest (Germany and Philippines, n = 83), and pre-test (n = 376) in nine languages by Launer / Marcial / Gaumann (2020), test retest (Marcial / Launer (2021), and hypotheses derived in a pre-test (Launer / Svenson / Ohler, 2020).

## EXPLORING INTUITIVE DECISION-MAKING DIFFERENCES IN VARYING INDUSTRIES FROM A WORLDWIDE SAMPLE

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### Abstract

Intuitive decision-making is a prominent concept in the managerial literature featuring common properties of unconscious, holistic, associative, and fast thinking. Although organizational scholars have proposed various perspectives to explain intuition, there is a need to synthesize the findings and develop a multi-dimensional approach for understanding its mechanisms. Our new multi-dimensional approach is based on theories and common principles such as rational choice theory (deliberation), intuitive decision-making, emotional decisions (e.g. gut feeling), quick heuristic decisions, slow unconscious thinking, and anticipation (RIEHUA approach).

This paper aims to describe the underlying principles and theoretical underpinnings of intuition in the workplace, and explore whether different intuition types are dominant in varying industries. We argue that (R) Rational and analytic decisions are being made by analysts from banks, in wholesale, and in basic industries (chemical commodities). (I) intuitive decisions are predominant at emergency doctors, police, fire brigade, priests and esoteric, Sports, Yoga. (E) Emotional decisions (gut feelings) prevail as well in police and fire brigades, sports, yoga, and the healthcare sector. (H) Fast heuristic decisions are predominantly used by police/security guards, firefighters, emergency doctors, and logistics, wholesale, as well as retail stores. (U) Slow unconscious thinking is applied dominantly in the Chemical industry, Manufacturing, and Farming, Bio Tech and Pharmaceuticals. (A) Anticipation or pre-cognition decision style is pre-dominant by priests, spiritual people as well as yoga and meditation teachers.

We have used a multicultural sample consisting of 4103 individuals from 28 different industries. In the first step, we have explored our proposed multi-dimensional intuition model and found a structural confirmation of six different types of intuition. In the second step, we have tested our hypotheses based on the confirmation model. The one-way analysis of variance (ANOVA) tests were used to identify possible differences among mean scores of industries. The results affirming all hypotheses showed that intuitive decision-making styles are significantly different across industries, and there is a dominant intuitive decision-making style in a specific sector.

The theory is based on the two EU financed research projects “Digital Trust & Teamwork (DigVert)” and “Intuition (RHIA)” of Launer et al (2020). The database was from the empirical follow-up project (n = 5.500) “Digital Trust & Intuition at the Workplace” (Marcial /Launer, 2019) of Ostfalia University and Silliman University (Philippines). The model was pre-tested with a tesol test, test retest (Germany and Philippines, n = 83), and pre-test (n = 376) in nine languages by Launer / Marcial / Gaumann (2020), hypotheses derived in a pre-test (Launer / Svenson / Ohler, 2020) and a test retest by Marcial / Launer (2021).

## RESEARCHING DIGITAL TRUST AT THE WORKPLACE – A LITERATURE REVIEW

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### Abstract

Organizations today are very much entering the digital transformation stage, so the issue of mutual trust in the digital world is becoming increasingly important. All the more so as the essence of the phenomenon is the drive to automate many processes and data flows, raising concerns among both customers and company employees. Digital trust in the workplace needs to be built from the ground up, at every level of the organization. The process of consciously building digital trust in the workplace will result in a more effective organization.

This paper presents a guided tour on Digital Trust evaluation through literature-research. The article aims to present a selective literature review of digital trust theory synthetically and identify research gaps and future research directions on Digital Trust. The paper is based on a systematic literature review. It analyses English-language publications from recent years, mainly from Elsevier, Springer, Wiley, and EBSCO research databases.

The first part of the article discusses definitions of the term Digital Trust and theories used to explain this issue. The second part of the literature research was based on the theoretical framework for measuring digital trust at the workplace developed by Launer and Marcial (2019). So far, studies of the core items of the framework concerning four areas: People, Information Technology, Digitalization Process, and Digital Environment are discussed in the article (core model by Launer / Cetin (2021).

Despite the numerous studies undertaken on building trust within organizations and between an organization and its stakeholders, there is still a clear gap in the literature regarding digital trust research at the workplace. Fragmentary knowledge regarding the influence of particular items of the framework on digital trust level at the workplace is evident.

The article concludes by signaling limitations and possible directions for further research. The purpose of this paper is to improve the theoretical foundation of the EFRE research project “Digital Trust and Teamwork (DigVert)” financed by the European Union and the State of Lower Saxony, Germany as well as the global follow-up project “Digital Trust at the Workplace” (Marcial / Launer, 2019).

## INTUITION OF PUBLIC SERVANTS

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### Abstract

Integrity focuses on the decision-making behavior of the participants in governance; misconduct ‘might be caused by different characteristics of the involved individuals’ (Huberts 2018). We tackle individual differences through looking at decision-makers’ cognition. Through our survey, we grasp public servants’ preferences for using intuition or more rationalistic approaches in decision-making.

The proposal contrasts behavioral differences between public servants and employees in the private sector (Andersen 2010). Behavioral dimensions are investigated including decision-making style (intuition, thinking, and feeling) and personality traits. An analysis of global data from 5000 employees from outside and within the European Union reveals significant differences in behavior between the two groups.

We are looking deeply at the use of intuition in decision-making of public servants. There are already some models highlighting how public servants (e.g. Edlins 2019) can use empathy. We contribute to this line of research by displaying to which extent intuition is used in decision-making of public servants. Intuitions are feelings. Using own feelings to make decisions appears as a condition for being able to understand and share others’ feelings (Downey, Papageorgiou & Stough 2006). We argue that for a public or nonprofit administrator to be competent in practicing wisdom, the use of intuition in decision-making is an important condition. Through training programs that highlight using mental simulation to enhance empathy competency in the use of intuition increases.

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## THE BASIC AND EXTENDED CONSTRUCTS OF DIGITAL TRUST MODEL AT THE WORKPLACE

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### Abstract

The purpose of this study is to explore the validity and reliability of a newly developed instrument for measuring digital trust in the workplace. The basic model proposes to measure digital trust in the workplace, emphasizing the people, technology, and processing factors. The extended model integrates the company's environment factor to the basic model.

The sample was from a global study with 5,580 employees from different industries and countries worldwide. For the validity, the explanatory and confirmatory factor analyses were conducted for determining the factorial constructs. For the reliability, internal consistencies were calculated. The results showed that explanatory and confirmatory factorial constructs confirmed the fit of three basic dimensions associated with covering the proposed ten sub-dimensions. The 10 dimensions are described by 50 questions. The extended model was also confirmed by adding the company's environment factor in the construct. The extended model reached 11 sub-dimensions described by 53 questions with some modifications. The factorial construct also ensured the reliability of the instrument by providing higher level internal consistencies. All the findings demonstrated that the newly proposed instrument is valid and reliable for measuring digital trust in the workplace.

The digital trust in people, technology, processes, and the company's environment are the key factors for describing electronic confidence in a company. This paper also provides a synthesis of the quality literature by identifying the four most critical factors for measuring digital trust in the workplace.

The theory is based on the two EU financed research projects "Digital Trust & Teamwork (DigVert)" and "Intuition (RHIA)" of Launer et al (2020). The database was from the empirical follow-up project (n = 5.500) "Digital Trust & Intuition at the Workplace" (Marcial/Launer, 2019) of Ostfalia University and Silliman University (Philippines). The model was pre-tested with a tesol test, test retest (Germany and Philippines, n = 83), and pre-test (n = 376) in nine languages by Launer / Marcial / Gaumann (2020), a test retest for digital trust (Marcial / Launer, 2021) and hypotheses derived in a pre-test (Launer / Svenson / Ohler, 2020).

**SOCIAL MEDIA AND TRUST IN DIFFERENT AREAS OF LIFE - A SYSTEMATIC LITERATURE REVIEW**

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**Abstract**

Social media have become a very popular communication channel around the world, supporting the creation of social and business relationships. Thanks to them, their modern users are in constant contact with many recipients at the same time, regardless of whether it is a contractor or a family, no matter where they are currently located in the world. They can share their experiences, knowledge and information, which they later use in their private and professional lives. Social media have also been trusted by users in a specific way. The aim of the study was to present the relationship of trust in various areas of social life in the space of social media. A systematic literature review on trust and social media was carried out. In selected articles, the connection between social media and trust was noted, which is particularly important in the group of young SM users. The conclusions formulated in the article may contribute to a more in-depth approach to the issue of trust in the area of social media.

## ANALYSIS OF CRISIS-RESISTANT TOURISTS THROUGH THE LENS OF HOTEL REVIEWS ON TRIPADVISOR

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### Abstract

The current situation of the COVID-19 pandemic is influencing almost all the economy sectors in nearly every country. Pandemic-induced changes on the markets translate into impediments, causing deterioration of strategic and operational conditions for business. Without a doubt hotel industry belongs to the most affected ones (Gursoy and Chi, 2020). Lock-downs, limitations in free movement of tourist, and other administrative restrictions severely impacted travelling, and thus also functioning of accommodation providers (Yu, Lee and Hyun, 2021).

However, in the periods, when the restrictions were somehow mitigated (although still not waved completely), there was a group of tourists ready to resume their travel activities even if it was burdened with additional stress and obstacles (Gursoy, Chi and Chi, 2020). This group of tourists, with higher risk tolerance, can be called “crisis-resistant” (Hajibaba *et al.*, 2015). This characteristic makes the group particularly valuable target for hoteliers, as the restrictions induced by the pandemics are going to stay in power for some, unpredictable time. For this reason, learning about crisis-resistant tourists should be one of the top priorities for hoteliers.

Having this in mind, the aim of our research was to learn about and understand ‘crisis-resistant’ tourists. We decided to look at them through the lens of eWOM which this group creates and – to some extent – also consumes. We used web-scraping method to acquire 1239 reviews posted on TripAdvisor by tourists travelling in the times of COVID-19, together with related information (feedback from other tourists and from hotel managers – if existed).

The analysis of the collected material proved, that this group treats issues related to the pandemic as any other aspect of the hotel performance and usually accepts them. The very important finding was that all the pandemic-related burden over hotel stay did not have any negative impact on the hotel performance evaluation. We also discovered a more disturbing circumstance, this time not related to tourists, but rather hotel managers, who failed to respond timely and adequately to the negative comments, although a timely response is of key importance in times of crisis.

The situation now is very demanding as far as hotel management is concerned, and the return to the full recovery may take years. It means, that the only way to survive is rediscovering new modes of functioning while relying on the customer group, which is ready to face some additional burdens and risks while travelling. Our research contributed to building understanding of this highly desired ‘crisis-resistant’ group of tourists, which can be a foundation for the in- and post-pandemic future of many hotel facilities. However, to benefit from this group hoteliers should concentrate

more on the digital space, as any kind of negligence in this field may have a severe, negative impact on the survival of the hotel objects.

**Keywords:** crisis-resistant tourists, eWOM, hotel reviews, COVID-19, TripAdvisor

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## SOCIAL MEDIA USE FOR REMOTE LEARNING DURING COVID-19

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### Abstract

Social media are widely used, especially due to the fact that they offer the possibility of sharing all pieces of information available to users, as well as allow for quick interactions. One can identify a remarkable number of studies on the use and functioning of social media, as well as focusing on their impact on human health and behavior. Nevertheless, it has to be stated that only few articles on social media touch upon the issue of learning via social media. Alternative methods of learning based on the use of IT-related solutions have been implemented by universities around the world as an answer to the current pandemic-related situation.

Remote learning introduced as a result of the COVID-19 pandemic requires searching for new solutions with regard to knowledge sharing and acquisition. One of ways of integrating the community of students - for learning purposes, but not only - is to take advantage of social media. Therefore, it seems sensible to examine the impact of the COVID-19 pandemic on the use of social media for the needs of remote learning. The point of focus of this paper is to analyze the determinants influencing attitudes of students using social media for the purpose of learning. The paper predominantly focuses on communication-related functionalities, as well as the commitment and skills of students when it comes to using social media. The willingness to utilize social media, ability to solve scientific problems thanks to them, and the availability of educational materials have been all checked. Moreover, the usefulness of social media has been compared to traditional sources of knowledge, such as libraries.

The examination has been conducted on a sample of several hundred students from various universities located in Poland. The results have shown the ease of use and a positive impact on improving the quality of remote learning of social media. The vast majority of respondents has additionally confirmed the increased use of social media in comparison to the pre-COVID situation. It has confirmed a formulated thesis stating that the utilization of social media for the purpose of remote learning during the pandemic can be truly helpful.

**Keywords:** Social Media Technology, Learning Styl, Higher Education, COVID-19, E-learning

## **FACTORS INFLUENCING BIG DATA ANALYTICS CAPABILITIES OF SMALL AND MEDIUM-SIZED ENTERPRISES: A QUALITATIVE STUDY FROM GERMANY**

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### **Extended abstract**

#### ***Theoretical background***

While big data analytics (BDA) has brought up new possibilities for strategic decision-making which is well taken by companies in diverse industries (Halper & Krishnan, 2013, p. 5; Popovič, Hackney, Tassabehji, & Castelli, 2018, p. 210; Tutunea & Rus, 2012, p. 867), small and medium-sized enterprises (SMEs) are still lagging behind and are not using their full potential (Parra, Tort-Martorell, Ruiz-Viñals, & Álvarez Gómez, 2019, p. 156). Building on resource-based theory and its idea of resource orchestration for capability-building (Barney, 2001, p. 54), while acknowledging for the influence of external factors according to dynamic capabilities view (Teece, 2007, pp. 1341–1344), there is lack of comprehensive studies concentrating on both firm resources and environmental factors supporting big data analytics (BDA) implementation in SMEs.

#### **Proposition and methodological approach**

As such, the main purpose of the research project was to explore the driving and hindering factors for BDA implementation in German SMEs in form of the (internal) firm resources and the (external) environmental factors to build a comprehensive framework for capability-building. Based on a resource-based view for capability-building, we utilise a qualitative approach to conduct in-depth interviews with experts and process the obtained data with the computer assisted qualitative data analysis software MAXQDA.

#### ***Findings***

It has been found that certain BDA capabilities are needed, which rely on firm resources and are influenced by environmental factors. In terms of firm resources, 18 relevant resources have been identified in the categories of physical, organisational, and human capital. Furthermore, seven environmental factors have been found influencing the process of BDA implementation. This study has built a framework presenting a list of relevant resources and factors responsible for the BDA implementation process in SMEs. The development of BDA capabilities follows the concept of resource orchestration and adaption according to the dynamic and diverse situation of SMEs, thus, requiring a holistic consideration of the presented framework.

#### ***Discussion***

Credibility of the findings is strengthened by a comparison to studies on BDA capabilities of large companies (e.g. Comuzzi & Patel, 2016, pp. 1468–1492; Gupta & George, 2016, pp. 1–58), specific SMEs characteristics (e.g. Kumar et al., 2012, pp. 141–143; Reker & Andersen, 2014, p. 5), and the SME-specific barriers of BDA implementation (e.g. Coleman et al., 2016, pp. 2157–2158; Parra et al., 2019, p. 156).. While several similarities can be found to the available literature, this study uncovers differences on the micro level accounting for the specific characteristics of SMEs.

## Contribution and implications

This study contributes to the discussion of influencing factors (e.g. Moonen, Baijens, Ebrahim, & Helms, 2019, p. 27; Park & Kim, 2019; Sun, Cegielski, Jia, & Hall, 2018, p. 6) and capabilities (e.g. Liberatore, Pollack-Johnson, & Clain, 2017) for BDA implementation in recent scientific literature, while adding to the rich literature on resource-based capability-building. By making use of the proposed framework, SMEs shall be enabled to identify critical firm resources and influential environmental factors to successfully implement BDA. This study contributes to the demystification of BDA understanding and the breaking down of barriers inherent in SMEs to support the BDA adoption. By exploring the firm resources and environmental factors, it shall form a foundational step into the direction of BDA capability-building and enable SME managers to take strategic actions towards BDA adoption. SMEs are enabled to detect and configure their core resources and also be sensitised for the range of relevant resources and factors, which need to be thought through.

## Conclusion

Although the potential of BDA for SMEs is depicted in literature, these companies are still lagging behind and not using their full potential (Parra, Tort-Martorell, Ruiz-Viñals, & Álvarez Gómez, 2019, p. 156). While several studies started the discourse on SME-specific BDA implementation (e.g. Coleman et al., 2016, p. 2152; OECD, 2020), a holistic framework for BDA implementation has not been developed yet. As such, this study lays the foundation for future research to further investigate this relevant topic.

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**Keywords:** Big data analytics, small and medium-sized enterprises, capability-building, firm resources, environmental factors

## EFFECTS OF THE COVID-19 PANDEMIC ON ICT USAGE BY ACADEMICS

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### Abstract

The COVID-19 pandemic has altered and/or disrupted academic work. Information and communication technologies (ICTs) have played a pivotal role during the pandemic (Myers et al., 2020; Trogisch et al., 2020). In many countries, COVID lockdowns triggered discussions on the usage of ICTs in academic exchange (Bottanelli et al., 2020; Fink, 2020; Weissgerber et al., 2020). The scale and speed with which academics adapted ICTs for collaborations, meetings, communication, conferences, projects and lectures revealed that ICTs can substitute many of the in-person interactions in the academic workplace (Byrnes et al., 2020; Kligler-Vilenchik et al., 2020; Schwarz, et al., 2020; Utof, 2020).

The major premise of the paper is to recognize differences in the usage of ICTs by academics to support their work in the periods before, during and after the COVID-19 pandemic. This study examines the ICT usage in two types of academic work, i.e., research and teaching. We tackled four essential questions about the usage of ICTs by academics in the context of the COVID-19 pandemic. First, how are ICTs used in research in the periods before, during and after the COVID-19 pandemic? Second, are there any differences in the usage of ICTs in research in the aforementioned periods? Third, how are ICTs used in teaching in the periods considered? Fourth, are there any differences in the usage of ICTs for teaching in prior to, during and after the pandemic?

To gain insight into the defined research issues, we conducted a survey, which was distributed between June 11, 2020 and August 18, 2020. This led to 982 responses. After screening the responses and excluding outliers, 476 usable, correct and complete responses from Poland and abroad were collected and subjected to further analyses.

Our research findings are focused on two issues.

First, the results show that during the Covid-19 pandemic academics have worked more than before the pandemic. More specifically, before the pandemic, the research-related work was indicated as the main area of academics' work followed by teaching. However, during the pandemic, the shift was noticeable and resulted in academics spending most time on teaching than on research-related work.

Second, the results on ICTs show that there were big differences in ICTs used in research and teaching between the periods before and during the Covid-19 pandemic. This is particularly noticeable in e-learning platforms and communications apps. Furthermore, the academics have anticipated that after the pandemic ICTs will be used in a greater scope than before and during the pandemic. The results on the differences in ICT usage in research between Poland and non-Poland academics show that, regardless of the time span, non-Poland academics used ICTs more often before and during pandemic than Poland ones. However, both Poland and non-Poland academics assume that the ICT usage after the pandemic will not come back to the level which they had experienced before the pandemic and that ICTs will be employed in a much greater scope after the pandemic. Regarding the teaching, the results show that, during the

pandemic, Poland academics more frequently used ICTs than non-Poland ones, especially communication apps and e-learning platforms. Similarly, they predict that, after the pandemic, ICTs will be employed in teaching in a greater scope than it was the case before the pandemic. The study contributes to the ongoing research on the influence of the COVID-19 pandemic on the academic work, especially research and teaching. We argue that ICTs are not meant to substitute in-person interactions entirely, but rather reshape how academics research and teach. We expect hybrid approaches to research and teaching to emerge, which combine digital and in-person interactions, and an increase in digital communication and collaboration between geographically distant academic communities. We conclude that the time has come for the digital interaction to be part of a new approach to academic work.

Our research findings can be used by academic communities for planning and modelling a new hybrid approach to research and teaching at universities around the world.

The limitation of the study is primarily related to the sample size, which did not allow the results to be generalized to the entire population of academics. A limitation that may affect the research results is also the 5-point Likert scale, which determines the possibility of making analysis.

**Keywords:** COVID-19 pandemic, Academic work, Teaching, Research, ICT

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