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REVIEW PAPER

WAYS OF IMPROVING UNIVERSITY AND ENTERPRISE COOPERATION IN B&H

Aldina Šogolj[1], **Nataša Tandir**[2]

[1] ***International Burch University***, *Sarajevo, Bosnia and Herzegovina*
[2] ***International Burch University***, *Sarajevo, Bosnia and Herzegovina*

Correspondence concerning this article should be addressed to Aldina Šogolj, International Burch University, Sarajevo, Bosnia and Herzegovina. E-mail: aldina.sogolj@gmail.com and Nataša Tandir, International Burch University, Sarajevo, Bosnia and Herzegovina. E-mail: natasa.tandir@ibu.edu.ba

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ABSTRACT

Today's fast growth has made it difficult for businesses to react to market demand if they depend only on their capabilities; thus, many businesses seek to collaborate with universities to innovate, enhancing their innovation capacity and competitiveness. In addition, the institution will commercialize its scientific research to accomplish the desired win-win partnership. In this paper, university-enterprise cooperation serves as the context for a review of the impact of various factors on the innovation performance of university-enterprise collaboration. The review is divided into three aspects: cooperation network structure, spatial geography, and social factors.

The inadequacy of engineering students' professional characteristics and technical abilities to match work requirements is a significant issue. For this reason, universities and universities are actively studying and revising the present people training model to discover solutions to an issue in which the university-enterprise partnership model is growing in popularity. University enterprise collaboration method may meet the purpose of staff training, increase the vitality and strength of operating universities, and raise the level and quality of operating universities and education. Simultaneously, it will help satisfy the demands of social and economic growth, supply firms with high-quality resources, and address the issue of engineering student employment in universities.

Keywords: University-Enterprise Cooperation, Innovation Performance, Influencing Factors, higher education

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INTRODUCTION

Industry-University Partnerships were first implemented in the United States and Canada in 1906 and 1957, respectively, through co-op programs in engineering programs (Haddara & Skanes, 2007). Universities - enterprise cooperation refers to the contact between any aspect of the higher education system and industry with the primary objective of promoting knowledge and technology transfer1 (Bekkers & Freitas, 2008; Siegel et al., 2003). UEC has a long history (Bower, 1993; Oliver, 2004) as a method for companies to grow their knowledge base (Cricelli & Grimaldi, 2010). The United States (Lehrer, Nell, & Garber, 2009), Japan (Woolgar, 2007), Singapore (Lee & Win, 2004), and European Union countries (Lee & Win, 2004) have all seen considerable growth in these partnerships in recent years (Barrett, Austin, & Mccarthy, 2000; Powers, 2003; Gertner, Roberts, & Charles, 2011). This growth has been linked to industrial and academic pressures (Meyer-Krahmer & Schmoch, 1998; Giuliani & Arza, 2009). Pressures such as fast technological development, shorter product life cycles, and fierce global rivalry have drastically altered the competitive climate for the majority of businesses (Bettis & Hitt, 1995; Wright, Clarysseb, Lockett, & Knockaertd, 2008). Regarding universities, pressures have included the expansion of new information, the difficulty of growing expenses, and financial issues, which have imposed significant resource loads on universities for them to stay at the forefront of all academic fields (Hagen, 2002). In addition, universities are under increasing public pressure to be seen as economic development engines and less as fulfilling the larger social mission (education and knowledge production) they have had in the past (Blumenthal, 2003; Philbin, 2008). These demands on both sides have increased the impetus for establishing UECs that seek to boost innovation and economic competitiveness at institutional levels (nations and industries) via information exchange across academic and commercial areas (Perkmann et al., 2013). Moreover, UEC has been generally seen as a viable instrument for building organizational capacity in open innovation — when a company uses external networks to produce creativity and knowledge (Dess & Shaw, 2001) as an alternative to conventional internal R&D. (Harvey & Tether, 2003).

Due to the rapid development of economic globalization and information technology, it is difficult for businesses to adapt to the changing market demand based solely on their capabilities. As a result, businesses should collaborate extensively with various objects for innovation activities, including suppliers, competitors, users, universities, and research institutions, the scientific research strength of which cannot be overlooked. This cooperation model reduces the cost of innovation and the risks faced by enterprises to a certain extent; universities play a role in bolstering the promotion of technological innovation, and they can also commercialize scientific research; university-enterprise cooperation has good complementarity, so it has attracted widespread interest from all walks of life. Based on this environment and related academic research, this study reviews innovation performance aspects primarily from the network, space, and social perspectives on university-business collaboration.

The nations considered to be industrially developed have elevated collaboration between private business and public research institutes to the position of a significant policy goal. At the same time, academics who study innovation economics have researched the many modes in which public-private interaction might take place. Since the 1980s, there have been more studies on how to help transfer technology, improve public research results, and use these results. These first concentrated on the idea of the national innovation system (Freeman, 1987; Lundvall, 1992; Nelson, 1993), and then in the 1990s turned to examine the regional innovation system (Cooke et al., 2004), as well as the "triple helix" model of national development (Etzkowitz & Leydesdorff, 1998), which presented close interaction between the three spheres of public research, industry, and government institutions as the ideal method for increased innovation and regional development

Collaboration between the public and business sectors in research is one of the primary channels via which technology is transferred. This phenomenon has been the subject of research from a few different studies. In general, these studies explore the links between universities and industries along two primary dimensions: the contribution of universities to the creative activities of industry or how the relations produce and actualize (D'Este & Patel, 2007; Muscio, 2010). One line of inquiry has focused on possible personal and institutional motivations, and it has viewed collaboration as an exchange relationship that benefits both partners (Meyer-Krahmer & Schmoch, 1998; Manjarrés-Henrquez et al. 2009).

More prominent universities are perceived by businesses that have just begun the process of looking for potential partners as being able to provide larger research groups and a more comprehensive range of academic specializations. While this is happening, another study has shown that more prominent businesses, as opposed to smaller ones, are more likely to participate in collaborative efforts (Fontana et al., 2006; Segarra-Blasco & Arauzo-Carod, 2008). Studies that adopt a "gravitational model" (Ponds et al., 2007) also show that the capability for collaboration between pairs of public research institutions and private enterprises from different systems (meaning, for example, from different territories) depends on the product of their respective masses, as well as on the square of the distance between the pair (Ponds et al., 2007). Lee and Mansfield (1996) support that even if a university's reputation is influential, geographic distance is a deciding factor. This is likely due to the expenditures that are connected with traveling to a farther location.

Additionally, Lindelof and Lofsten (2004) showed that proximity to a university encourages exchanging information and ideas through official and informal networks, which benefits emerging technology-based businesses. Meanwhile, excellence in universities in a particular region has positive consequences for innovation, which even extend to neighboring regions (Jaffe, 1989; Jaffe et al., 1993), while the flow of knowledge from the public sector to industry weakens progressively with increasing distance (Arundel & Geuna, 2004). In general, the frequency of collaborations between partner pairs diminishes at an exponentially faster rate the more apart those pairs of partners are from one another (Katz, 1994).

Europe's academic and industrial collaboration landscape is characterized by its diversity. Because of their organizational structures and cultures, companies and universities approach technology management from quite different vantage points. Cooperation between businesses and educational institutions is a relatively new development that is still in its infancy (Unger et al., 2018; Jarábková, Chreneková, and Roháiková, 2019). There is still a substantial amount of space for greater and more intensive collaboration between universities and enterprises; nevertheless, challenges still exist in terms of trust and understanding of the operation on both sides (Roud & Vlasova, 2018). Despite this, there is a lack of adequate models or theoretical frameworks to comprehend how clients and other stakeholders collaborate with businesses to produce value (Frow et al., 2015). Recent years have seen a significant shift in research focus, emphasizing case studies involving well-known institutions and giant multinational corporations (Edmondson, 2012). A limited number of studies have considered the possibility of collaboration between academic institutions, small and medium-sized businesses, and non-governmental groups.

The University-Enterprise-Cooperation (UEC), also known as Industry-University Partnerships (Smith et al., 2018) and Academia-Industry Cooperation (Shapira & Rosenfeld, 2011), is a pedagogical form of education approach and thinking that focuses on the cultivation of graduates with a high level of innovation capability and practical skills through the full utilization of resources from the university and company/industry (Liu & Zhong, 2011). According to Russell and Stouffer (2003), many undergraduate programs that produce construction professionals were not designed to prepare students to be competent and successful project managers. Therefore, the university, the construction industry, professional organizations, and the government should build a comprehensive partnership to cultivate construction professionals with solid leadership abilities (Toor & Ofori, 2008). The American Society of Civil Engineers (ASCE) also realized this issue and created the practitioner-in-residence program for civil engineering students. It was suggested that engineering schools build their practical capabilities, which may be accomplished through working in the construction business and networking with active engineers (Koehn, 2004).

Moreover, the National Academy of Engineering (NAE) produced a paper in 2005 titled Educating the Engineer of 2020 that underlined the need for industry and academic partnership in producing engineers with strong theoretical foundations and practical experiences (NAE, 2005). Gann (2001) argued that academic researchers typically publish in refereed journals. In contrast, refereed journals are not the most appropriate means of producing research output for applied research in construction-related fields, either for advancing knowledge or disseminating it to the construction industry. Shapira and Rosenfeld (2011) found that collaboration between academia and the construction industry was crucial to the success of an innovative research and development (R&D) project and that the R&D endeavor could not be accomplished without this cooperation.

Higher education institutions and businesses both stand to gain from working together, and because cooperation fosters the dissemination and exchange of information, it also makes it easier to form lasting business relationships (Guan & Zhao, 2013). In the process of innovation, it is also increasingly highlighted the importance of collaboration between science, information, and technology (Rebelo et al., 2015; Unger & Meiran, 2020) and that, in the advanced industrial economy, there is a strong integration of the activities of science and technology systems. The ability to work together effectively is rapidly becoming a significant source of competitive advantage. However, there are certain flaws in the knowledge transfer process, particularly concerning communication and collaboration between institutions and businesses. These flaws affect both parties' capacities for innovation and jeopardize the collaboration's success. However, key factors present in the interaction determinants that, once identified and adequately addressed, will assist in managing collaboration between universities and businesses, thereby making it more profitable and a source of value for both parties and society.

Businesses in Bosnia and Herzegovina primarily collaborate with universities to gain access to more qualified graduates. In addition, they emphasize the desire to gain access to new technologies and improve their reputation. In addition to collaborating for organizational reasons, they collaborate to affect society. This is the bottom line for business involvement at UEC: impacting meaningful improvements in education quality throughout the entire tertiary education system, acting with its educational resources, and producing more graduates who meet the business needs.

THEORETICAL BACKGROUND

Business leaders are being challenged by an intensifying level of competition, globalization, shifting technical landscapes, and a new way of thinking strategically. It is necessary to combine limited resources to reach a critical mass to accelerate the introduction of innovation into the market. Innovation is not only the act of coming up with new ideas; it is also the product of intricate social interaction, communication, and information sharing. Innovation in the context of the global economy is defined as the capacity to generate new ideas and translate those ideas into new goods and processes with commercial value. The ability of civilizations to innovate is becoming increasingly important in determining their health and prosperity.

Science and technology are emerging as essential drivers of competitive advantage. Culturally diverse and varied cultural configurations should stimulate creativity, which is vital for generating new knowledge and ideas. The more mature and advanced an economy gets, the more creative it has to be to keep up with the ever-increasing amount of information, innovation, and creativity that it is capable of absorbing. This supports the formation of "creative knowledge spaces," which may be defined as surroundings, contexts, and surrounding regions that have a favorable impact on human beings who are participating in a creative activity.

1.1 University enterprise cooperation models

Modalities and perspectives of university enterprise cooperation (UEC) include various forms of research and development, the mobility of students, faculty, and staff, curricular cooperation, and adult education. Todtling and Trippl describe the differences between peripheral, formerly industrial, and metropolitan areas and the resulting € issues. Understanding the diversity of policy perspectives is essential for appreciating their strengths and weaknesses. In the United Kingdom, Crespi et al. (2011) found that increasing incentives for academics to patent and seek financial returns may not be desirable above a certain threshold because they publish less and connect with companies through other channels less frequently. De Fuentes and Dutrenit (2012) systematized conventional inquiries, including why research organizations and businesses work together.

Universities and businesses' knowledge exchanges (UEC) are two very different approaches to knowledge exchange that substantially affect intellectual property protection, the number of industry partners, and the nature of the results. Ankrah and Al Tabaa (2015) advocated for a comprehensive, methodical evaluation of UEC. Various factors, including necessity, reciprocity, and effectiveness, are used to evaluate the differences between the two approaches. The fifth element comprises variables that promote UEC, such as money, incentives for cooperation, and the legal framework. The sixth section comprises UEC's results, including revenue and product patents. Some researchers attempt to determine which organizational factors correlate with the collaborative style of a productive team member (Bozeman et al., 2012).

1.1.1. The Triple Helix model

The Triple Helix model asserts that the potential for innovation and economic development in a knowledge-based society lies in a more prominent role for the university. The model emphasizes the relationship between differentiation and integration in forming the industry-academia-complex government system. The change to an entrepreneurial university comes from academia's "inner logic" and can be seen as an improvement, not a perversion of education. The entrepreneurial university can be viewed as an evolutionary process comprised of two interrelated dynamics. Exogenous factors include commercial opportunities in research and the emergence of entrepreneurial research groups.

The "first academic revolution" was the process by which universities came to view research as equally crucial to their mission as teaching. Government policies that sought to strengthen ties between universities and society, particularly business, were a major driving force.

1.2 University enterprise cooperation benefits

A new vision of business R&D management emerged in the 1990s, focusing on integrating learning and research into corporate strategy. Businesses have formed new alliances (partnerships, cooperative programs, consortia with universities, government laboratories, and other companies) to gain access to external sources of technology and knowledge. In this era, openness to collaborative research ceased to be viewed as a company's weakness and became a crucial form of knowledge acquisition. As a result of the European Union's (EU) decision to become the most competitive economy in the world, university-business cooperation has become a popular area of study. Universities grew from a simple information factory focused on new outputs to a regionally active, entrepreneurial-relational university with industry ties and publicly and privately funded research contracts.

1.3 Benefits for the university

Universities have become more involved in socioeconomic development and commercialization of research output. Some attribute it to declining government funding for academic research and changes in funding flows. Others see it as a consequence of the shifting social division of labor between academic and business R&D. New institutional structures and organizational forms have emerged at the university-business interface. An entrepreneurial university has new management and marketing functions more tailored to the private sector.

Strategically, the university adopts a strategic mindset, invests in priority fields, closes ineffective study programs, and develops market-responsive curricula. In practice, collaboration with industry indicates market competitiveness for education services, training, and research. We observe entrepreneurial activity in the transfer of knowledge in Europe; universities utilize research to stimulate economic growth and regional development.

1.4 Benefits for the students and society

UEC is defined as any engagement between HEIs and businesses for mutual gain (Davey et al., 2011) and is considered a key driver of knowledge-based economies and communities. UEC not only assists HEIs in addressing some of their most pressing challenges, such as the need for capital and innovation but also significantly impacts the local economy. To improve employment, productivity, and social cohesion in Europe, it is necessary to strengthen the bonds between the public sector, private sector, and HEIs. Most organizations, especially SMEs, lack the financial and human resources necessary for systematic innovation. UEC can give SMEs access to new knowledge, technology, procedures, and talent to attain and maintain a competitive advantage. It can assist educators in meeting the needs of the labor market by providing graduates with more relevant knowledge and skills, thereby increasing their employability.

1.5 The entrepreneurial sector's readiness to cooperate with academic institutions

There is still a substantial gap between the knowledge created by researchers and the knowledge used in practice. European universities have the potential to significantly increase their appeal because partnerships have become a top priority. The "European paradox" refers to the contrast between the continent's high research capacity and its inability to transform that knowledge into innovative products. Collaboration between researchers and businesses can be achieved through various channels, but it is crucial to emphasize the importance of trust to initiate and maintain the relationship. When negotiators have mutual trust, they are

more likely to develop a plan for value creation and problem resolution. The next step is understanding the factors determining the collaboration's ultimate success (Rajalo & Vadi, 2017).

2. UNIVERSITY ENTERPRISE COOPERATION IN EUROPE

The report "The state of European university-business cooperation" (EC, 2011) details the status of the eight forms of cooperation in the Member States. Collaboration in R&D is the most prevalent form, and commercialization of results requires appropriate legislation and support mechanisms. The ERASMUS program is an instrument that facilitates the temporary or permanent transfer of students from one university to another or from the university to the business world. The European University-Business Forum (UB-Forum) was established in 2008 as one of the most significant EC-level responses to supporting dialogue for UEC. The Forum was established to assist the academic and business communities in achieving regular and sustainable dialogue, exchange, sharing, and learning. This project aims to contribute to that growth by enhancing knowledge of the current state of UEC in Europe.

2.1 University enterprise cooperation in Albania

Albania's Higher Education Institutions (HEIs) need to increase their role in local and regional social and economic development, authors argue. University-industry collaboration can increase the opportunities for bachelor's, master's, and doctoral students to collaborate on projects, work with industry representatives, and find employment in the industry sector. A lack of information is the primary factor hindering cooperation between universities and businesses.

2.2 University enterprise cooperation in Montenegro

Relationships are the driving force behind UEC development in Montenegro. Academic and HEI administration is primarily motivated by the UEC's existence of a shared objective and mutual trust. In Montenegro, UEC-supporting mechanisms are perceived to be more developed than the European average. For non-cooperating academics, the most significant barrier to UEC cooperation is the dearth of business personnel with scientific knowledge.

3. UNIVERSITY ENTERPRISE COOPERATION IN BOSNIA AND HERZEGOVINA

3.1 Period before 1992

After World War II, Yugoslavia became one of the six republics that constituted the Federal People's Republic of Socialist Federal Republic of Yugoslavia. Despite recurrent persecution, universities remained sites of critical thought, social protest, and political activism. Yugoslavia changed its research policy after the Infoburo fight and invested heavily in atomic and nuclear scientific research to develop an atomic bomb. HE development in Bosnia and Herzegovina began after the First World War, but Yugoslavia hindered it. In 1946, the first university was founded, followed by universities in major cities nationwide. By 1975 there were four universities and several of their branches, and by 1980 there were 53. The HE system was an exclusively state-funded and -controlled system of education for 45 years.

3.2 After Dayton period

Bosnia and Herzegovina's HE system is by far the most complex in the Western Balkans, primarily because of its administrative structure. The pre-war network of four universities has evolved into three separate HE systems under the jurisdiction of the RS and Brcko District, or, in the case of FBIH, the ten cantons. There is no ministry responsible for higher education at the level of BiH, but each of the 10 cantons has its ministries of education.

3.3 University Policy Framework for Promoting Entrepreneurial Activity

The strategy identifies issues in entrepreneurial education, with a lack of communication between the business sector and universities being the most significant. Entrepreneurial education was not identified as a component of university-level curricula in 2012 (before the plan's adoption) This provides insight into the emergence of entrepreneurship as a value in education systems after 2012.

3.4. University innovation and entrepreneurship in Bosnia and Herzegovina

The number of higher education institutions in Bosnia and Herzegovina has changed dramatically over the past 15 years. Public research institutes with a mission-oriented focus have been shut down, privatized, or left with unclear legal standing.

Entrepreneurship is not a priority for private institutions, while beneficial changes have occurred in recent years at public universities. Many companies in Bosnia and Herzegovina rely primarily on external resources for R&D, and most have collaborated with highly regarded researchers. There is little study or data to explain the motivations that motivate university professors and academics to collaborate individually with businesses. Before 1992, primary funding for public universities was derived from the public budget, and there is a shortage of data regarding charitable foundations and professional groups that provide financing for research from private sources such as businesses.

CONCLUSION

Globalization, increasing competition, changing technology, and new strategic thinking are challenging business leaders. Innovation is the ability to create and commercialize new ideas. Cultural diversity should inspire creativity, which is essential for innovation. University enterprise cooperation models involve research and development, student, faculty, and staff mobility, curricular cooperation, and adult education. Appreciating policy strengths and weaknesses requires understanding their diversity.

Crespi et al. (2011) found that above a certain threshold, academics may not benefit from patenting and seeking financial returns. De Fuentes and Dutrenit (2012) systematically asked why research organizations and businesses collaborate. Universities and businesses' knowledge exchanges (UEC) differ greatly in intellectual property protection, industry partners, and results. Ankrah and Al Tabaa (2015) urged systematic UEC evaluation. The Triple Helix model suggests that a more prominent university role in a knowledge-based society will boost innovation and economic growth. The "first academic revolution" saw universities view research as important as teaching. Government policies to strengthen university society, particularly business, pushed it.

In the 1990s, business R&D management emphasized integrating learning and research into corporate strategy. University-business cooperation is popular due to the EU's goal of becoming the world's most competitive economy. Due to declining government funding for academic research and funding flows, universities have become more involved in socioeconomic development and research commercialization. An entrepreneurial university has a strategic mindset, invests in priority fields, closes ineffective study programs, and develops market-responsive curricula. UEC—HEI-business collaboration for mutual benefit—drives knowledge-based economies and communities. Strengthening public-private-HEI ties will boost European employment, productivity, and social cohesion. UEC can provide SMEs with new knowledge, technology, procedures, and talent to gain and maintain a competitive edge and help educators meet labor market needs by providing graduates with more relevant knowledge and skills.

Researchers' knowledge and the entrepreneurial sector's willingness to collaborate are still far apart. Trust is key to starting and maintaining research-business collaboration. Understanding how the collaboration will succeed is the next step. "The state of European university-business cooperation" (EC, 2011) describes eight forms of Member State cooperation. R&D collaboration is the most common, and commercialization requires legislation and support.

The European University-Business Forum (UB-Forum) was founded in 2008 to help academics and businesses maintain regular and sustainable dialogue, exchange, sharing, and learning. This project seeks to improve European UEC knowledge to support that growth. Albanian university-business cooperation Albania's Higher Education Institutions (HEIs) need to play a larger role in local and regional social and economic development, and university-industry collaboration can help bachelor's, master's, and doctoral students collaborate on projects, work with industry representatives, and find jobs in the industry. The ERASMUS program helps students move between universities or into business. Scientifically literate businesspeople are the biggest obstacle to UEC cooperation.

Due to its administrative structure, Bosnia and Herzegovina's HE system is complicated. The pre-war network of four universities has become three separate HE systems under the RS, Brcko District, or FBIH's ten cantons. Over the past 15 years, public research institutes have closed, privatized, or lost legal status, reducing the number of higher education institutions. Private institutions don't prioritize entrepreneurship, but public universities have improved. Few studies have examined why university professors and academics collaborate with businesses.

This study examines academic-business collaboration in Albania, Bosnia and Herzegovina, and Montenegro. Public universities collaborate with businesses less than private universities, while private companies collaborate with universities more than state companies. The study aims to understand university-business cooperation at all levels. The Sustainable University-Enterprise Cooperation for Improving Graduate Employability/SUCCESS project collected the data. Research hypotheses were tested using the Pearson chi-square test.

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ORIGINAL RESEARCH PAPER

THE IMPACT OF NEW TECHNOLOGIES ON THE CONNOTATION OF AUDIT PROFESSION

Bojana Vukovljak[1], **Nina Peter**[2]

[1] ***University of Applied Sciences Burgenland***, *Eisenstadt, Austria*
[2] ***University of Applied Sciences Burgenland***, *Eisenstadt, Austria*

Correspondence concerning this article should be addressed to Bojana Vukovljak, University of Applied Sciences Burgenland, Eisenstadt, Austria. E-mail: 2119001106@fh-burgenland.at and Nina Peter, University of Applied Sciences Burgenland, Eisenstadt, Austria. E-mail: 2119001104@fh-burgenland.at

ABSTRACT

Blockchain is increasingly conquering the finance sector. Blockchain technology enables a decentralized, distributed registry with durable and traceable data access in real time. Due to this, business processes are transforming.
Currently the work of an auditor is predominantly retrospective and focuses on the accuracy and consistency of a company´s financial statements. Real-time data accessibility would alter this.
The purpose of this paper is to understand how digital revolution affects audit profession. In this regard, the focus is emphasized fresh possibilities and associated difficulties.
Research published in financial journals provide the foundation of this paper and shows, that many companies are consulting firms such as the Big Four KPMG or Deloitte on the potential impact of technological advances. There are preparations and accompaniments for the implementation of new technologies. Besides the literature review, a quantitative content analysis is elaborated.
The analysis indicates, that well-known auditing firms and companies are actively investigating blockchain and are already launching the first initiatives to implement the new technologies. The relevance of Blockchain is noticeable present. However, there are uncertainties about the current legal framework and the rapid pace of change due to digital revolution. Thus, this research can add new dimensions on audit profession and, particularly, express the benefits and opportunities of Blockchain as part of the auditing process.

Keywords: digitization, Blockchain, audit profession, accounting

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I. INTRODUCTION

With the rise of new technologies like blockchain, traditional audit services are being challenged and compelled to reconsider their practices. Since it is already assumed that blockchain will have an impact on a variety of economic sectors and their business processes, this will result in a new auditing foundation in the future. What makes it so intriguing for the auditing profession is that this innovation has the potential to free up resources to dedicate to greater detail in the auditing process itself. Manipulations comparable to those in the Wirecard scenario could become obsolete or be drastically reduced. Current events such as the still ongoing scandal regarding the Wirecard Group are probably the best known and most recent examples of failed financial management. However, prior to this crisis, the media wrote positively about Wirecard. According to experts, the company had outstanding staff, a solid business model, cutting-edge technology, and adequate resources to ensure a bright future (Kleine Zeitung, 2021). This type of statements about the once wealthy financial services provider are no longer common. The company declared bankruptcy in 2021. Accounting fraud is alleged to have occurred. Balance sheets were fabricated with fictitious sales to get larger bank loans and reflect a greater market value.

Subsequently, the company´s auditor received criticism too. There have been questions over whether the annual audit should have caught the balance sheet's manipulation.

Advancing digitalization and developments, such as blockchain, can create the possibility to provide considerable benefits in situations like these. Presently, the auditors' abilities are limited. The auditor is reliant on the standard and volume of the paperwork that the client provides. Of course, any evidence the auditor thinks relevant for a proper audit or for the purpose of a diligent audit may be requested from the legal representatives (IWP & KWT, 2022), but if these are falsified, there is a residual risk that the auditor will not recognize the falsification despite excellent expertise. The unchangeable access to real-time data enabled by blockchain technology is redefining the audit profession's options. Fresh chances are provided, while on the other hand uncharted threats arise. Hence, audit profession needs to actively adapt and change.

Since the introduction of blockchain and the growing understanding of its applicability to several processes in various industries, auditing and the auditor's role have particularly come into attention (EY Americas, 2019). Especially when there is constant discussion about how this technology has the potential to transform and modify many industries (Was sind die Chancen und Risiken der Blockchain?, n.d.). Real-time reporting, immutability, traceability, and many other features of blockchain technology make this system appealing to this segment of the business. Numerous of these advantages could facilitate the audit process and permit the auditor to concentrate on pertinent areas of the audit (Garanina et al., 2021). Which would significantly increase the quality of these processes and make them more accurate (Abdennadher et al., p.56). This, in turn, would have the advantage of preventing economic events like 2008 from occurring, because visibility would be available in many ways (Tapscott, & Tapscott, 2016, pp.151-152). It should be noted that this is not only about the audit process, but also about the customers' new business models. Knowledge of new business models, which are becoming increasingly relevant, is rising to the forefront, and posing a challenge for auditors. Understanding and creativity in relation to this innovation are becoming more and more essential to the assessor's duties. Furthermore, the significance of these technology advancements is not missed on the world's active auditing groups (Blockchain and its potential impact on the audit profession, n.d.). This is evident from the fact that collaboration is being entered into with huge technology behemoths to research and acquire knowledge in this area. This is exemplified by the collaboration between KPMG and Microsoft. The goal is to combine the experience of both organizations to investigate future potential and areas of application (KPMG And Microsoft Announce New Blockchain Nodes, 2017). This also emphasizes the significance and seriousness of potential impending blockchain reforms.

Thus, the current state of information leads to the basic hypothesis of this study, which is that Blockchain will simplify auditing work and gain greater significance in this area. The purpose of this paper is to investigate in the various economic implications of digitalization on the audit profession and consequently, highlight current technology trends like Blockchain. The first part focuses on a literary review and description of blockchain technology and the accounting field. Following that, the methodology of applied quantitative research is explained. The fourth part summarizes the findings

followed by a discussion section. The presentation of findings includes an interpretation of the quantitative research and an analysis of the Big Four's stances on this issue. A conclusion forms the last section.

II. LITERATURE REVIEW

i. The present scope of audit profession

The framework requirements for auditors' activities in Austria are regulated by the *Wirtschaftstreuhandberufsgesetz*. Auditors occupy an official position, which they qualify for by passing the auditor exam (Wirtschaftsprüfer, n.d.). An auditor's duties include auditing the annual and consolidated financial statements of a company to establish their legality and consistency. An assessment of the proper accounting is made, and it is ensured that the assets, financial situation, and earnings situation as they are presented in the annual report also accurately reflect the facts (Löffelholz, 2010). The International Financial Reporting Standards (IFRS) and Austrian company law (UGB) are central to the audit (Schula, 2022).

Legal representatives of a corporation must provide the auditor access to go into the company's books and records, as well as its assets and liabilities. Any evidence the auditor thinks relevant for a proper audit or for the purpose of a diligent audit may be requested from the legal representatives (IWP & KWT, 2022). The auditor is required to provide a written report detailing the audit's findings.

"The Supervisory Board and shareholders rely heavily on the auditors' work as a source of information and assurance of accurate financial reporting and information. But that's not all. In their work, auditors should also have knowledge of a company's economic development in addition to meeting all legal criteria, helping the supervisory board in its endeavors and best assist the supervisory board in fulfilling its role and obligation!" (Androsch, 2022).

Statements like these highlight the arduous nature of an auditor's job.

However, an auditor's abilities are limited. Auditors are obligated by their risk analysis to audit those areas in which there is a major misstatement in an organization's financial statements. Because, as previously stated, the audit of annual financial statements is not a thorough audit, there is always a residual risk that the audited annual financial statements may also contain inaccuracies (IWP & KWT, 2022). Additionally, the yearly financial statement audit is not a management audit. It is not the auditor's responsibility to determine, if a business choice was or is correct, or whether management's behaviour complies with certain principles of economy, expediency, and so on. An essential aspect of boundaries in the preparation of the annual financial statements is the further development of a company. The primary concept of accounting is that the reporting company will remain in existence. This is the foundation upon which accounting is based ("going concern") (Androsch, 2022). The auditor must decide whether to continue the entity. Being able to assess this is particularly challenging when businesses are struggling, and the economy is unstable. The auditor needs to challenge if the management's conclusions have been formed in an understandable manner and must deal extensively with those conclusions. He himself does not, however, make a going-concern prognosis as part of the financial statements' examination (IWP & KWT, 2022). This implies that the auditor's reliance on the accuracy of the data and information supplied to him for his work is constant. Due to the historical nature of his work, it is only partially possible to predict the future, even though this would be extremely helpful in today's rapidly changing world.

Legislation, case law, computer technology, international accounting standards, and auditing standards are all continually changing, posing new challenges to auditors. High levels of dedication, adaptability of thought, and innovation are necessary for their professional work. As a result, the economy values them as valuable partners (IWP & KWT, 2022).

The economic, social, and private spheres are all undergoing a profound structural change due to the digital revolution. This development has an impact on the auditing profession (Ziegler et al., 2018). Although there may be new company sectors where auditors can offer guidance, the audit itself is changing because of digitalization. Digitalization is accompanied by the concepts of big data, cloud computing, cyber security, remote audit, and continuous audit. Traditional auditing and modern information technologies will invariably coexist.

ii. Blockchain's Effect on the Auditing Profession

Since the emergence of cryptocurrencies, blockchain is a new technology that has gained increasing popularity (Martino, 2021, p.33). The introduction of a decentralized network that permits a variety of transactions independent of third-party interference. Which can have a favourable effect on costs, processing times, transparency, and public confidence in businesses (Ferri et al., 2021). By going deeper into this advancement, it has been feasible to better appreciate the capabilities of this innovation. Very immediately, it became apparent that this technology could do much more than facilitate transactions. The peer-to-peer-based decentralized system can be used to transfer a variety of assets (Martino, 2021, pp.15-16). In addition, with the possibility of processing business agreements and conditions digitally and automatically via smart contracts (Atanasovskil & Toceva, 2022, p.277).

Everything occurs within a structure of blocks and chains. Inputs and transfer activities are arranged into blocks and linked together to form a chain. Each movement contains a time and date stamp, allowing for an accurate chronology. The present cryptography, as well as validation through a consensus process of all network allowed parties, assure the system's integrity. Access is granted to a database where all transaction operations may be tracked, with the restriction that they cannot be deleted. This then serves as a type of digital manual, with copies distributed to everyone on the network (Lardo, 2022, p.205). Furthermore, the entire process occurs in real time, ensuring that insight is always readily available. Consequently, it is equally intriguing for the auditing procedure and its exporters (Abdennadher et al., 2022).

Blockchain's initial concept is to represent a network by connecting all financial systems. This would make this discussion regarding the auditing profession obsolete. As a connected, decentralized network throughout the financial systems would render this redundant (Loitz, 2018). Since this innovation is still in its infancy and current procedures require a human stamp of approval, it is vital to be aware of its progress. It is already expected that accounting firms and their auditors would encounter a variety of challenges relating to blockchain technology. The emphasis today is not only on an auditor's field of operation, but also on his customers' prospective alterations. Companies are undergoing transformation and new business models are emerging due to digitalization and blockchain development (Chartered Professional Accountants of Canada & American Institute of CPAs, 2017). In the future, networked and overlapping enterprise systems, as well as a plethora of interfaces, such as with a regulator, are achievable and realistic. As a result, it is expected that an auditor and his institute will possess distinct knowledge and abilities. Specialist expertise alone will not suffice. A combination of expertise and understanding of digital technologies will be required (Loitz, 2018). On the one hand, audits can thus be conducted in a much more independent and understandable manner; on the other hand, auditors' training and career notions will need to be modified. In addition, it is anticipated that many auditing-related tasks will be performed automatically (Chartered Professional Accountants of Canada & American Institute of CPAs, 2017, p.15). This will result in changes to audit processes and their respective sections. Interfaces and places where discretionary decisions exist will be emphasized. Due to the fact that many tasks will only be completed digitally, systems will be audited. A accuracy and trust check will be feasible only by a human, especially when it comes to changing, for example, a blockchain technology within a firm (Blockchain – was heißt das für die Abschlussprüfung?, n.d.; Loitz, 2018). Similarly, there may be a shift in reporting. The elimination of the financial data valuation margin will have a favourable impact. The use of a standard approach would allow for improved data analysis and increased traceability (Blockchain and its potential impact on the audit profession, n.d.). The audit's scope of tasks would enable an attention on relevant and critical positions. As this is frequently not achievable due to the amount of testing conducted today. However, this will also eliminate the reconciliation audit, reducing the auditor's workload (Chartered Professional Accountants of Canada & American Institute of CPAs, 2017, p.11). It is also possible to envisage displaying the exam results using blockchain. Thus, it would also allow viewing by any authorized person, without possible manipulation or inaccuracy (Tiron-Tudor et al., 2021, p.490).

It is evident that many are still hesitant to make definitive statements regarding the anticipated change in this field. Despite this, various projects and studies have already been conducted in this area. Particularly prevalent at top accounting companies (Wu et al., 2019, p.19). Since Deloitte, PWC, and KPMG consider that dealing with this field of development in good time and acquiring knowledge is beneficial. Especially considering that

the currently accessible advances reach a broad spectrum and can consequently have an effect everywhere. Therefore, awareness of technology advancements like blockchain is inevitable (Was sind die Chancen und Risiken der Blockchain?, n.d.; Time for trust, n.d.; Blockchain, n.d.).

III. Research Methodology and Design

i. Objective and research question

There is increasing awareness of blockchain in relation to auditing. The research in this article assumes that new technologies will have a substantial impact on an audit profession. Based on a traditional literature assessment, the existing scope of audit activities is compared to potential blockchain-related modifications and outlined. The aim is to add new dimensions to the enlightenment of auditors and to demonstrate the associated benefits.

The primary research questions "Is academic literature addressing blockchain in the context of auditing more frequently through the last ten years?" and "Do academics recognize the need for an auditor to deal with the blockchain issue?" accompany the entire research process and constitute as the foundation for this article's techniques section.

The emphasis of the technique section has been on a quantitative literature review. The goal is not to delve into detail about the subject, but rather to highlight the current state of development in this area. Given that it is frequently stated in numerous papers that this technology is still in the research phase and that assumptions are frequently available in the auditing field, it seems reasonable to examine the quantitative growth of the publications. In addition, the goal is to provide a comprehensive overview of the auditing profession and all connected areas, including accounting, auditing, and digitalization developments in this industry.

ii. Clarification of the evaluation method

This paper used a quantitative research approach. Following the completion of the classical literature search, the literature selected for this purpose was categorized, tagged, and interpreted. Particularly, the reference books utilized, were categorized in accordance with their original information source. According to physicist Wilhelm Fucks, this strategy is founded on the concepts and methods of quantitative content analysis (Aichele, 2005).

For the analysis, the Google Scholar, Pro Quest, and Scopus databases were employed. The key justification for using Google Scholar was the ability to declare in a broad, global sense that the topic is present in research. Pro Quest and Scopus were supposed to supplement this by highlighting specifics as well-founded and highly regarded databases.

Since 2008 many articles often focus on blockchain and cryptocurrencies. Therefore, the technique part concentrates on the previous fourteen years. In detail the following periods consisted for the evaluation:

- 2008 – 2012
- 2013 – 2017
- 2018 – 2022

Initially, categories were formed, which were used to search the databases for the number of hits on scientific work. The categories chosen include the major keywords and topic blocks that appear most succinctly and frequently in the literature on which this article is based. The frequent mention in connection with the topic of audit and blockchain led to the assumption that it is precisely these selected keywords that best summarize the literature. The following keywords have been outlined to evaluate the corresponding hit rate according to literature available for this purpose:

Table 1:
Keywords

Blockchain
Cryptocurrency
Distributed Ledger Technology
Industry 4.0
Blockchain and Accounting
Blockchain and Auditing
New regulations and challenges in auditing
New technology in auditing
New required knowledge in auditing
New consulting fields in auditing

Following that, a codebook based on these categories was produced. To address our study

topic, the relevant categories were arranged in a table by relevancy.

Table 2:
Code Book

0	Blockchain
1	Cryptocurrency
2	Distributed Ledger Technology
3	Industry 4.0
4	Blockchain and Accounting
5	Blockchain and Auditing
6	New regulations and challenges in auditing
7	New technology in auditing
8	New required knowledge in auditing
9	New consulting fields in auditing

Each Article shall be classified in the corresponding category if it mentions overall information to the chosen category.

Examples:

	Record	**Justification**
0	"Enably privacy and leakage resistance for dynamic blockchain-based access control systems"	This article should be categorised as "Blockchain" because it gives information to Blockchain relevant impacts.
1	" Hybrid gated recurrent unit bidirectional-long short-term memory model to improve cryptocurrency prediction accuracy"	This article should be categorised as "Cryptocurrency" because it gives information how to deal with Cryptocurrencies in the Blockchain system.
2	"A Design Model of Copyright Protection System Based on Distributed Ledger Technology"	This article should be categorised as "Distributed Ledger Technology" because its title shows that the article is based on the distributed ledger technology.
3	"Supply chain management and industry 4.0: A theoretical approach"	This article should be categorised as "Industry 4.0" because it is obvious that the topic deals with the implications of this time age.
4	"Intelligent matching: Supply chain management and financial accounting technology"	This article should be categorised as "Blockchain and Accounting" because the title of the paper itself shows that it deals with new forms of the supply chain due to Blockchain and their impact on Accounting.
5	"The Impact of Blockchain Technology on Internal Auditing in the Financial Sector"	This article should be categorised as "Blockchain and Auditing" because the title of the paper summarizes the category we build.
6	"The emergence of audit data analytics in existing audit spaces: findings from three technologically advanced audit and assurance service markets"	This article should be categorised as "New Regulations and challenges in auditing" because it analyses the impact and challenges on audit profession due to new possibilities on the market.
7	"The transformation to data analytics in Big-Four financial audit: what, why and how?"	This article should be categorised as "New Technologies in auditing" because the content shows that the paper deals with the possibilities of data analytics in audit profession.

8	"Understanding the internal audit function in a digitalised business environment?"	This article should be categorised as "New required knowledge in auditing" because the articles title shows that it deals with the impact of digitalization on auditing and the therefore necessary knowledge.
9	"The aim of this paper is to introduce use of artificial intelligence in audit and accounting, with an emphasis on currently trending blockchain technology. Due to its innovative character, this field is constantly changing, with the biggest companies investing enormous amounts of capital to achieve wide use of artificial intelligence in audit and accounting."	This article should be categorised as "New consulting fields in auditing" because the sentence out of the abstract of this article reveals that auditors are investing a lot of money in finding out what new business areas blockchain technology can generate.

Using the codebook, the respective keywords were entered into the search engines of Google Scholar, Pro Quest and Scopus and the respective hits were counted. More detailed information on the results can be found in the results and discussion part.

IV. Results

As stated in the previous chapter, the quantitative research for this work was conducted using the Google Scholar, Pro Quest, and Scopus databases. The period 2008-2022 was analysed.

Furthermore, the hypothesis that blockchain will simplify audit work and gain significance in this field was investigated.

Primarily, Google Scholar was used for the initial search by number of articles. This is because this search engine exposes general publications of all quality levels. This can provide a more accurate picture of the mood about this topic, because the quality of an article indicates nothing about the general public's interest in this topic. There were no limitations on the search. Publications of all genres, as well as those written in German and English, were desired.

The compilation of the results generated the following records:

Table 3:
Google Scolar

Keyword	2008-2012	2013-2017	2018-2022
Blockchain	1700	50600	161000
Cryptocurrency	311	6820	47900
Distributed ledger technology	4880	8720	17500
Industry 4.0	7480	13900	18400
Blockchain and Accounting	3540	8630	18500
Blockchain and Auditing	52	1010	16300
New regulations and challenges in auditing	18000	18200	17100
New technology in auditing	56000	78000	55800
New required knowledge in auditing	27400	26700	18600
New consulting fields in auditing	15700	17100	17100

The results clearly show that the number of published papers related to blockchain is steadily increasing. If you find only a few hits in 2008, you already get over a hundred thousand findings in today's 2022.

The next step was to conduct a Proquest database search. Proquest is a well-known database that is particularly useful for dissertations in the United States. Whoever obtains the chance to publish there has unquestionably produced work of the highest tier. The intention was to contrast Google Scholar's findings with those of a smaller database that only publishes chosen articles. The search was unrestricted in this case as well, and

the analysis covered all results, including literature in both English and German.

The following results were outlined:

Table 4:
Pro Quest

Keyword	2008-2012	2012-2017	2017-2022
Blockchain	0	4995	68874
Cryptocurrency	4	2287	33741
Distributed ledger technology	3632	4822	10922
Industry 4.0	41335	58481	3809904
Blockchain and Accounting	0	555	24720
Blockchain and Auditing	4052	172	3890
New regulations and challenges in auditing	75329	9998	41965
New technology in auditing	243851	14585	187726
New required knowledge in auditing	87163	11851	43498
New consulting fields in auditing	62283	5106	43356

In the third stage the database Scopus was scoured. Like Proquest, Scopus is a highly declared publication platform that only accepts scientific papers of high quality into its repository. A comparison to the hits of Proquest should be found, in order to underpin the findings with another well-founded source. The following objectives were achieved:

Table 5:
Scopus

Keyword	2008-2012	2012-2017	2017-2022
Blockchain	4	1637	81289
Cryptocurrency	3	570	15426
Distributed ledger technology	69	519	14251
Industry 4.0	30	2803	11840
Blockchain and Accounting	0	88	6253
Blockchain and Auditing	0	37	3541
New regulations and challenges in auditing	1424	2851	5177
New technology in auditing	5834	10555	20135
New required knowledge in auditing	275	524	919
New consulting fields in auditing	213	379	539

Looking at the results the picture painted by the literature review is confirmed. The academic community is increasingly associating the auditing field with blockchain, and it is undoubtedly extremely up to date.

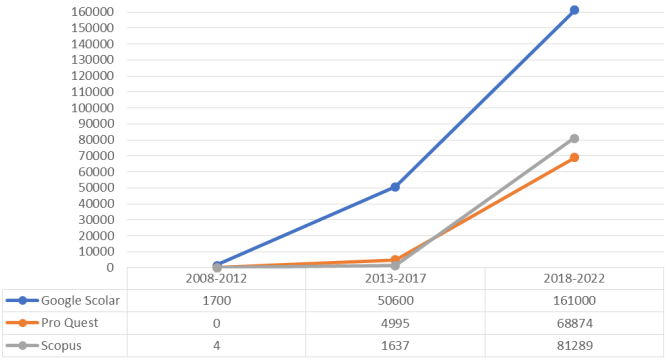
The last phase was to focus on material issued by one of the Big 4 accounting firms to reinforce the results of the quantitative content analysis with specific qualitative reasons. The Big Four companies are KPMG, PWC, Deloitte and Ernst & Young. Their publications on the overall topic of blockchain, as well as auditing, were examined. Since it was discovered in general research on blockchain and auditing that the Big 4 are heavily active in this sector. In addition, they would be profoundly affected by such a change, so it is of major importance to understand their perspective and efforts in this area. Notably, the investigation and publication of the Big Four must be conducted differently due to the fact that their databases and input options, such as years, are distinct. Specifics are provided in the various findings.

Looking at the Google Scholar results, it became clear what the literature already revealed: the accounting profession has always been and continues to be a changing profession. New legal situations require new knowledge and bring forth new fields of consulting. This result was also shown by the categories “New regulations and challenges in auditing”, “ New technology in auditing”, “New required knowledge in auditing” and “New consulting fields in auditing”. Even before the publication of the first literature on blockchain in 2008, there is

already a large amount of technical literature in the databases examined on these categories. Google Scholar is a very broad database, with Pro Quest and Scopus providing only selected articles. This is also shown by the number of hits found. Nevertheless, the trend is clear and can be seen throughout all systems. The technical literature on auditing connected to blockchain is steadily growing when viewed over time. It is evident that the scientific community anticipates a shift in the auditing profession as a result of the new technology.

The following image emerges when the Blockchain category is examined in detail across all time periods:

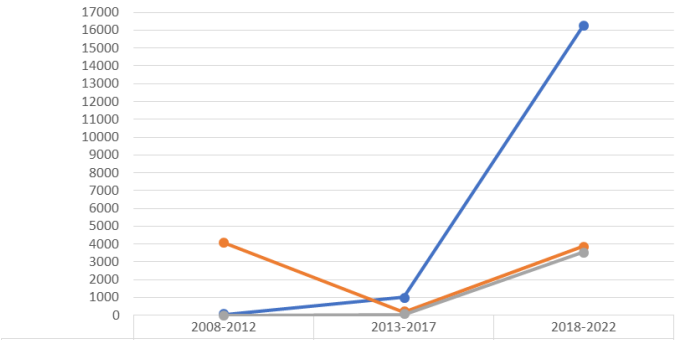
Figure 1:
Blockchain



	2008-2012	2013-2017	2018-2022
Google Scolar	1700	50600	161000
Pro Quest	0	4995	68874
Scopus	4	1637	81289

The graph demonstrates how the issue of blockchain is constantly becoming more prominent in the literature and is receiving more attention. Therefore, it is possible to expect that the auditing process will be significantly impacted by the blockchain technology. Analyzing the category "Blockchain and Auditing" reveals a similar pattern.

Figure 2:
Blokchain and Auditing



	2008-2012	2013-2017	2018-2022
Google Scolar	52	1010	16300
Pro Quest	4052	172	3890
Scopus	0	37	3541

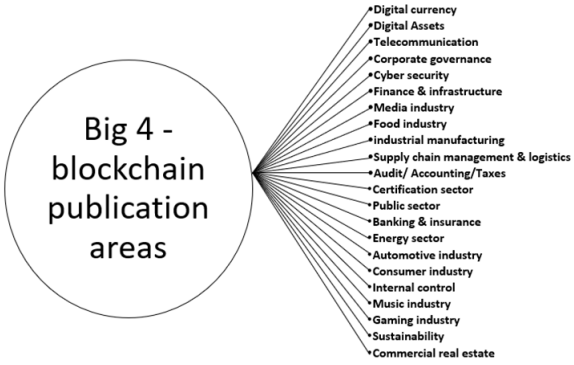
The amount of literature that is available grows yearly. Pro Quest is an exception for the years 2013-2017, but this may be due to a lack of high-quality articles submitted to the database. The quantitative content analysis on which this paper is based confirms the hypothesis, that academic literature addresses blockchain in the context of auditing more frequently through the last ten years. According to the data, the question "Do academics acknowledge the need for an auditor to deal with the blockchain issue?" can also be answered positively. However, articles written by the Big 4 on the study question were examined in a subsequent phase in order to be able to add qualitative statements to this.

This can be a clear indicator that the auditing profession's relevance in this sector has expanded. As stated in the fifth section, this is consistent with the involvement of the Big Four in this topic and their publications in various economic areas.

V. An overview to the Big4's perspective on blockchain technology and auditing

Numerous sectors of the industry, including the four largest accounting firms, have realized the disruptive potential of blockchain technology. These organizations have several initiatives happening around the world and provide their clients with diverse blockchain services to develop experience. Beginning with cryptocurrencies and progressing to the potential applications of blockchain technology itself. (Bajpai, 2017). In addition, they wish to enhance knowledge and confidence in this technology and its potential applications. The rationale for devoting so much attention to this topic is the early awareness that this innovation will have a significant impact on audits. It is acknowledged that auditors will require knowledge of these new company models for future auditing methods (CNN,2021).

Figure 3:
Blokchain-related publications of the Big Four



When analysing the Big Four and their current publications in the subject of blockchain, it is possible to discern their involvement in numerous economic sectors. The figure below depicts the issues on which these auditing firms can inform and advise their clients in this regard. These attempts can be viewed as an indication that accounting firms take this innovation and its potential to disrupt numerous industries seriously and wish to alert their clients in a timely manner. Moreover, this may already be an indicator of how the auditing profession will evolve, as some predict that it will expand beyond general business analysis (Loitz, 2018).

Focusing exclusively on the auditing industry as a whole and analysing the Big Four separately reveals the following:

- **Deloitte:**

Analysing the Deloitte contributions from Germany and the United States on their website in regard to auditing, it is noted that Blockchain progress will have an impact on auditing. Deloitte explicitly states that blockchain will have an impact on many industries, altering modern accounting, but that competent accounting and the creation of legally compliant financial statements will continue to be required. Especially considering that faith in the accuracy of business data is essential for functioning capital markets. They consider the auditor's examination to be essential and independent of technology. They perceive the change in auditing activities primarily in the automation of numerous laborious and time-consuming preparation stages. In addition, an examination of blockchain technology and its modes of operation will be required. The activity will consist of examining certain protocols and standards of the selected blockchain. As a result of this assessment and the auditor's participation, a certain level of assurance should arise (Blockchain – was heißt das für die Abschlussprüfung?, n.d.). In the future, Deloitte anticipates that auditors will not only conduct spot checks, but will also have access to real-time data and a holistic perspective. They are also aware that the needs for the auditing profession will evolve, demanding the development of new training courses. It is also noted that a distinct emphasis has been placed on transformation in the auditing area, and hence investments in this field are being made (Neue Technologien in der Wirtschaftsprüfung und ihre Auswirkungen auf das Berufsbild, n.d.).

Furthermore, Deloitte Germany provides its clients with dedicated blockchain technology centers of excellence. In this context, they have offerings for all industries and hence aim to be involved in the development of various blockchain approaches. Similarly, in the United States, there is the Deloitte Blockchain Lab offering. It is intended to assist businesses in adopting blockchain and all of its benefits and prospects. Additionally, it should make it easier to determine priorities and remove the uncertainty that comes with the unknown (Deloitte Blockchain Labs, n.d.).

- **KPMG:**

KPMG, like Deloitte, provides information about blockchain, including potential applications, possibilities, and hazards. Furthermore, they advertise the availability of several blockchain solutions. To assist their clients, in particular, in the areas of audit, internal control, cyber security, and risk management, in order to develop necessary mitigation measures during process adaption (KPMG, 2021, p.3). A thorough understanding of blockchain, as well as cryptocurrencies, is provided. These provide insight into the blockchain selection process, as well as controls, strategic alignments, and risk management (Blockchain and risk, n.d.).

Moreover, it is intriguing that KPMG works so closely with a market dominating giant like Microsoft. It is recognizable that, they try to combine auditing skills with technological know-how to generate the greatest blockchain understanding and provide suitable support. As with all other accounting giants, the objective here is to assist with all currently accessible technology, such as cloud computing and artificial intelligence (KPMG and Microsoft, n.d.).

- **EY:**

Ernst & Young gives a similar vision for blockchain usage. By providing information for a variety of economic segments, it is possible to foresee a shift in the future severity of blockchain technology. Further, with the EY Blockchain Analyzer effort, this accounting company has made an initiative in the auditing industry. With this initiative, launched in 2018, EY aims to keep pace with the rapid evolution of the blockchain field and improve the auditing process for itself and its clients. The objective is to adapt audits in an innovative manner to catch up with customers and their modified business models. For the development itself, worldwide

experience and blockchain technology were joined to produce a workable solution for future audits and confidence. This blockchain application should be included into the transaction verification auditing process. This is to establish a new method for auditing, as well as regulatory compliance and reporting (Curtis, 2018).

- **PWC:**

PricewaterhouseCoopers illustrates a comparable picture. Similarly, there is a vast array of information in several economic areas associated with blockchain technology. According to their website, 47 publications on blockchain technology were published in the last year. In addition, they predict this development will accelerate the expansion of the economy and industries. According to PWC, experts think that this technology will be adopted by the majority of firms worldwide within the next couple of years (Blockchain ist Einsatzbereit ,n.d.). However, PWC itself already offers three blockchain solutions. The Smart Trace, Smart Credentials and Halo solution. Innovative solutions for the simplified management of third parties, the provision of credentials in real time, and the verification of ownership and custody of a blockchain's tokenized securities (Unsere Blockchain Lösungen, n.d.).

VI. Discussion

The analysis of this paper demonstrates an increasing correlation between the audit profession and Blockchain. It supports the fundamental hypothesis that Blockchain will simplify auditing work and gain greater significance in this area. The increasing number of publications in reputable, peer-reviewed journals such as Scopus confirms the academic community is progressively associating the occupation of auditors with Blockchain technology. The same argument is made by Deloitte Germany and United States (Deloitte Blockchain Labs, n.d.). In its publications, the auditing company emphasizes that the Blockchain progress will have a significant impact on the auditor's possibilities regarding examination activities. In line with the hypothesis, it became apparent that the audit profession has always been and continues to be a changing profession. KPMG endorses this view and promotes the further training of employees with regard to new technologies enormously. (KPMG and Microsoft, n.d.). For the auditing industry to be competitive and continue to provide high-quality services, a firm's ability to acquire and apply technological knowledge will become increasingly important. Collaborations between companies like KPMG and Microsoft provide evidence for this claim (KPMG and Microsoft, n.d.). The group accompanies its clients through implementation processes and stands out above all for insights into the blockchain selection process, as well as cryptocurrencies. This assistance might offer them with knowledge of new business concepts, hence creating benefits. According to Deloitte, new business models will be crucial to future financial reporting, making their comprehension a requirement (Blockchain and its potential impact on the audit profession, n.d.). The data in the literature review contribute to a clearer understanding of how the dependence between auditors and their clients will change (IWP & KWT, 2022). The auditor will be more independent based on the information provided by his client. Blockchain technology not only allows for real-time data access, but it also ensures that data cannot be modified. This benefit is also emphasized by PWC, which also provides cutting-edge options for credentialing in real-time. The organization is convinced that this technology will be adopted by the majority of companies worldwide (Unsere Blockchain Lösungen, n.d.).

Finally, it is obvious that the transformation in the auditing industry has not yet developed a definite trend (Chartered Professional Accountants of Canada & American Institute of CPAs, 2017, p.14). Similarly, experience with blockchain technology is currently quite limited and has substantial growth potential (Deloitte, 2016, p.5). For example, Deloitte provides modification suggestions but no defined framework or definite process processes (Blockchain – was heißt das für die Abschlussprüfung?, n.d.). EY's explanation of the procedures in this sector demonstrates that these advancements still have promise. According to EY, the development is continuously monitored and adjustments are being made as necessary (Curtis, 2018).

The results might suggest that the annual audit will become much simpler and the auditor´s work may become less important. The opposite is the case, the auditing activities and daily challenges will change. In particular, the new business models emerging as a result of new technologies promise exciting workdays for auditors in the future (IWP & KWT, 2022). Organizations like the Chartered Professional Accountants of Canada and the American Institute of CPAs have expressed the view that new technology make obsolete resource-intensive preparatory processes, allowing more time

and attention to be devoted to auditing essential transactions (Chartered Professional Accountants of Canada & American Institute of CPAs, 2017, p.11).

Moreover, the exact process and practical approach are not quite clearly worked out. Conducting a more extensive content analysis of such an audit process and developing a detailed strategy for future interactions between the business and the auditor would be advantageous. This paper is limited by its quantitative examination of whether the relevance and significance of blockchain in auditing is discernible. The Big Four were utilized to provide qualitative support for the quantitative findings, but not to assist determine future activities.

VII. Conclusion

In conclusion, it is evident that Blockchain is gaining more and more importance in the field of auditing. In particular, Big 4 firms are informing and supporting Blockchain strategies in a variety of business segments. It is important to emphasize that they are aware that the auditing sector will be affected by the change brought about by blockchain technology. The Big 4 uniformly hold the view that the auditing profession will change, and new activities will be added. However, they are certain that the auditing field itself will not become redundant, but that new areas of consulting will be opened up. The quantitative content analysis also shows that, measured in numbers, the publications and thus the scientific interest in the development of the accounting profession in connection with this innovation is steadily increasing. This confirms the fundamental assumption that the auditing profession is about to undergo a transformation. The direct impact of new technologies such as blockchain on the accounting profession has been sufficiently researched. The real-time collection of vast amounts of data enabled by Blockchain is poised to transform the auditing profession. However, it would be interesting to find out how the actual audit procedures of a group audit are changing. Larger data volumes not only mean the advantage of obtaining more information, but also a limitation in that not every single data record can ever be analysed by a human being. This is exactly where the further research of this article will start and go through the process of a group audit step by step in order to find out which audit procedures will be relevant in the future.

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ORIGINAL RESEARCH PAPER

THE FACILITATION OF DIGITAL LITERACY IN EFL CLASSES

Rosina Preis [1], **Barbara Geyer** [2]

[1] ***University of Applied Sciences Burgenland***, *Eisenstadt, Austria*
[2] ***University of Applied Sciences Burgenland***, *Eisenstadt, Austria*

Correspondence concerning this article should be addressed to Rosina Preis, University of Applied Sciences Burgenland, Eisenstadt, Austria. E-mail: preisrosina@gmail.com and Barbara Geyer, University of Applied Sciences Burgenland, Eisenstadt, Austria. E-mail: barbara.geyer@fh-burgenland.at

ABSTRACT

Digital literacy has become an essential form of literacy for the students of the 21st century. This development had been significantly accelerated by the Covid-19 pandemic, when all students in Austria had to switch to distance learning at some point between the years 2020 and 2022. Based on a web-based survey conducted among Austrian EFL students, this paper aims to investigate the current status of digital literacy among 5th and 6th grade EFL students from their perspective. A special focus is placed on students who have received a digital device for e-Learning purposes within the school year 2021/2022.

The following key results were observed: Students have a generally positive attitude towards e-Learning that also shows a connection to their level of digital skills. Furthermore, there are significant differences in experiences and attitudes toward e- Learning based on grade level. Further research into manifold areas of digital literacy could be beneficial in order to gain a deeper understanding of the topic and practical assistance for educators and students.

Keywords: Digital literacy, digital competences, English, EFL, self-assessment, language learning

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1. Introduction

The following paper examines digital literacy in English as a Foreign Language (EFL) classroom, following the introduction of digital devices into Austrian classrooms in 2021.

In 2020, the Austrian Federal Government launched the "Initiative Digitales Lernen" (Initiative Digital Learning), which – among other things - provided students in Austria's 5th and 6th grades with digital devices at a reduced price in the school year 2021/2022. Whether schools took part in this program was decided internally. In consecutive years, the initiative will be continued in future 5th grades. The goal is to establish digital learning in all Austrian schools until 2024, and this is part of an 8-point plan to digitalize schools (Bundesministerium für Bildung, Wissenschaft und Forschung, 2020). This distribution of digital devices accelerated the integration of e-Learning into everyday teaching approaches. While digital competencies were at the center of consideration, digital literacy offers a wider and more holistic picture of skills that are essential in a globalized society.

The present paper discusses the impact of introducing said digital devices into the EFL classroom, the attitude towards e-Learning and the expected advancement of digital skills and the differences in using e-Learning regarding grade level. In order to provide meaningful data for this discussion, a web-based survey was conducted among 151 Austrian EFL learners.

2. Literature review

2.1 e-Learning

E-Learning has become one of the most prevalent terms in the wide range of concepts that describe digital-device-supported learning. It is short for *electronic learning* and therefore combines technology and learning. Aparicio et al. describe technology as serving as "an enabler of the learning process, meaning that technology is used like any other tool in the education praxis, as is a pencil or a notebook, for example." (Aparicio et al., 2016, p.292) However, it is not as simplistic as a pencil since technology includes many dimensions of society and learning. Stemming from Computer Based Training (CBT) and Web Based Training (WBT), e-learning has established itself as an umbrella term that encompasses many aspects of learning that are supported by digital devices (Arnold et al., 2015). Electronically arranged learning media is mostly interactive and allows learners to access content online or in a blended format (a combination of online and offline methods) (Möslein-Tröppner & Bernhard, 2021).

During the Covid-19 pandemic, e-Learning has become the go-to tool to compensate for the inability to gather in large crowds (Dautbašić & Bećirović, 2022) and provide an alternative learning environment for the large number of students quarantined at home. Next to other benefits, self-regulation is one of the most commonly named assets attributed to e-Learning (Bećirović et al., 2022). This self-regulation, however, can be a challenge for students who lack the reflective skills to identify learning gaps. Additionally, the rapid transfer of lessons into an online environment meant that a loss of teaching quality was often observed. Purposeful guidance through these new learning possibilities can, however, result in varied prospects of connecting individual needs to a great diversity of learning styles and methods (Bećirović et al., 2021).

2.2 Digital literacy

School has always been a place of literacy. Literacy, according to Merriam-Webster, is "the quality or state of being literate" (*Literacy*, n.d.). At first glance, it might be defined as the ability to read the language, which was certainly the most common conception of literacy for centuries. The concept of other literacies – apart from writing and reading – is quite young and has only emerged at the end of the 20th century. Apart from other concepts like moral literacy or cultural literacy, computer literacy finally became part of the academic discourse in the 1990s (Collins & Blot, 2003).

A close definition of digital literacy was established by UNESCO in 2011:

"Digital literacy is an umbrella concept for important skill clusters whose names are often used as synonyms; their content, however, is not exactly

the same. ICT literacy refers to a set of user skills that enable active participation in a society where services and cultural offerings are computer-supported and distributed on the internet. Technological literacy (previously called computer literacy) entails a deeper understanding of digital technology and comprises both user and technical computing skills. Information literacy focuses on one of the key aspects of our Knowledge Society: the ability to locate, identify, retrieve, process and use digital information optimally". (Karpati, 2011, p. 2)

Solikhati and Pratolo refer to digital literacy as "the skill to receive information from a digital format"(Solikhati & Pratolo, 2021, p. 2) and Paul Gilster defines it as „[…] a set of skills to access the internet, find, manage and edit digital information; join in communications, and otherwise engage with an online information and communication network. Digital literacy is the ability to properly use and evaluate digital resources, tools and services, and apply It to lifelong learning processes" (Gilster, 1997, p. 220).

Jones and Hafner argue that while "'Literacy' traditionally means the ability to read and write"(Jones & Hafner, 2021, p. 16), true literacy is comprised of "interpersonal and social processes" (Jones & Hafner, 2021, p. 17). They suggest that crucial parts of literacy are social aspects as well as finding, decoding, and interpreting information (Jones & Hafner, 2021).

What is eminent is that all of these definitions do not limit themselves to measurable skills but rather the ability to use and reflect the use of digital resources. Based on these definitions and approaches, digital literacy, therefore, will be regarded as a way to successfully navigate digital media in the context of this paper.

2.3 Measuring digital literacy

If digital literacy is inseparable from social aspects and cannot be broken down into lone digital competencies, what is the benefit in measuring it and is it even possible?

Chetty et al. propose that the G20 create a "comprehensive digital literacy index"(Chetty et al., 2017, p. 12) in order to provide an evidence-based international guidance system that can be utilized by emerging economies as well as established ones. They argue that "Appropriately measuring digital literacy and consistently ensuring that policies are agile enough to react to the dynamic nature of digital skills will lead to productivity gains across the country" (Chetty et al., 2017, p. 11). They suggest to measuring five different sub-groups of literacy: Information, Computer, Media, Communication and Technology. Within these categories, they propose measuring the technical, cognitive and ethical perspectives (Chetty et al., 2017).

In 2018, UNESCO created "A Global Framework of Reference on Digital Literacy Skills", which offers a more global approach to the manifold national and regional developments in the field. UNESCO refers to the 2017 DigComp 2.1 framework, published by the European Union (Carretero et al., 2017) as a foundation for their work. Additionally, UNESCO expanded this competence-based approach by "collecting examples of digital literacy use in everyday contexts in a wide range of countries outside of Europe" (Karpati, 2011, p. 13). UNESCO comes to the conclusion that digital literacy is highly dependent on demography, geography and the specific digital needs of a particular group. Therefore, a framework can be established but has to be adapted according to the specific needs of the country in question.

As of the summer of 2022, there is not a single framework of measuring digital literacy that has become canon among the digitalization community. Research suggests that digital literacy measurement must be adapted to the exact research question proposed and skills or competencies attributed to digital literacy (which is not canonic also).

3. Methodology

3.1 Participants

The examination sample consisted of 151 students from GRG10 Laaerberg Vienna, a grammar school in the tenth district of Vienna, Austria. Participants were selected from grades five and six and were picked based on convenience and access. One class was always polled in its entirety, and no students were polled individually.

Students from both grades received a new digital device in the school year of 2021/2022 and have worked with it in and out of school and in context with their EFL class for at least seven months prior to the conduction of the survey. Grade 5 students received a few (between 1 and 3) introductory lessons into the workings of the devices. Grade 6 students, however, attended an obligatory IKT (Informations- und Kommunikationstechnologie = Information and Communication Technology) class to the extent of one lesson per week.

A total of 6 classes were surveyed, with the whole class participating if present. Thus, there were 69 participants (45,7%) from grade 5 and 82 participants (54,3%) from grade 6. Ages ranged from 10-14 (M=11.59 SD=0.751).

Because of the exceptionally diverse background of the wide range of students, 82 participants (54,3%) stated their nationality as being Austrian, while 69 participants (45,7%) stated their nationality as "Other". Since no other nationality had more than 10 participants per group (McMillan, 2012), all nationalities except "Austrian" were summarized as "Other".

The analysis shows that there were 72 participants (47.7%) that identified as male and 75 participants (49.7%) that identified as female. 4 participants (2,6%) didn't identify with either of those genders.

An almost even number of participants was polled from the 5th and 6th grades (M=5.54, SD=0.5). The distinction was made because they have different backgrounds regarding digital literacy. The fifth graders only received a few introductory lessons on their digital devices. The sixth graders attended a year-long course whose focus was on information and communication technology. Both grades used their digital device for at least one day per week in alternating subjects. The last demographic question of the survey concerned the students' average mark in English. "Average mark" was defined as the marks mostly received in English exams and report cards. The results show that the majority of the students received a positive mark in English (M=2.36, SD=1.13).

3.2 Instruments and Procedures

The survey was conducted as a web-based survey and was created in Google forms. It comprised five parts. The first part of the survey contained demographic questions regarding gender, age, nationality, mother tongue and average grade in English. The results of this demographic part have been laid out in the previous chapter.

The second part was comprised of outline questions regarding the habits of digital device use, such as the type of device, the extent of use and the tools applied in school and at home.

The third part focused on the advantages and disadvantages of e-Learning use in the EFL classroom by letting the participants rate how much they agree with certain statements related to e-Learning use.

The fourth part aimed attention at the students' experience in using e-Learning at school by letting them rate how much they agree with certain statements regarding their daily use of digital devices.

The fifth and final part was a self-assessment scale, with questions about the spread of new technologies, the participants' digital skills levels, their overall estimation of digital skills, the improvement in certain tools, their improvement in their English abilities and their assessment of the use of digital devices in the EFL classroom.

3.3 Data analysis

Because of the amount of data that was gathered, it was crucial to use evaluation software in order to analyze the information properly. There are manifold choices in such software on the market, such as SPSS, Stata or R.

For the sake of this paper, the choice was made to work with SPSS. SPSS is short for Statistical Package for the Social Sciences and is a software that allows advanced analysis methods, significance tests and simple correlation tests (Tausendpfund, 2019). This program was established in the 1960s at the University of Stanford (Braunecker,

2021). The data analysis for this paper was conducted with SPPS-Version 27.

4. Results

4.1 The perceived impact on digital literacy of introducing digital devices in the 5th and 6th grades

The introduction of digital devices into Austria's 5th and 6th grades was part of a bigger initiative to improve digital competencies on a wider scale. The survey conducted among 151 students showed that the students noticed an impact on their digital literacy as well.

Specifically, in the section "Self-assessment" of the survey, students were asked about skills that are often associated with digital literacy. The results have shown that generally, the students mostly observe an increase (37,7%) or significant increase (37,1%) in their digital skills throughout the year. After this general observation, the participants were also questioned on specific skills that attribute to a digital literate user of digital devices by answering "Do you" and "Can you" questions.

The outcome of the "Do you" questions is quite varied but generally shows an understanding of most sections and skills. The question "Do you use keyboard shortcuts" was quite balanced in positive (47,7%) and negative (52,3%) replies. Assuming that a time-efficient way of operating a digital device is a significant part of digital literacy, we can observe that there is still some room to grow for both 5th and 6th graders. Similarly, the question "Do you feel competent in using digital learning resources?" was balanced in positive (51,7%) and negative (48,3%) replies as well. Confidence in the use of digital devices is an essential part of digital literacy. This outcome shows that more has to be done to prepare students and build tenacity in the use of one of the most important resources of the 21st century. The results show that most students can do basic tasks such as changing the computer's screen brightness and contrast (94%) and changing the size of windows on the computer screen (82,8%). However, when it comes to the safety of their device, only 41,1% are able to scan it for viruses. The results for writing files onto a CD, a DVD or a USB Drive were quite balanced, with 55% positive and 45% negative results. An important note regarding this question is that most students were encouraged to save their files onto a cloud service and not to do it locally. 52,3% of students claim to be able to create and update web pages, which seems like a high number based on the level of skill required for the task. However, some students in grade 6 were instructed on how to build a basic website already. Generally, the "Do you" questions (65,6%) and "Can you" questions (73,8%) were answered positively and therefore present a confident picture of digital literacy in the English classroom.

The survey also – unsurprisingly – showed that an overwhelming amount of students use social networks (78,1%). This outcome underlines the importance of preparing young students for their digital life, even if social networks are not legally available to them, as most of them have at least a legal age of 13. It could be argued that by providing the students with messaging services like *MS Teams*, we encourage them to use social networking tools before they are legally able to do it.

When comparing the tools used and the improvement thereof, a clear connection was visible. However, the survey did not show what kind of tools were used in other subjects, and therefore, a correlation cannot reliably be reported.

In conclusion, the research question "What is the perceived impact on digital literacy of introducing digital devices in the 5th and 6th grade? "cannot unambiguously be answered with the results of this survey. Students do see a generally positive impact of the implementation of digital devices in their classroom, and most skills listed seem to reach the majority of students. However, the results show that – naturally – most skills acquired in English class are limited to working with the tools provided by the teacher. Further skills attributed to digital literacy are limited by multiple factors, such as the teacher's competence, time management and resources. In order to gain a more meaningful insight into the true impact of the implementation of digital devices on digital literacy skills, it would be most helpful to conduct similar surveys on an annual basis or conduct the survey among a group of students who did not receive any digital devices

in the schoolyear of 2021/2022. The fact that there is no comparable initiative for improving the digital infrastructure among secondary school students in Austria is both a chance to gain information but also an unprecedented challenge for educators and administrations. As stated before, digital literacy is a complex conglomerate of abilities that is fluid in its level of proficiency. It has been shown that there – currently – isn't a clear-cut examination method that measures digital literacy. It seems sensible to focus, in that sense, on the confidence of students in their abilities to use their digital device and existing and taking part in a digital world.

4.2 Differences in the advancement of digital skills based on attitudes towards e-Learning

The participants were able to work with their new digital devices in English class throughout the preceding eight months. The juxtaposition of the variables associated with attitudes towards e-Learning and the advancement of digital skills showed that there is a clear difference in the approach and outcome. It was shown that an increase in digital skills often occurs together with a positive attitude towards e-Learning. Although most students prefer either an offline or hybrid setting for their English classes, the ones who prefer online English classes also perceived the most gain in their digital skills. The participants who think positively about e-Learning also appeared to gain most in respects to their digital skills. And lastly, students who perceive e-Learning as an enjoyable factor in their learning life also perceived the most gain in their digital skills. Therefore, it must be concluded that there are significant differences in the advancement of digital skills based on attitudes towards e-Learning. Positive attitudes lead to a positive outcome for the students.

In order to be thorough in the analysis of this question, one must pay attention to the fact that the attitude towards e-Learning is certainly subject to change and is influenced by a wide variety of factors that were not explored in this survey. It could be heavily biased depending on the quantity of use or the students' relationship with teachers who regularly use digital devices. Additionally, the quarantine factor cannot be understated. Students were forced to move their education from school into their homes because of the Covid-19 pandemic in 2020 and in subsequent years. The undoubtedly negative association with this era must be kept in mind when observing negative attitudes towards e-Learning. It can be argued that had the Covid-19 pandemic never taken place and the introduction of digital devices proceeded independently of inarguable need and haste, the approaches towards e- Learning would have been different.

4.3 Differences in using e-Learning in EFL class regarding grade level

The juxtaposition of grade level and attitudes on and experiences with e-Learning showed clear distinctions. The results showed that more 5th graders perceived an improvement in their digital skills by using their digital devices in the EFL classroom. The reasons for this might be the different approaches to teaching digital skills to students of different grades. As stated above, 5th graders only received fundamental introductions to their digital devices and the workings of them, whereas 6th graders received a significantly more intense education. This is merely attributed to the fact that there were mandatory lessons held in the 6th grade.

Additionally, the perception of improvement is also dependent on the frequency and method of use in the English classroom. Teachers of this school were instructed on multiple tools and software that contribute to English lessons while working on digital skills and literacy. However, the frequency and intensity of use was not monitored by the administration and certainly has an impact on the results of this question. It would be helpful to evaluate at the end of the school year how often the digital devices were used and if there is a significant difference based on grade level. While the conducted survey cannot offer clear results on why digital devices were used more or less frequently based on grade level, there are multiple factors that contribute to the use of them by EFL teachers. On the one hand, teachers might not use digital devices as frequently in 5th grade because the students have not had much experience with the devices yet, and teachers assume that the use would come with a significant expenditure in time during their lessons to work on technical aspects. On the other hand,

teachers might not use digital devices as frequently in 6th grade because the students have more tests and exams that have to be conducted and therefore, additional work on the devices seems less enticing or even possible.

More 6th graders disagreed that e-Learning makes teaching and learning more flexible. This could be caused by the fact that most classes only had one day a week that was dedicated to working with digital devices. While most 5th grade classes decided upon the day based on which subject teachers were willing and able to work with devices, 6th grade classes decided upon the day based on when their IKT (Informations- und Kommunikationstechnologie) classes were scheduled. This often resulted in less regular use of the devices in other subjects and less flexibility in when the device could be incorporated into the teaching plan in a structured way. Another striking result is the attitude towards the enjoyment of working online. In the question, "I think that e-Learning has made the learning process more enjoyable," one can observe strong positions in both directions (Agree and Disagree).

To sum up, there are significant differences in using e-Learning in EFL class based on grade level. The different initial positions of both grades contributed to that, and further factors would be sensible to explore in further research.

5. Conclusion

After two years of inconsistent learning environments due to the Covid-19 pandemic, the schoolyear 2021/2022 did not hold back in further challenges for both teachers and students. The distribution of digital devices was therefore expected to support the students in providing a more dependable means of social and academic connection. The results of the last few pages have given us insight into many areas of digital literacy from the perspective of 5th and 6th graders but not all provided us with a positive picture that the expectations would suggest.

When asked about the impact on digital literacy that the introduction of digital devices had, students generally conveyed a positive picture as to the digital skills learned throughout the year. However, most students cannot see their English classes fully transitioning into an online setting. It is a probable conclusion that students did not have a positive learning experience during an unprecedented pandemic. Therefore, negative attitudes towards e-Learning are to be expected and logical at this point.

The majority of students notice an increase in their digital skills, and they also generally observe sufficient competencies in various digital areas. However, confidence in digital literacy and in the use of digital devices, in general, seems low for students who have a disproportionately higher experience with working with those devices than peers of their age a few years prior. When it comes to attitudes towards e-Learning, the results also suggest that a positive attitude has a connection to the increase of digital skills of the students. This also shows up in the findings that students who prefer online English classes - in contrast to offline English classes- evidently notice a gain in their digital skills. The motivational factor also should not be disregarded, as students who enjoyed e-Learning likewise experienced a gain in their digital skills. When asked about the use of e-Learning in EFL classes, the analysis of the survey showed that there were significant differences depending on the grade levels. 5th graders show a generally more positive attitude towards e-Learning. As hypothesized above, we suggest that this could be based on two things:

1. 1) 6th graders have to attend a class that is focused on digital competencies. Assigning a class and a mark to a subject often leads to a negative connotation for the students in comparison to a few introductory lessons.

2. 2) 6th graders have experienced the Covid-19 pandemic and the accompanying distance learning regulations in a more pronounced way and might therefore associate it more negatively. 5th graders spent the previous two years in elementary school and mostly worked individually and seldomly took part in e-Learning classes. 6th graders spent two schoolyears in grammar school, which was closed down nationwide but still held classes online.

This survey has shown that digital literacy has been facilitated in both grades, equally among genders and in varied way. Students do not feel extraordinarily competent in their digital literacy skills but notice a significant increase in their competencies. The use of several different tools in the EFL classroom had a positive impact on both English language skills and digital literacy skills.

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REVIEW PAPER

THE IMPACT OF THE BELT AND ROAD INITIATIVE ON KAZAKHSTAN

Christopher Schagerl[1], **Lana Soldo**[2]

[1] ***University of Applied Sciences Burgenland***, *Eisenstadt, Austria*
[2] ***University of Applied Sciences Burgenland***, *Eisenstadt, Austria*

Correspondence concerning this article should be addressed to Christopher Schagerl, University of Applied Sciences Burgenland, Eisenstadt, Austria. E-mail: christopher@schagerl.org and Lana Soldo, University of Applied Sciences Burgenland, Eisenstadt, Austria. E-mail: 2129001103@fh-burgenland.at

ABSTRACT

In 2013, the Belt and Road Initiative (BRI) was announced in Astana. It was expected to connect as the New Silk Road the producing East and consuming West. In line with this, Kazakhstan introduced a major infrastructure program called "NurlyZhol" to improve the logistic corridor. Now, after almost 10 years after its announcement it is worth seeing whether the country benefited from the programs and whether the expectations set up 10 years ago came true. Besides the literature, the experience of 10 experts in the region was used. Strong involvement of China, politically and economically, supports the development of the logistics corridor. Not only the logistics sector showed growth, potential also for the future, but the agriculture and renewable energy sectorsas well might light for the country's economy as to the international experts. Negative impacts, due to hindrances on the land corridor, which goes partially through Russia to Europe, hinders the projects to use their full potential.

Keywords: Kazakhstan, BRI, Silk Road, NurlyZhol, EAEU, China

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Introduction

Kazakhstan has an outstanding situation from various angles. On the one hand, the country has been a WTO membersince 2015, but also a member of the Eurasian Economic Union (EAEU) largely driven from the Russian Federation (Shakhanova & Garlick, 2020). Bordering with large economic players like China and Russia plays an essential role also as a logistics corridor between the producing countries in Asia and consuming economies in Western Europe.

The Belt and Road Initiative, China's flagship program, is an extremely vast one, which has gained the involvement of an important number of countries, has been extensively analyzed, and has a number of different dimensions. The term refers to the formally named "One Belt, One Road" initiative, whereas the "belt" links the countries and the "road" focuses on the new Silk Road promoting trade by removing trade barriers and decreasing cost of doing business (Brakman et al., 2019).

The project was first announced during President Xi Jinping's visit to Kazakhstan in 2013 (Ministry of Foreign Affairs, the People's Republic of China, 2013). On September 7, 2013, he made a speech entitled "Promote People-to-People Friendship and Create a Better Future" at Nazarbayev University. He proposed to develop cooperation between China and the countries of Central Asia, in particular, by strengthening economic and infrastructural ties between them. The initiative is aimed, as officially stated by the country's President Xi Jinping, at strengthening economic development policy communication and regional cooperation; improving road connectivity (to open up the transportation channel from the Pacific Ocean to the Baltic Sea and to gradually form a transportation network that connects East Asia, West Asia, and South Asia); promoting trade and investment facilitation; enhancing monetary circulation and strengthening people-to-people exchanges. Xi Jinping referred to a golden opportunity for the countries of Central Asia (Brakman et al., 2019).

In 2014, Kazakhstan launched a major program "NurlyZhol" aimed at the modernization of national transport infrastructure. The goals of the program are largely in line with those of the BRI: it is mainly focused on attracting state and FDI into core infrastructure and priority sectors of Kazakhstan in order to achieve faster economic growth (Cinar, 2021). It was planned to spend approximately USD 9 billion on developing agribusiness, manufacturing, trade and logistics, tourism, information technology and finance sectors. The creation of "NurlyZhol" program has, among other goals, allowed a swift integration with China's BRI, many of the program's goals reflecting those of the BRI and their success depending significantly on Chinese investments. China praised the creation of NurlyZhol program in Kazakhstan and in 2015, the two countries signed a joint declaration on conjunction of the Silk Road Economic Belt and NurlyZhol (Alibekova, 2016).

Since almost 10 years have passed since the announcement of the BRI initiative it is relevant to gain the understanding of the current situation and whether the preliminary projects objectives have had the expected impact on the Kazakhstani economy. The purpose of this study is to highlight in which areas the plans of the programs were achieved and which areas would require further improvements in order to reach the goals specified about 10 years ago.

Literature Review

The BRI is a major factor in the development of the regions it passes through. As one of the key elements, shaping the direction of development of these regions at various different levels, it has spurred a considerable amount of both positive expectations and opportunity-related optimism, but also lots of pessimism, ranging from mild concerns to strong fear. Almost ten years after the first announcement of the initiative, it seems interesting to evaluate its factual impact on Kazakhstan, one of its major participants, and one of those expected to benefit the most from it. The core of the BRI is the development of several new trade routes connecting China with the rest of the world, with infrastructural projects implemented all along it. However, the BRI is also frequently referred to as one of the major instruments of China's influence, in particular via investment projects, in which China acts as a creditor. Kukeyeva and Dyussebayev (2019) point to the opportunities and risks of the BRI for Kazakhstan to achieve a more diversified economy, but also emphasize the importance for Kazakhstan to assert its interests against an overly influential partner.

Jue and Wallace (2021) express concern about the increasing dependence of the BRI participants on China and its economy and the risk of fallinginto a debt trap for many of them. In addition, Zogg (2019) points to Kazakhstan's more cautious approach to Chinese investments compared to

other countries in the region and a stronger position it is in, which would allow it take advantage of the BRI more cautiously, despite the general opacity characteristic of the Chinese presence in the country. A relevant background on the foundations of the BRI is also provided by Brakman, Frankopan, Garretsen, Van Marrewijk, and Shakhanova, Garlick (2020). Czerewacz-Filipowicz (2019), in particular, focuses on the Eurasian Economic Union as part of the BRI.

Economic exchange between China and Kazakhstan has been in active development, in particular since 2000. Kazakhstan is the largest recipient of FDI from China among the CIS countries, and one of the key recipients of investment in the framework of the BRI (SamrukKazyna, 2018). The new economic corridor over the Eurasian region covers more than 30 countries from Eurasia to the Baltic and Pacific region (Gelvig, 2020). Some projects cover both regions – the EAWU as well as the EU (CzerewaczFilipowicz, 2019).

According to the World Bank, Kazakhstan is likely to be among larger beneficiaries of the BRI. First of all, this is due to its location: it is a land-locked country, and consequently, its dependence on the quality of cross-border transport for exchange with other countries is high. This raises two issues for Kazakhstan. The first one is maintaining the quality of its own trade routes, which the country has already been investing into, and which is expected to benefit considerably from FDI in the framework of the Chinese initiative, coupled with substantial investments from the Kazakhstan's government. The major benefit of the BRI for Kazakhstan is supposed to be the improvement of national trade routes. In addition, the BRI has also been expected to contribute greatly to the easing of the second issue related to Kazakhstan as a large land locked country: the quality of infrastructure in surrounding countries. Indeed, Kazakhstan's exchange with the rest of the world has been hindered by a rather low quality of transport infrastructure in the neighboring countries. This is an issue, which would be more challenging to resolve via the country's own state investment. China's focus on connecting its western and central regions more effectively to Europe and to West Asia provides an opportunity to address this issue. In addition to the improvement of infrastructure, providing opportunities for better connection of Kazakhstan to the surrounding regions and to global trade, thanks to such development of trade routes and facilitation of trade procedures (customs, tax, financial), Kazakhstan has been expected to pick up a part of the trade flow between China and Europe, as well as between China and West Asia (World Bank, 2020).

Methodology

The questions to be answered are in which sectors the country has benefited over the last years and which sectors have growth potential over the coming years, in particular, for international companies or companies from the EAEU.

Certainly, it was interesting to understand whether the targets the companies set up themselves 10 years ago were fulfilled or where variance to the previous expectations appeared. Additionally, extra focus was given to the aspect of whether (according to the experts' opinion) Kazakhstan has benefited from being a member of the EAEU.

As the influence of the BRI is vast and complex, and manifests itself in many interrelated areas, expert interviews were chosen as a qualitative research method to take into account the most significant recent developments, such as the conflict between Russia and Ukraine. Based on the cumulative experience and knowledge of experts who have seen and studied the changes caused by the BRI up close and on the spot, it is possible to capture their worldviews and future expectations. In connection with this, 10 experts were interviewed.

In order to receive an unbiased and objective result of the study, the particular attention was given to the interview of partners from different industries. Relevant long-term knowledge of the Central Asian region of about 10 years was the key criterion when choosing sample. The experts interviewed are from the logistics sector, professional services, such as consulting companies or risk advisers, but especially companies with long-term local presence. The interviews were conducted via physical meetings, phone calls or other electronic communication tools. The interviews were conducted in Russian and English languages and translated by the author. Two respondents answered the questions in written.

After that Phillippe Mayring's qualitative content analysis method was applied. It was chosen as one of the most structured and theory-guided approaches in order to provide the most accurate analysis. Categories were formed applying the inductive method (first suggested in the 6thaddition of Mayring's Qualitative Content Analysis), defined

and delimited (Mayring, 2015). Finally, the interpretation of results with regards to the research question was conducted. The application of such method allowed a structured and rule-guided analysis of the material based on clear instructions aiming to achieve the most validity, reliability and objectivity of the research. In order to receive supplementary information for this article existing literature on the BRI and the Silk Road with a focus on Kazakhstan was reviewed as a secondary source of information. The literature in Russian was translated by the authors.

Results

Further into the integration of China – Kazakhstan cooperation, four key areas have been defined. The first area corresponds to the development of a transit corridor, creation of logistical centers in Kazakhstan, and the facilitation of customs, tax, financial, and other processes related to trade. The second area of cooperation corresponds to joint projects in various industries. In September 2015, the decision to relocate 51 Chinese factories to Kazakhstan was announced. The projects will receive investment from the Silk Road Fund and the Asian Infrastructure Investment Bank. The third area of cooperation relates to science-driven and high-tech sectors and includes collaboration at the level of scientific institutes and universities, as well as joint enterprises. The fourth area of cooperation is agricultural sector. By 2016, 19 joint projects were planned for implementation or under implementation, in particular, in such sectors as deep processing of agricultural products: meat, oil-bearing plants, grain crops, tomatoes; and construction of feeding stations. The products are then planned mainly for export to China (Alibekova, 2016).

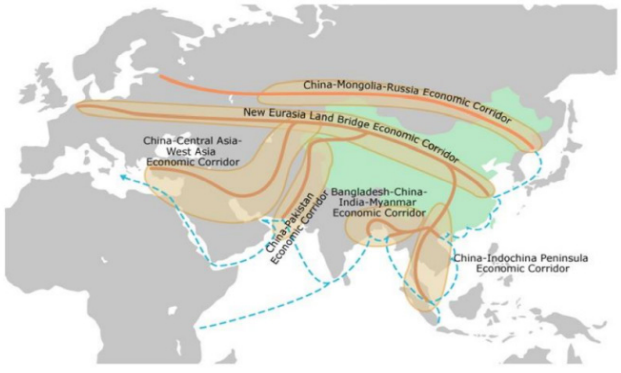
Indeed, one of the key goals of China with the BRI is increasing its own economic and political power and making the participating countries interdependent with the Chinese economy (Jue & Wallace, 2021). And, as countries with considerable differences in size and economic potential build joint projects, it is important for the lesser power to avoid losing its economic and political autonomy, considering its interests (Kukeyeva & Dyussebayev, 2019). Kazakhstan is thus faced with considerable opportunities presented by the BRI, but, in order to fully benefit from them, a strategy protecting the county's interests while working with such a powerful partner seems necessary.

The BRI has thus been expected to have a number of positive effects on Kazakhstan, including the development of its transit potential, modernization of its internal and surrounding transport infrastructure, raising trade turnover, attracting investment into various industries and reducing the dependence of economy on natural resources exports, as well as an overall GDP increase (Amrebaev, 2017).

The regions, located along the three routes of the BRI passing through Kazakhstan, and, in particular, main transport hubs of these routes, have been expected to benefit the most from the new and upgraded infrastructure, as well as from the increasing trade flow.

For Kazakhstan, China is an important partner, creditor, and investor. However, Kazakhstan also has a major place in the implementation of the BRI, mainly due to its location, but also to its level of economic development and rich natural resources. Indeed, two BRI corridors pass through Central Asia to connect China to Europe and to Iran and West Asia via five routes, three of which go through Kazakhstan. The first corridor passes through two railroads, one through Kazakhstan and Russia and the other through Kazakhstan and Turkey. The second corridor goes through three routes, out of which one goes through Kazakhstan, Uzbekistan and Turkmenistan as illustrated in Figure 1.

Figure 1:
The Belt and Road Initiative (World Bank, 2020).



Source: Xinhua News Agency; Hong Kong Trade Development Council

The Eurasian Land-bridge BRI Corridor connecting China to Europe uses two routes, both of which pass through Kazakhstan. **Route 1:** China (different cities, Urumqi, Alashankou); Kazakhstan (Dostyk, Mointy, Astana, Petropavlovsk); Russia (Yekaterinburg and Moscow); Belarus; Poland and finally Duisburg in Germany (Duisburg). This route mainly benefits the North East of the coun-

try. It passes through Dostyk in the Almaty region, which is one of the main regions of the destinations of the BRI investment in the country. It is located at the border with China; Mointy in Karaganda region; Kazakhstan's capital Astana, and Petropavlovsk (North Kazakhstan region) in the north of the country, at the border with Russia.

Route 2: China (different cities, Urumqi, Khorgas); Kazakhstan (Altynkol, Almaty, Shu, Zharyk, Zhezqazghan, Saksaulskaya, Aktau); Azerbaijan (Baku, Ganja, BeyukKesik); Georgia (Gardabani, Tbilisi); Turkey (Kars, Istanbul) and Europe. The second route passes through Altynkol and Almaty in Almaty region bordering China, then Shu (Zhambyl region in the south of Kazakhstan), then heads west through Zhezqazghan in Karaganda region, Saksaulskaya in Kyzylorda region, Shalkar (Aktobe region), Beyneu and Aktau (Mangistau region) at the Caspian Sea shore.

One of the three routes of the corridor connecting China to West Asia also passes through Kazakhstan, although only through Almaty and Altynkol in Almaty region bordering China.

Consequently, in terms of infrastructure development in the framework of the BRI project, Almaty region is expected to be the largest beneficiary in the country as the main point of entry for transport going from China to Europe and to West Asia. North-eastern regions of the country are also supposed to take an important part in the BRI, namely Karaganda region, Astana and North Kazakhstan. Zhambyl region in the south of the country, as well as some western regions–Kyzylorda, Aktobe and Mangistau are also located among the major routes of the BRI (World Bank, 2020).

As for agricultural investment projects, the main destinations are the regions located at the border with China, in the eastern part of Kazakhstan, and those located along the main BRI routes. These are, for instance, East Kazakhstan region (e.g. with the construction of a meat processing plant), Almaty region (beef production plant project), Aktobe region (beef production); North Kazakhstan region (oil-bearing plants and grain processing); Kyzylorda, East Kazakhstan and West Kazakhstan regions with tomato processing plants projects (Alibekova, 2016).

Major industrial investment projects planned in the framework of the BRI are more evenly spread all over the country, namely: the production of methanol and ammonia, as well as products based on them; The first stage of polypropylene production by United Chemical Company LLP, which is a subsidiary of Samruk–Kazyna; modernization of the Atyrau oil refinery (construction of a deep oil refining complex & construction of a complex for the production of aromatic hydrocarbons), all three in Atyrau region; production of elevators and lift equipment by Kazakhstan lift-building company KazLift (Almaty); cement production plant DANAKE Corporation in Kyzylorda region; production of phosphorus trichloride and glyphosate; production of methanol and ammonia, as well as products based on them, both by United Chemical Company (a subsidiary of Samruk–Kazyna); production of potassium sulfate; spindle production by Factory POSH-Taraz; project of the FEZ Chemical Park in Taraz, all five in Taraz FEZ in Jambyl region; polyethylene terephthalate waste processing and staple fibre production in the BADAM industrial zone (Turkestan region); construction of a mining and processing plant on the site of the Tymlay deposit in the Kordai region; reconstruction of the Kazakhstan Electrolysis Plantin Pavlodar region; construction of a plant for the production of fuel assemblies by Ulba in East Kazakhstan region; manufacture of Anhui Jianghuai Automobile brand cars (SaryarkaAvtoProm, Motors, CMC) in Kostanai region; modernization of the Shymkent oil refinery (Aminjonov et al., 2019).

The Reduction of dependence of the economy on natural resources is one of the key goals of Kazakhstan, as the country's economy has been for long highly dependent on its rich resources, in particular, hydrocarbons. The BRI has been seen as a chance to reduce this dependence. Developing the country's transit potential and investing in joint ventures in its various industrial sectors would indeed allow it to diversify the economy (Kukeyeva & Dyussebayev, 2019). On the other hand, there are also doubts about the positive stimulus for the country's economic, being highly dependent on oil and its export along with mineral resources. It is questionable how the country benefits from being majorly a logistic hub for Chinese products being transported to the consumers in the West (Cinar, 2021). Also from the interviewed exerts'side infrastructure projects, such as the dry ports Khorgoz or the improvement of the Caspian Sea port of Kurik, were mentioned. However, in addition to several expected positive effects, the BRI has also raised a number of concerns for Kazakhstan.

Financial dependence is a minor concern for Kazakhstan, other areas of potential inequality

of benefit from joint projects have risen some questions. As the BRI has not been very transparent on its projects, there have been concerns related to the local labor and businesses, which might be hurt by the inflow of workers and stronger businesses from the powerful neighbor. Indeed, Chinese businesses might bring their own workforce with them, and offer more competitive prices in the market, which would create difficulties for local population and companies (Zogg, 2019), (Ecological Civilization and the 19th National Congress of the Communist Party of China, n.d.). The real conditions, under which joint projects are implemented and in which measure they take into account Kazakhstan's interests is a matter that remains to be analyzed (Kukeyeva & Dyussebayev, 2019).

In addition to the concerns related to the growing influence of China over Kazakhstan and challenges for the local workforce and businesses, there have also been concerns related to the environmental issues. As China has adopted a new ecological civilizationmodel, which is aimed at reducing pollution in the country, (Ecological Civilization and the 19th National Congress of the Communist Party of China, n.d.) there is a danger of particularly polluting businesses being relocated to other countries. Consequently, environmental impact of Chinese plants relocated to Kazakhstan needs to be closely examined.

There has also been a geopolitical concern related to the parallel development of the EAEU project aimed at the creation of a common economic space, which would provide freedom of movement, goods, services, capital, and labor among Armenia, Belarus, Kazakhstan, Kyrgyzstan, and Russia. Even though the BRI and the EAEU do not directly contradict each other, Kazakhstan would need to pay particular attention to the coordination between the projects in the framework of the two different integration processes in order to avoid conflict (Kukeyeva & Dyussebayev, 2019). The mutual dependence between the BRI and the EAWU was also emphasized by the experts' side. In particular due to the conflict between Russia and Ukraine Kazakhstan's position as a logistics corridor gains attention while Kazakhstan is viewed to be a hub for the whole Central Asian and Caucasian region, nonetheless the EAEU is dominated by its largest participant – the Russian Federation. Trade routes are increasingly avoiding Russia. The neighboring countries gain attention, such as Mongolia or Uzbekistan for instance.

The interviewed experts also see a future strong potential, besides infrastructure projects, in the agricultural and renewable energy sector. The customs union within the EAEU is of support here, which ensures simplified customs processes throughout the region, movement of people and goods through the markets.

Conclusion

The BRI has been expected to have a considerable influence on Kazakhstan at several different levels and in different areas. As most of the projects are focused on the infrastructure and cross-border cooperation, its impact has been expected to be rather uneven for different regions of the country.

As noted above, Kazakhstan can be considered one of major elements of the BRI, and the BRI, as one of the main phenomena for the development of Kazakhstan. Thus, it is expected to influence Kazakhstan in a number of different ways and areas.

The result of the improving infrastructure would be lowering of shipment time and trade costs, general increase of FDI (in particular, in non-energy sectors, such as agriculture and processed foods, transport machinery, and processed metals), growth of exports in other categories than energy resources, and rise of the country's GDP. As Kazakhstan is a EAEU member, together with Armenia, Belarus, Kyrgyzstan, and Russia, the country should benefit from the Union's aims on the free movement of goods, services, capital, and labor among the member states (Shakhanova & Garlick, 2020).

While many countries that take part in the BRI might see their dependence on China as their major creditor increase considerably, Kazakhstan has aimed at keeping the share of Chinese investments in the projects in its territory at a certain limit (Zogg, 2019). However, the real impact of the BRI on the growth of China's influence on Kazakhstan remains to be seen.

The BRI project is thus a source of great opportunities for Kazakhstan, but it needs to be managed carefully in order for the country not to become dependent on a politically, economically and culturally powerful partner, which China is for many countries in the BRI.

A clear strategy of economic diversification would also be needed in order to ensure that Kazakhstan's participation in the BRI contributes to the decrease of the country's focus on natural resources, which has been one of its major goals and which is a considerable challenge to achieve. The country's authorities would need to make sure that the investments flow into the industries other than natural resources, and, in particular, hydrocarbons extraction and sale (Louthan, 2022). As for the exports, several areas show strong potential. Besides infrastructure projects, the agricultural and renewable energy sectors have high perspectives for the future.

In general, the country seems to benefits from both – the participation in the BRI, while China's influence will probably continue to increase, but also from the EAWU with the easier transfer of capital, goods, services and people. In particular for the logistics sector the integration into the EAWU is useful. Further infrastructure projects along the Silk Road are expected to realize. The negative aspects of the limitations and sanctions on the Russia-based corridor may be offset with the reorganization of trade routes bypassing Russia. This might bring further light on the Middle Corridor. As for international companies Kazakhstan and the neighboring countries present themselves as a good opportunity for further investments.

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REVIEW PAPER

THE CONNOTATION OF DIGITALIZATION FOR A COMPANY'S RISK MANAGEMENT

Nina Peter

University of Applied Sciences Burgenland, *Eisenstadt, Austria*

Correspondence concerning this article should be addressed to Nina Peter, University of Applied Sciences Burgenland, Eisenstadt, Austria. E-mail: 2119001104@fh-burgenland.at

ABSTRACT

Digitization is apparent. Due to this, business processes are transforming. Particularly for risk management, the digital revolution introduces amendment. Fresh chances are provided, while on the other hand, uncharted threats arise. Hence, risk management needs to actively adapt and change. The purpose of this paper is to understand if digitalization affects risk management. Subsequently, the focus is emphasized in innovations. In contrast to one another and concerning to one another, risk management facilitation and challenges are discussed. Twenty articles in financial journals provide the foundation of this paper and show that many companies are consulting firms such as the Big Four KPMG or Deloitte on the potential impact of technological advances. There are preparations and accompaniments for the implementation of new technologies. According to this, the premise is that the trend toward digitalization streamlines and expedites risk identification and subsequent risk assessment. Along with a case study on the current situation involving the company "Vienna Energy," which is heavily covered in the media, a scientific literature search was conducted. The organization has been accused of poor risk management. The findings demonstrate that there is already adequate knowledge available, and many businesses are already aware of the advantages of new technologies. Digitalization has a huge impact on business processes and will result in risk management rationalization and change. Thus, this research can add new dimensions to the risk assessment process and, particularly, express the benefits and opportunities of non-analog methods.

Keywords: digitization, risk management, rationalization, media case "Vienna Energy"

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I. INTRODUCTION

"The sharp rise in wholesale gas and electricity prices has put Vienna Energy in financial jeopardy. However, the company regrets its inability to pay." (Schlager, 2022, p.2). Since last August, these and other similar claims have been reported in the media. Hence, the issue of the group's risk strategy and whether risk management has failed arises.

"Vienna Energy" is a typical example of the current challenges that businesses face. Increasing digitalization, ongoing cost pressure, and the threat of trade wars are just a few of the many tasks that sap companies' energy and patience, and effort (Weikhard A., 2020). Therefore, thorough risk management should be an essential component of economic decisions. Recent market analyses and current research indicate that risk management, which is defined by data collection, aggregation, evaluation, and reporting, possesses enormous digitalization potential. Individual process steps as well as the data to be processed are viewed as opportunities for risk-oriented corporate management associated with digitalization (Schwenzer et al., 2020). There is no denying the subject's volatile nature.

Thus, the state of knowledge leads to the fundamental hypothesis of this paper, that digitalization simplifies the work of risk management. The purpose of this paper is to contribute to the various economic implications of digitalization on risk management and consequently highlight current risk management trends. The benefits of digitalization for risk management are discussed and contrasted with new emerging difficulties and costs. The knowledge gap regarding if innovations provide organizations with real added value in risk detection will be closed.

The paper is divided into two major sections. Based on a literature review, chapter one of this paper fundamentally explains digitalization in the context of risk management and defines technical terms. Subsequently, the possibilities and trends of non-analog risk management are listed and justified in detail. The second chapter focuses on a case study that uses the example of "Vienna Energy" to provide qualitative insights into the failure of risk management. The Stated Problem Method is applied. This entails a critical evaluation and assessment of the choices made in the "Vienna Energy" case based on the knowledge gleaned from the literature. The question whether the use of new technologies could have prevented or defused the "Vienna Energy" situation through early warning signs is investigated. The discussion around appropriate digital risk management tools is constantly growing in companies. Therefore, this paper can be of high importance for many experts in their decision-making process. The results form a basis for their risk assessment and can revolutionize the risk management process.

II. Literature Review

Humanity went through the industrial revolution about 200 years ago, now we are currently in the digital revolution. Industry 4.0 is another term for the digital age in science. Currently, risk management is viewed as an integral component of corporate management. It encompasses all organizational measures and processes aimed at identifying, assessing, controlling, and monitoring risks, as well as shaping the risk situation (Diederichs, 2018). In contrast, modern, digital risk management entails not just decreasing risks, but also recognizing possibilities. The conflict of objectives between opportunities and risks must be made clear to be resolved in the best possible way, following corporate strategy (Hopfener & Timm, 2018). This is accompanied by increasing complexity. The number of available data as well as its volume is increasing enormously. In addition, companies must face the challenge that the information flow of this data is spreading at a rapid frequency. Hence, it can be concluded that digital data streams enhance risk analysis capabilities, but also introduce new risks such as potential cyberattacks.

The risk management process starts with risk identification. Automation techniques enable systematic mass data analysis according to the parameters set by a company. Previously, this activity had to be performed analogously by an employee and cost not only more time but also a lot of money. Big Data relieves the employee and allows them to focus solely on the analysis of findings (KPMG, 2019). Big Data, which refers to rapidly increasing amounts of data, is a result of digitalization. Big data aids in the real-time monitoring of internal and external information sources in risk management. The effectiveness of risk-aversion measures can be continuously assessed, making risk management a dynamic component of the business process. The central prerequisite for this is transparency and knowledge of the business processes within the company and the surrounding ecosystem (Schwenzer et al., 2020).

Digitalization necessitates the transition from a reactive to a proactive risk management function. Currently, risks are updated for the majority of businesses on a monthly, quarterly, or annual basis in a traditional risk report about assessment criteria and the status of corresponding measures. This documenting of existing risks, like the identification and assessment that took place in analog risk management, is based on the human aspect. If several people are reporting in a larger company, this can lead to redundant reports or contradictions in the content of the reports themselves. This will be changed. Digital risk management enables forecasts far into the future and, thanks to the availability of data in real-time, a precise, timely, and accurate analysis of the risk dynamics and the associated potentially dangerous developments. An up-to-date risk report may be available at any time (Schwenzer et al., 2020).

Customer needs that are always changing, increased need to innovate, and increased competition do not end with a company's risk management. Risk management must evolve and frequently adjust to changing circumstances. Risk management must transform itself and regularly adapt to changing conditions.

When you examine risk management from the ground up for a business, the business model serves as the foundation. New technologies simplify many work steps and create automation, so companies' business models often change fundamentally. For example, for many businesses, the now-established online selling has been a significant adjustment. The increased reliance on web-based resources gives businesses more flexibility, but it also introduces new hazards. IT systems need to be periodically maintained to ensure quick and efficient processing of online purchases (Glaser, 2022). The digitization of business processes poses challenges for companies, as it goes hand in hand with the global networking of data flows. This requires a broad spectrum of security activities in the company to manage cyber risks appropriately (Röhm-Kottmann. M. Kesting. B. , 2022). This clearly shows that risk identification and evaluation are becoming less reliant on the human aspect. However, the employee is compelled to participate in new activities. Calibration and maintenance of risk management processes, as well as the systems and algorithms that support them, remain dependent on humans and must be performed by them. Digital systems benefit from the ability to communicate with one another. Hence, suitable interfaces with other departments can be developed for risk management, allowing a significantly larger amount of information and data to be collected within a single system. Each department does not need to be consulted separately and can make inputs straight into the system. This provides clarity for the entire organization (Röhm-Kottmann. M. Kesting. B. , 2022).

Non-analog risk management will secure future data flow and data security. Algorithms eliminate the need for a brain to collect and interpret data; instead, this is done automatically. However, the algorithm must be programmed, and the system must be instructed. Future risk management must be able to conceive in terms of networks and act rapidly. Flexibility and adaptability must become essential themes in daily work. Big Data and Artificial Intelligence will make it easier to identify threats and collect larger amounts of data. However, this rapid pace also introduces new dangers. Companies are becoming more technically exposed, and there is a greater chance that information will be accidentally created and leaked to the public. Employees in the field of digital risk management must think collaboratively and be aware of these specific threats. Overall, it is evident that risk management must become more adaptable considering digitization to capitalize on the corresponding advantages of digital intelligence and still not overlook any dangers for one's own company (Schwenzer et al., 2020).

New technologies can automate the original activity of a risk manager in the future. Intelligent software programs will provide their users with a push notification of the potential risk. Thus, the risk management team of a company can react immediately and consider measures. However, the consideration of measures will not be limited to risks that have already occurred. In the future, risk managers will have to build up technical know-how to understand their technology partners in the form of software and thus also to be able to analyze which risks are hidden behind them. The question must be asked as to how it can be ensured that no outside persons with IT knowledge have access to the enormous data flow of a company. Data protection is becoming increasingly important.

In summary, intelligent software means high acquisition costs for companies, as well as associated high training costs for all employees in risk management. However, it is to be expected that this use will quickly pay for itself. After all, even the

best risk managers cannot capture and analyze the volume of big data with the same speed and precision. Of course, due to the fast-moving nature of the data, a corresponding package of measures must also be decided upon and implemented by the management of a company within a short period. If this does not happen, the company will lag its risks.

III. Research Methodology and Design

Objective and research question

Risk management and digitization are integrated, according to the scientific community. This article assumes that digitization will have a significant impact on risk management activities. Based on a traditional literature assessment, the existing scope of risk management activities is compared to potential modifications. The aim is to add new dimensions to the enlightenment of risk managers and to demonstrate the associated benefits. The primary research questions "Does the use of digital risk management tools achieve results that facilitate risk identification?" and "The use of which digital applications enables warning signals to be transparent and assists companies in the early detection of potential hazards?" accompany the entire research process and constitute as the foundation for this article's techniques section.

The emphasis of the technique section has been on a qualitative case study. The case of the Vienna Energy company, which has recently received a lot of attention in the media, serves as a prime example of potentially failed risk management and is meant to demonstrate if digitization could have allowed the company to make earlier forecasts. The goal is not to conduct a thorough investigation of Vienna Energy; it is the responsibility of the International Court of Auditors. The aim is to reflect the current state of risk management developments and to use a tangible example to query whether the use of a specific tool might have saved Vienna Energy from a risk management failure. The objective is to conclude whether digitization can contribute to more transparent risk management in the future.

Clarification of the evaluation method

This paper used a qualitative research approach. Following the completion of the classical literature search, the company Vienna Energy was analyzed and newspaper articles about the recent liquidity crisis of the company were collected. Throughout the course of the investigation, articles from traditional print media as well as publications from online periodicals were consulted. There were no constraints imposed on the source of the newspaper stories, such as focusing on specific databases. The key justification for using all sources was to capture the greatest possible range of background information on the existing risk management system implemented at the Vienna Energy company. However, it was obvious that only literature based on well-founded, retraceable sources was included in the analysis. The case of Vienna Energy is a recent event, hence no restriction regarding the publication period of articles was required. All the underlying literature focuses on the years 2020 to 2022.

Each author has a different focus in their publications, so the newspaper articles were categorized as a first step. The underlying ambition was to compile a well-rounded and clear case description from individual sources. The categories chosen include the major keywords and topic blocks that appear most succinctly and frequently in the literature on which this article is based. The frequent mention in connection with the topic of risk management and digitalization led to the assumption that it is precisely these selected keywords that best summarize the literature. The following literature categories have been outlined:

Table 1:
Literature categories

General data and history of the company
Case description – what happened?
Core Business
Stock market development
current risk management
Warning signs
Potential misconduct by management

Following that, the newspaper articles were summarized to create a case description of Vienna Energy.

The case description forms the basis for the analysis of the research underlying this paper. To conduct this process of investigation, the stated problem method was applied. This approach

summarizes a previously occurred event or already known problem. Based on intensive data collection and data gathering, an attempt is made to deduce possible causes and triggers for this and to work out conceivable proposals for solutions. This technique offers support to the previously mentioned study questions, "Does the employment of digital risk management technologies result in outcomes that facilitate risk identification?" and "Which digital applications are used to make warning signals transparent and help businesses find possible problems early on?". The causal investigation planned as a first stage in the data analysis may, for example, indicate whether the employment of new technology in the "Vienna Energy" scenario revealed plausible signs of potential hazards. This finding would imply that the company's risk management failed, confirming the assumption from the literature analysis that digitalization in risk management simplifies risk detection. Additionally, the applied methodology is effective in answering the second research question. The solution to the question of which tools make risks more transparent and thus produce early warning signs may be simultaneously associated with a possible solution approach in the Vienna Energy case.

Based on the case description, all difficulties identified were listed as categories.

Table 2:
"Problem" categories

0	Stock market dependency
1	Term of forward transactions
2	Dependency between electricity and gas

For these categories, the results of the literature research were examined and analyzed or assessed, respectively, with which scientific cause the named challenge can be justified and which solution can be derived from it. More detailed information on the results can be found in the results and discussion part.

Case description Vienna Energy

Vienna Energy is Austria's largest energy supplier with around two million customers. Millions of households are supplied with electricity, gas, and district heating. On Sunday, August 28, 2022, it suddenly became known in the media that the company was missing several billion euros. The company is in a liquidity crisis. Without government assistance, Vienna Energy would no longer be able to purchase electricity and thus would no longer be able to adequately supply its customers. The company's official justification was that, due to the ongoing conflict between Russia and Ukraine, energy and gas costs had skyrocketed, making it far more expensive for Vienna Energy to purchase power for its consumers. Additionally, the stock exchange price had also doubled, so the company ultimately slipped into a financial emergency.

The basic business of Vienna Energy happens on the stock exchange. According to its information, Vienna Energy sells large quantities of electricity via exchange for two years in advance at a price that has already been fixed. This is referred to as forward transactions, specifically so-called futures. In this way, electricity producers can hedge against price fluctuations and know what fixed revenues they can expect. In return, the electricity buyers secure a guaranteed energy supply. This is important for the security of supply. Without such forward transactions, energy suppliers would not be able to offer their household customers fixed tariffs, but only floater tariffs, which are adjusted depending on the development of the electricity price - usually monthly. The company must raise large sums in advance financing. In the case of such futures, the energy exchanges act not only as pure trading centers. They are coupled with clearing houses that guarantee the respective buyer and seller that the transaction will take place as agreed. For this purpose, both trading partners must deposit collateral with the clearing house - so-called margins. Part of this collateral is recalculated daily. If electricity prices rise, the seller must make additional payments; if they fall, the obligation to make additional payments falls on the buyer. Such cash settlement takes place daily in the case of futures. Let's assume that a producer offers to deliver electricity today for 100 euros per megawatt hour in a year. If the price of electricity rises to 150 euros in the meantime, he is hit by a so-called margin call and must pay 50 euros more. However, if the price falls to 50 euros per megawatt hour, it is up to the buyer to pay 50 euros more. This means that the business partners are mutually hedged. If the producer is unable to deliver on the agreed date, for example, because he has gone bankrupt, the buyer would have to buy his electricity at the current daily price of 150 euros and would not be able to purchase it for 100 euros as agreed. If, however, the current price on the delivery date is 50 euros and the buyer is unable to purchase and pay for the electricity, the producer

would have to sell his energy to another buyer at a lower price. The margins , therefore, serve to ensure that in the event of default by one of the two contracting parties, the exchange can indemnify the other. If the transaction goes through as originally planned, both counterparties receive their paid-in collateral back (Melichar & Hiptmayr, 2022).

Despite this understandable change in the market, the company is accused of having failed in its risk management. Rightly so? Voices are being raised that the company should have always anticipated unforeseeable inflation and built-up reserves. The sentiment is clear, instead of paying dividends to shareholders, preparation for possible crises and risks would have been called for.

This is exactly what the analysis of this case study is intended to answer. Did Vienna Energy's risk management fail? Could technological tools such as Big Data have helped in the early detection of stock market developments?

IV. Results

As stated in the previous chapter, the qualitative research for this work was conducted by building categories for the stated problems of Vienna Energy in the media and print media. The hypothesis that digitization will simplify risk identification was investigated.

The compilation of the results showed the following outputs:

0 – stock market dependency

Vienna Energy sells its electricity exclusively on the stock exchange and at the same time also buys the gas required for electricity generation there. The company only concludes forward transactions with a minimum term of two years on this trading platform. However, those exchanges that trade in energy are coupled with so-called clearing houses, which guarantee the buyer and the seller that the transaction will take place. For this service, however, market-price-dependent security in the form of cash must be deposited with the clearing house on both sides. (The exact function was explained in the case description).

This short paragraph and description make clear, that Vienna Energy exhibits a very high dependency on the stock market, especially on the clearing houses. The reason for this is obvious. There is no maximum limit on the amount of collateral to be deposited, regardless of the amount of a transaction. Collateral is not part of the business contract. Clearing houses work exclusively at daily updated prices and depending on the current price development, the buyer or seller must make corresponding deposits.

If Vienna Energy concludes a transaction, this is always a fixed price. The obligation on the part of the buyer and seller to enter the transaction in two years is always variable. This is the crux of the matter and the cause of Vienna Energy's payment difficulties.

A possible solution is already proposed in the literature review. On the one hand, the company could reduce its dependency on the stock exchange by negotiating with the clearing houses about possible maximum limits or at least ranges of fluctuation in which the securities will be forfeited. On the other hand, the use of big data could also help to forecast market price developments more easily across the industry, so that a business can be abandoned in good time.

In detail, the company should use blockchain technologies to monitor market prices across the industry on a second-by-second basis and react immediately as soon as the collateral to be deposited exceeds the value of the transactions concluded. If this is the case, the company will no longer be able to make a profit even if trading is carried out as planned.

1 – term of forward transactions

The literature research indicates that Vienna Energy only enters forward contracts with a term of at least two years (Melichar & Hiptmayr, 2022). This company guideline exists to be able to offer customers the security of supply. This guarantee is, of course, one of the decisive points that make the state-owned provider Vienna Energy one of the market leaders in the Austrian energy sector. The downside, however, is that Vienna Energy must calculate its market price forecasts far into the future. These calculations are associated with strong uncertainties in conventional analog risk management. Vienna Energy describes those past values of the last years (related to the term of the energy contract) including an inflation premium of 2.5% used for the calculation of market prices (Melichar & Hiptmayer, 2022).

Basing the calculation of market price forecasts only on past values no longer corresponds to the rhythm of the current era. This is also the cause of the company's problem area. Therefore, the recommendation is again that it would be advantageous for Vienna Energy to implement blockchain and its technology in the company.

2 - Dependency between electricity and gas

In addition to selling its power on the stock exchange, Vienna Energy also purchases the gas needed to produce electricity there. Yet, it is unknown how many contracts for gas trades are signed ahead of time (Melichar & Hiptmayr, 2022). The trajectory of gas costs has a big impact on the business. In this instance as well, the energy group's risk management only relies on hazy projections. According to what is known, Vienna Energy's similar risk management system creates an annual risk matrix and analyses each financial year's specific dangerous business activities. Analyzing the publications concerning the Vienna Energy case, the literature notes thatby experts, the energy group devotes little effort to investigating the dependency between the development of the gas price and the electricity price. This aspect is perceived as one of the factors that have contributed to the company's payment difficulties. One reputable auditing firm, for instance, recommends building a so-called SWOT analysis from the price developments of both sectors. The justification behind this is to identify correlations easily. A comparison frequently mentioned in the literature is the relationship between supply and demand. If the supply on the market increases, but the demand decreases, then a price reduction is to be expected. Vienna Energy could apply the same principle in its considerations.

An overview of the Big4's perspective on Vienna Energy´s risk management

Vienna Energy´s wholesale obligations increased dramatically as early as 2021, but the company made no response. The company is also accused of speculating on falling gas prices and rising electricity prices since 2020. The company had sold electricity on the stock exchange for two years in advance for expensive money, which, however, could be produced cheaply by the company in its gas-fired power plants. The result was a nice contribution margin, which in the end could be distributed as a high dividend to all shareholders (Melichar & Hiptmayr, 2022). This business model contains an inherent risk and is not considered sustainable and reasonable.

Numerous industries, including the two largest accounting firms, have recognized the disruptive potential of digitalization in risk management. The aforementioned companies KPMG and Ernst & Young already offer services regarding the implementation of digital risk management tools and have publicly commented on the Vienna Energy case. In particular, they commented on whether Vienna Energy's auditors themselves should have already recognized an inherent risk in the annual financial statements of previous years.

• KPMG:

KPMG advocates the digitization of risk management. For the company risk management entails digitalization and is unavoidable for companies to include in their annual planning. Systematic, automated mass data analysis is required by KPMG to identify relevant developments for Vienna Energy. Particularly, KPMG highlights three innovations that are relevant for Vienna Energy. This technology does not replace the human risk analysis at the energy company on site, but it supports repetitive work and thereby ensures that all available data has been included. In the second case, KPMG emphasizes the application of blockchain technology, which enables real-time monitoring of identified risks both internally and externally. The efficiency of being able to continuously assess all actions taken is provided by this technology. In addition, the auditing firm recommends drill-down effects, which define automated navigation in historical data, in the key figure analysis (Otremba, 2019).

• Ernst & Young:

EY presents a similar vision for Vienna Energy. As a basic requirement for the future risk management of the energy group, the auditing firm sets out the systematic collection, processing, and interpretation of data from heterogeneous sources and thus clearly advocates the use of blockchain technology. Along with this, a planning calculation in a real-time format with a high degree of automation is recommended. With the help of this tool, unlike before, a basis for decision-making can be presented at any conceivable point in time and possible scenarios for alternative courses of action can be derived. Ernst & Young sees the digitalized risk management for Vienna Energy as having the advantage of giving risk management employees

more scope to develop and consider possible scenarios through automation and big data. In professional circles, this is referred to as Continuous Scenarios (Waniczek, 2020).

Both KPMG and Ernst & Young agree that digitalization has a huge impact on successful risk management. The auditing firms confirm that an algorithm reporting the price development of gas and electricity prices in real-time could have detected that the gap between gas and electricity prices seems to be widening. The audit firms support the implementation of blockchain and recommend the use of drill-down effects. Nevertheless, it is important to emphasize that neither the literature nor the company's published financial statements contain any indications that Vienna Energy speculates on price developments and thus that an inherent risk was overlooked by their auditors. On the contrary, the audit was carried out very precisely and carefully. The fact that the company's business model entails risks were known and only the company itself could have reacted to the movements on the stock exchange.

Big Data enables early detection of risks. After careful analysis and review of all the articles on the Vienna Energy case, it can be confirmed that the use of artificial intelligence could have been a support in correctly assessing the risk. The questions about data protection can only be answered ambivalently. Because Vienna Energy is a state-owned company, the Group also has certain disclosure obligations that must be met. In summary, however, it can be concluded that the Group's risk management should have recognized early warning signs and that at least the recommendation following a portfolio reduction on the stock market would have been the right step. Of course, a war situation and associated price increases cannot be predicted, but contingencies, even if not on the scale that will occur, must be recognized by risk management and packages of measures prepared. In the best case, these will never have to be used.

V. Discussion

The entire research of this article was accompanied by the basic hypothesis that digitalization and especially its effects of it (Big Data, Artificial Intelligence) simplify risk identification and assessment. It supports the fundamental hypothesis that digitization will simplify risk identification.

The activity of risk management is facing a transformation. The literature confirms that risk management is becoming increasingly important and extensive. Digitization can provide optimal support in this regard. The transformation is expected to be such that the human workforce will be supported by automation around data analysis and its focus will be more on deriving the right insights from these results. This is also confirmed by the case of Vienna Energy, which was explained in a case study in this paper. In the past, the energy group relied particularly on analogous risk assessments carried out on self-selected cut-off dates. KPMG's argumentation and recommendation confirm that this approach is outdated and no longer in line with current times. KPMG advocates the implementation of blockchain, as this software can be used to evaluate both internal and external information and data in real-time. Ernst & Young also see only advantages in the implementation of this and emphasizes that the energy sector must be well monitored, as it is a very fast-changing market. For the company, the proposals offer enormous time savings and the possibility to analyze larger amounts of data.

Similarly, risk management is thus expanding its competence. However, this is also accompanied by newly emerging risks. More captured data also means more attack surfaces for outside hackers who aim to access internal company data. The know-how of risk management must change the focus on lacing up the right packages of measures. In addition, the necessary knowledge to instruct intelligent software with parameters suitable for one's own company must be acquired. The change in risk management also means that the reaction time available for appropriate measures is becoming increasingly shorter. Data is changing faster and faster and almost by the minute due to big data acquisition, and corresponding decisions must be made just as quickly in the company (Waniczek, 2020).

Hence, it is valid to mention, that experience with digital risk management is currently quite limited and has substantial growth potential (Deloitte, 2016, p.5).

The cost factor for the acquisition and modernization of early detection systems will quickly pay for itself, but in addition, it is also a factor that cannot remain unnoticed.

The results might suggest that risk management will become much easier and the risk manager's job will become less important. The opposite is the case, risk identification and daily challenges will change. In particular, the assessment of risks and the actions to be taken as a result will come into focus. Organizations such as the auditing firms KPMG and Ernst & Young have commented in particular that companies must learn to design decision-making processes quickly. Risks of new business models leave little room and time for reflection. This also requires changes to internal business processes. The exact process and practical approach for the energy sector are not quite clearly worked out. A more comprehensive content analysis of such a risk management process and the development of a detailed strategy for future interactions between business and risk management would be beneficial. This paper is limited to a qualitative investigation of whether the relevance and importance of digital risk management are apparent and necessary in the Vienna Energy case. The Big Four were consulted to qualitatively support the findings, but not to determine the future risk management tools to recommend. Subsequently, it would be interesting to develop and test exactly the relevant possibilities of digital applications for Vienna Energy.

VI. Conclusion

In conclusion, digitization is gaining more and more importance in the field of risk management. In particular, Big 4 firms are informing and supporting risk management strategies in digital form in a variety of business segments. It is important to emphasize that they are aware that the risk management sector will be affected by the change brought about by Big Data and Artificial Intelligence. Risk management will evolve. The hypothesis that digitization simplifies risk management can be confirmed. The Vienna Energy example underscores the assumption that digitization brings benefits, especially in early detection, and can also contribute to data protection. Risk management and digitization go hand in hand. This confirms the fundamental assumption that the risk management profession is about to transform. However, it would be interesting to know what specific risk management tools should be used in the energy sector and what novelties significantly change the activity of risk management. This is where the further research of this article comes in, going through the process of functioning risk management step by step to find out which technologies will be relevant in the future.

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REVIEW PAPER

GOVERNANCE IMPLICATIONS OF APPLYING INTERNAL AUDITING STANDARDS TO BLOCKCHAIN-BASED DECENTRALIZED AUTONOMOUS ORGANIZATIONS (DAOS)

Miloš Lončarević[1], **Goran Kozina**[2]

[1]***University of Applied Sciences Burgenland***, *Eisenstadt, Austria*
[2]***University North***, *Varazdin, Croatia*

Correspondence concerning this article should be addressed to Miloš Lončarević, University of Applied Sciences Burgenland, Eisenstadt, Austria. E-mail: 2219001040@fh-burgenland.at

ABSTRACT

The research paper discusses governance implications, benefits, and challenges of applying internationally recognized internal auditing standards to the newly emerging Decentralized Autonomous Organizations (DAOs) that have quickly gained traction in the past years and are currently totaling market capitalizations of more than USD 20 billion globally. It is analyzed how standards established for traditional centralized organizations are compatible with a decentralized, often anonymous organization that makes decisions democratically based on majority votes while most operations are conducted autonomously subject to pre-defined self-executing smart contracts. After the technological attributes of blockchains, smart contracts, DAOs and other general considerations are determined, each IIA standard is applied separately and results are drawn from a qualitative analysis. The publication contains the major conclusions from a literature analysis followed by a summary of conceptual obstacles to complying with the standards in case of selecting a DAO as an organizational form which could make their overall legality impossible in a context where the implementation of an IA function is mandatory. Additionally, it is summarized how choosing a DAO can contribute and/or challenge compliance with the standards while giving a glimpse into what internal auditing could look like in the future.

Keywords: Blockchain, Decentralized Autonomous Organization, DAO, Governance, Internal Audit, Standards

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GOVERNANCE IMPLICATIONS OF APPLYING INTERNAL AUDITING STANDARDS TO BLOCKCHAIN-BASED DECENTRALIZED AUTONOMOUS ORGANIZATIONS (DAOS)

Miloš Lončarević and Goran Kozina

I. INTRODUCTION

Internal audit (IA) is seen as a trusted partner by management and other stakeholders including their owners. Based on a study conducted with more than 300 experts in Austria about ¾ not only believe that organizations with IA functions are more trustworthy but about the same number of people believed that it should be mandatory for large-sized organizations. IA functions take on the new role of consulting decision-making bodies in times of emerging technologies especially since currently the largest exposure of Austrian companies is seen to be in IT security (PC Concordia, 2021). Internal auditors' jobs are shifting from mere assurance providing functions to risk and opportunity consultants. Moreover, their business case of representing a modern IA profession should contain the ability to respond to rapidly changing and unpredictable market demands including the emergence and rapid growth of blockchain (BC; see Pugliese, p. 1-3, 2021). In view of the progress regarding artificial intelligence (AI), internet of things (IoT) as well as the distributed ledger technology (DLT) in combination with highly automated directive and preventive controls, IA will need to become inventive and proactive in a world where traditional assurance tasks can be performed exponentially faster in combination with a significantly reduced audit risk.

Organizations and individuals have adopted cryptocurrencies or the blockchain technology in general at an uncontrollably fast pace. The capitalization for publicly traded crypto tokens was believed to be valued at USD 1.21 trillion in April 2023 (Coinmarketcap, 2023) and internal auditors must adapt and be knowledgeable about implications and risks in that regard especially once decision-makers decide to incorporate one of the facets into the business strategy. But even if they do not, the internal control systems must be established in a way in which contemporary risks like ransomware and crypto-jacking are considered (see Audit & Risk, p. 8, 2018). Not only should auditors be aware of risks and implications but also how the technology could affect their very own work. Traditional auditing tasks like performing account reconciliations, reviewing the compliance with policies etc. may be substituted by the technology through autonomous and continuous checks based on smart contracts and a set of automated and preventive controls. It has therefore been suggested that besides middlemen like banks and notaries, internal auditors could become obsolete in the future as well (see Peterson, p. 68, 2018). Auditing firms are already framing a new role that makes auditors validate "the new computerized validators", i.e. go one step back and review design and codes of auditing protocols and controls (see Rapaport, 2018). Overall, IA needs to be involved very early and auditors must educate themselves about the subject to stay on top of leading their organizations into the unknown. This is especially relevant because IA professionals rate their own preparedness relating to the adoption and use of enabling technologies as low (see Protiviti, 2021).

A considerable number of companies decided to engage in various types of blockchain (BC) projects starting from accepting Bitcoin as a payment method on to having part of their supply chain processes on a consortium blockchain to increase security and efficiency. IA should engage in the implementation stage to address their governance, risk, and control view for consideration because adjustments to the BC setup are difficult to execute once the system is up and running (see Chalker, 2018). Use cases vary greatly from fintech, gov-tech, insur-tech, law-tech over P2P energy trade, auction houses, online exchanges, complex data warehouses and thousands of others (see e.g. Innovation Eye, 2021) while senior executives globally make BC and digital asset investments a top-five priority (see McCollum, 2020). But there are not just organizations that are highly involved in blockchains and smart contracts. There are some projects that primarily exist on a blockchain and their business is organized through many layers of smart contracts agreed upon by majority vote of the token-holders. This type of organization is called a Decentralized Autonomous Organization (DAO). It is often geographically scattered, enjoys high anonymity, and has reduced human involvement. Protocols for autonomously executed processes are decided upon by the crowds instead of appointed managers. The number of DAOs has increased by 3,200% in 2021 only and the market capitalization of publicly traded DAO tokens is valued to be at USD 20.7 billion in April 2023 (see Yaffe-Bellany, 2022, see also Coinmarketcap, 2023). In 2021 and 2022 the US states of Wyoming, Tennessee, and Vermont were among the first movers to recognize the potential and legalize DAOs as a form of LLC that can be registered and multiple projects have been incorporated since then (see Lom & Browndorf, 2021, see also Gilbert, 2022). However, because the technology and its impacts on organizational forms is still new, there is still a gray area regarding the applicability of laws, regulations, and standards. Some law experts argue that because of the openly tradeable tokens that in their totality depict the organizations ownership, DAOs should be classified as public-

ly traded companies (see Hanzl, p. 296-297, 2019). Not only in this case but also for certain industries there is a mandate to establish a standard abiding internal auditing function. Some of those laws and policies include the Listed Company Manual of the NYSE, the Minimum Requirements for Risk Management Directive in Germany (MaRisk), the Banking Law in Austria (BWG), several Public Corporate Governance Codices of EU countries, and others.

Because of the strict governance requirements in the internal auditing standards and the complex conceptual setup of DAO-IT-governance, it is the goal of this research to determine obstacles to complying with any governance related internal auditing standards. Should this be the case, full DAOs may not only be operating in a gray area but it would be impossible to incorporate them in a context where implementing an IA function is mandatory. Because all standards are applied and evaluated in depth, not only obstacles are determined but also benefits and challenges regarding standard compliance are described. By conducting this research, we want to contribute findings for law/standards makers on the one hand and blockchain developers on the other by adding to a scientifically underexplored but highly exposed area of emerging technology. Additionally, the findings could be used as part of the mandatory internal and external quality assessments described in the IIA standards 1311 and 1312. Lastly, the sum of content provided ought to give an overall look into what internal auditing could look like in the future (see Loncarevic, 2023).

To be able to understand the implications of applying standards developed for traditional centralized organizations to the new concept of DAOs, it is essential to briefly provide an overview of the key functionalities of smart contracts and DAOs.

II. FUNDAMENTALS OF SMART CONTRACTS & DAOs

While the concept of digital smart contracts (SCs) is not new, the blockchain technology gave them a new twist. They self-conclude based on conditions agreed-upon by two or more parties. Complex types of agreements can now be prepared and executed including, for example, payments that are only triggered once pre-defined arrangements were met, and no third party needs to be involved because the blockchain serves as a transparent intermediary. The transactions carved into the blockchain are essentially immutable and therefore the need for trust is not required (see Alharby & van Moorsel, p. 127, 2017; see also Diederich, p. 166-169, 2016).

An example for a smart contract would be an agreement between an airline and a customer that provides partial refunds automatically if the plane departs later than four hours. Another one could be a billing agreement between a rent-a-car firm and their customers whereby payments are triggered gradually once a certain mileage was reached or some time has expired. A smart contract between a wholesaler and their preferred deliverer may only self-conclude once verifiable conditions of delivery to the customer were met. All these agreements are subject to information on-chain and off-chain. This is provided by the means of oracles, which provide the trigger to conclude the contract or not (see also Alharby & van Moorsel, p. 128, 2017; see also Mou, 2020). In the above-mentioned examples, the contract parties may agree on oracles such as a trusted source for time, departure boards from airports, mileage of a car plugged to an API transmitting values to the SC, track-and-trace functionalities of postage firms, various types of sensors etc. Note that oracles can be setup improperly, have inbuilt errors, or may be manipulated. Once an SC has concluded, it is difficult to undo the transactions. The program of the Ethereum blockchain is known to be catered to support advanced SC functions (see Alharby & van Moorsel, p. 128, 2017). Because of the complex code of an SC, its contents are not always verifiable by the individuals engaging in it and discussions over whether the actual agreement trumps the underlying code or vice versa have been going on at a legal and an ethical level (see Diederich, p. 169, 2016).

Smart contracts can be grouped and layered into more complex interdependent processes and governances forged into an autonomously executing project. Ownership of the project is shared by individuals buying into the business' ecosystem through providing a financial contribution and receiving ownership tokens that enable them to vote for or against changes to that project. This type of setup is called a Decentralized Autonomous Organization or simply DAO. The entire project reduces human involvement to proposals that participants can submit and decentralized votes based on the token-share owned by an individual (see Buterin, p. 13, 2014, see also Murray et al, p. 623, 2021). In such a setup there is no central management, but the totality of token-holders also represents the executive management through majority vote. Thereby the network avoids the principal-agent problem through direct incentivization concepts (see Murray et al, p. 623, 2021). The protocol must disincentivize not playing by the rules and be transparently followable by investors/owners. If the DAO is set-up and managed well, it can allow for more decen-

tralized execution of duties and less discriminatory engagements of participants in comparison to traditional centralized organizations (see Voshmgir, p. 104-105, 2019).

However, DAOs have shown to have a tendency for limited voter participation due to the effort required to work through proposals and make informed decisions. Also, corporate and tax law remain a gray area for this type of organization (see Chohan, p. 3, 2017). Beside the most common perceived drawbacks blockchains are known for, including tax evasion, terrorism and shady business financing, the energy consumption of certain consensus mechanisms etc. DAOs in particular may have some additional implications and risks worth mentioning. Majority voting may lead to mediocre outcomes because the lowest common denominator is chosen given a certain range. Changes are difficult to execute once majority votes have already happened and management decisions are made very slowly. Developers and proposal makers have disproportionately more implicated power over the ecosystem (see Kaal, p. 21-29, 2021). In a majority robs minority attack, a collective of investors holding 51% of the blockchain's native tokens may direct all funds including that of the minority to their own wallets (see Jentzsch, p. 2-3, 2016). New security issues may arise due to the code that are difficult to manage and can have a potentially fatal impact. One example is the original DAO-project called "the DAO" whereby a loophole in the code was exploited to drain USD 50 million. This had such a massive impact, that disagreements over how to proceed in the matter led to a hard fork in the utility blockchain Ethereum (see Voshmgir, p. 107, 2019; see also Konashevych, 2021 & Chohan, p. 2, 2017).

Despite and sometimes because of these drawbacks and risks, more elaborated DAOs are emerging, and their overall numbers and capitalization are rising (see Coinmarketcap, 2023). Because of the new legalization wave in the Unites States, more use cases have emerged for purposes like investments, decentralized finance, charity, fundraising and other projects. According to the NYT in 2021 there have been already 4,000 DAOs whose tokens rose 3,200 per cent in comparison to the year before (see Lipton & Livni, 2022). Considering the increased clarity brought about by new legislation it is only a matter of time before all requirements regarding internal auditing will be formalized. The next section will show the results of the literature analysis conducted regarding governance implications of internal auditing in DAOs (see Loncarevic, 2023).

III. LITERATURE ANALYSIS

In the literature section it was our goal to establish the current state of scientific literature in relation to internal auditing and DAOs, and more specifically, to any governance implications of merging the two areas of interests. Several databases and online catalogues were searched in consideration of narrow parameters and keywords. Note that in a separate publication all operations related implications were discussed, and the underlying dissertation was written due to the very fact that currently there has not yet been any research conducted concerning the combination in question (see Loncarevic, 2023). To yield relevant results, nevertheless, some overall aspects like auditing in blockchains and smart contracts as well as governance implications in DAOs were researched to add foundations to the respective section regarding the application of governance related internal auditing standards. Mind that the technology of blockchain is only approximately 15 years old and blockchain-based smart contracts are an even younger phenomenon. Knowledge building in the area has not always happened to the highest scientific standards but were rather a learning-by-doing process. Much of the knowledge initially came from blogposts whereby the author was in some cases (in line with many of the enthusiasts) anonymous and credentials, sources, or peer-reviews could not be validated. Only in recent years has the scientific community caught up to a certain extent and a summary of the most important findings from the literature analysis is listed below (see Loncarevic, 2023).

A. General Governance Implications of Blockchains and DAOs

Making use of the blockchain technology will have governance implication on any venture in one way or another. Should a company engage in a consortium blockchain it will have some shared governance over the blockchain and may not always be able to influence everything happening on the blockchain. What is often mentioned for DAOs as the most evident governance change, in comparison to traditional centralized organizations, is the supposed ridding of the principal-agent problem. Managers are sometimes incentivized to make suboptimal decisions for short-term gains to increase their own bonus. Conflicts of interests may arise if the incentives are not aligned (see Chedrawi, 2018; see also Yermack, p. 25-26, 2017). The decisions made on the blockchain have a bigger backing from the owners but as established above it may be slower, more uninformed, and mediocre.

Often the governance of a DAO is mistaken for the consensus mechanism of the underlying blockchain while the actual governance entails a lot more (see Rikken et al, p. 405, 2019). The governance of a DAO may be established as part of the BC code and additional smart contracts. In a perfect full DAO each token-holder has equal rights in the ecosystem. In some cases, additional roles and responsibilities may be defined like for voting-delegates, trusted funds-custodians, or even auditors. Apart from all agreements on-chain a lot of the governance can and will happen off-chain. This is because some debating and decision-making is happening more efficiently off-chain. More prominent and active members of the DAO may have additional implied power in the project potentially leading to counter-governance (see Rikken et al, p. 404, 2019; see also Ferguson et al, p. 6-8, 2020).

Risks to a DAOs governance include so called "whales" who have disproportionate large amounts of tokens in a proof-of-stake consensus mechanism or individuals with large CPU-mining power in a proof-of-work consensus mechanism that can steer the organization in an undesirable way for all participants. The above-mentioned 51% attacks and hard forks can also pose a threat to the success of a company with this organizational form. Due to mob justice, decisions in DAOs are often made based on herd-majority voting instead of rationale while individuals not equipped to make well-founded strategic decisions have the same decision-making power as those who do (see Rikken et al, p. 409-411, 2019).

Per design a DAO does not make any exclusions based on nationality, gender, ethnicity, age, or other backgrounds. On the other hand, there could be different views on what the corporate culture should look like and geographic preferences e.g. regarding risk appetite may lead to clashes in the ecosystem (see Rikken et al, p. 411-413, 2019). The anonymity aspect of the project also means that the real force behind individuals' decisions during voting is unknown. A competitor could cast votes not in the interest of the DAO or retrieve sensitive information. For accountability reasons it is likely that participants may have to identify themselves and link driver's IDs, perform some type of video-face-verification etc. (see Beck et al, p. 1028- 1029, 2018).

Mini et al. differentiate between "Establishing Algorithmic Organization" and "Taming Algorithmic Power" as two forces facing each other. The first strives toward full autonomy and trustlessness even resolving disputes between participants while the latter still puts human decision-making and control/superiority over the code into the center (see Mini et al, p. 9-12, 2021). It is worth noting that the project stands and falls with the strength of the protocol. Changes to the established governance are difficult to process at a later point in time. Moreover, the coordination and negotiation of smart contracts is time-consuming and still gives a lot of power to coders (see Beck et al, p. 1029-1030, 2018).

IT governance is a dominating force that has recently emerged with the computerization of business administration. In blockchains not only roles and responsibility are defined and assigned to nodes and private keys, but other aspects must be considered too. Once new nodes are added to the ecosystem, large transaction loads and queueing difficulties may arise. Auditors must test respective policies and procedures as well as data throughput and hardware related issues (see Lineros, p. 50, 2021). Other IT-related controls include those of data-storage, private key management, disaster recovery and business continuity management (see Lineros, p. 50-51, 2021).

B. Considerations for Internal Control Systems

If the expertise for securing an adequate internal control system for a DAO's/blockchain's business venture cannot be generated in house it must be provided by financial services firms and consulting agencies to combat not only established but also new risks. For an adequate governance issues like encoded segregation of duties, asset custody, as well as data verification and other aspects must be considered. The automation of controls may tempt to transfer all validation and auditing tasks to the machine which brings certain audit risk that can fully derail a business venture (see Smith, p. 143-144, 2019). Any set of preventive, directive, and otherwise automated control can only serve to assist in business administration but should be verified ongoingly because even the best protocol may have flaws. In fact, the literature suggests that auditors may focus their work on providing assurance on the design of otherwise automated controls and similar setups, which is something that is already happening on a large scale in environments with sophisticated ERP-systems.

Some fundamental conditions mentioned by Smith are that BC may not be mistaken for an accounting tool but as the distributed ledger technology that it is. The use of a blockchain does not mean that a business venture cannot be hacked. It simply means that some risk is eliminated or transferred while a new set of risks needs to be tended to. Not for every business case using a BC will be

the best choice considering the inherent costs as well as the usability. Lastly, being engaged in BC does not necessarily mean engaging in the use of cryptocurrencies, which often entails confusion once the topic of BC comes up (see Smith, p. 146-147, 2019). There is also a general perception that BC using organizations are somewhat riskier and control risks are increased in audit engagements. The lack of auditing standards may thereby diminish the benefits of a BC control system (see Dyball & Seethamraju, p. 613, 2021).

The roles and responsibilities regarding the management of smart contracts but also the internal control system in blockchains should be clearly defined, which may prove difficult in a fully decentralized environment. This becomes easier in permissioned blockchains where all participants are known to each other. Additionally, stakeholders of the blockchains must consider the cultural impact of using a blockchain, the transparency, potential anonymity, the way of decision-making, and many other aspects. The core values may vary greatly in comparison to a traditional centralized organization (see Vincent & Barkhi, p. 66-70, 2021). If internal auditors want to have an impact of governance, risk, and internal controls, they should be involved during the planning and implementation stage of the blockchain project (Vigliotti & Jones, p. 121-131, 2020; see also Loncarevic, 2023).

C. Implications for the Audit Committee

By the example of consortium blockchains it was shown, that the way audit committees receive and process reports changes substantially. In traditional centralized organizations the AC selects an external auditor, establishes the fee structures, and liaises with management and auditors. The AC will have to make sure the required expertise is available in view of governance, risk, and controls (GRC). But in a consortium the participating parties may have differing approaches to GRC and the weakness of one entity might affect the entire ecosystem. Auditors from one centralized entity may not have all required rights to validate all aspects of the blockchain. It is therefore advisable to consider establishing an audit setup on the consortium blockchain level rather than at the individual organizational one. Independent auditors may be involved to make sure each entity receives only reports from their sphere based on a need-to-know principle (see Smith & Castonguay, p. 129, 2020). This example shows that different layers of governance for ventures including a blockchain may apply that can sometimes mismatch. Likewise in a DAO the governance of the utility blockchain can have an impact on the native blockchain and vice versa as was shown in the example of "the DAO" (see Loncarevic, 2023).

D. Crowdauditing and Trusted Audit with Untrusted Auditors

If internal auditors are appointed, according to DAO principles some form of centralization may emerge which goes against the nature of full decentralization and democratization. Individuals could have too much of an impact and steer the project into a direction that is not in the best interest of the majority of token owners. To combat this issue Chen et al proposed a concept called "crowdauditing" and/or "trusted auditing with untrusted auditors". Well-designed smart contracts provide incentivization for participation in the DAO's auditing arrangement. Every individual can for example stake their tokens to join a pool of auditors. Additional requirements can be determined by the token-holders. Through an unbiased selection mechanism an auditor gets appointed and through the consideration of the Nash equilibrium point the personal benefits are maxed out to provide the best auditing work. After completion of the audit work, a second smart contract contains the evaluation of the audit reports integrity and quality. Based on the outcome the auditor's reputation gets updated which influences the possibility of getting selected as an auditor in the DAO again (see Chen et al, p. 6215-6236, 2021). The approach provides a model that attempts to preserve as much of decentralization and anonymity as possible. However, it also entails some challenges including the fact that early on bad apples may be selected, which can pose a threat to the business' success. Moreover, if an auditor performed well on one type of audit it does not guarantee that they will perform well in a different domain too. Among other potential drawbacks and open questions, it is still unclear how the system can be manipulated, how audit work is evaluated, and what kind of costs this approach involves.

E. Audit Nodes on a Blockchain

Another dimension that could influence the governance of the blockchain or a DAO are the number and the type of nodes involved in the endeavor. To obtain an understanding of the most common node types in blockchains, refer for example to Müller, 2021, Frankenfield, 2021, Seth, 2021, or Voshmgir, 2019 from the reference list. Another still uncommon type of node that could possibly complete the set, are audit nodes. Based on the pre-defined program of the blockchain they can have a variety of functions. Light nodes may connect to trusted audit nodes to validate that certain checks

according to the standards were performed (see Lemieux, p. 126, 2016). Audit nodes can also have information regarding ownership of data or about sensitive information including identities of participants. To protect the data certain information can be fragmented and transferred to different audit nodes (see Chen & Reiser, p. 95, 2017). It is important to note that the term audit node in this context may be confusing because in the mentioned examples the nodes have a specified automated function according to the protocol rather than providing user rights to the node owner in order to access and audit transactions manually.

IV. METHODOLOGY

The summary of the literature analysis conducted above shows some of the more relevant findings used as part of the qualitative and exploratory research in the next section. To address the research problem of whether and how governance related internal auditing standards can be applied to the DAO context, all conceptual attributes of a DAO were established. The common body of knowledge for the functionality and the literary basis of the DAO were defined and the analysis was conducted based on well-known frameworks for scientific literature analysis (see Vom Brocke et al, p. 3, 2009; see also Snyder, 2019). In the next step the IIA's International Standards for the Professional Practice of Internal Auditing (simply referred to as "the standards") were chosen as a reliable set of standards for parameters to be translated into the unique context of the DAO to establish organizational, technological, or any other governance related obstacles regarding the compliance with each individual sub-standard. Because each of them are screened for implications, not only obstacles but also benefits and challenges regarding compliance are identified and summarized as part of the paper. The standards were established and are regularly amended by the IIA, which has 210,000 members globally and the internal auditing standards are recognized universally (see theiia.org, 2022). A similar approach to that of Vincent and Barkhi (2021) and Burns et al (2020) was selected whereby an established framework (COSO) was applied to the context of the blockchain in general and implications, benefits, and challenges were identified. In this early stage of blockchain research exploratory methods are required to establish the foundation for quantitative work especially when tools established for the known type of organizations are applied to new, almost futuristic concepts and technologies (see Loncarevic, 2023).

V. FINDINGS

The following chapter shows the summary of major results regarding conceptual obstacles, benefits, and challenges in terms of the compliance with governance related internal auditing standards. IA has been around for a lot longer than DAOs which is why we can rely on a substantial amount of research and subject books. Before the respective issues are described, we elaborate on what the standard looks like for traditional centralized organizations to set the known basics before deriving implications.

A. Conceptual Obstacles

The below-mentioned implications prove to be most likely obstacles to fully complying with internal auditing standards. It does not necessarily mean that this list is complete and additionally, it cannot be ruled out that through giving up some anonymity, decentralization, or other characteristic of a DAO in combination with a well-established protocol an expert could conclude that standard compliance is possible. We rather show the biggest gaps related to established auditing standards in combination with the theoretical concept of a full and pure DAO.

i. Purpose, Authority, and Responsibility

In a traditional organization an IA function will need full backing from the top as well as the authority to perform their duties. The tone-at-the-top and the management style will decide what role the IA function will take up in the respective organization. Access rights and responsibilities must be established in an effective way and the purpose must be made known to stakeholders of the organization. The backing of the management will have a direct impact on the quality of the results from IA work (see IIA A, p. I-27, 2017). The internal audit charter is the central document containing the above-mentioned parameters and can be seen as a type of IA constitution. Other handbooks, processes, workflows etc. will directly be based on that charter. It is prepared and reviewed by the chief audit executive (CAE) and presented to senior management for approval. It includes specifics regarding mission and scope of work, accountability, independence, responsibility, authority, and more (see IIA B, p. 2-8, 2017).

In a DAO the senior management's role would be taken by the collective of token holders and the audit charter could be defined in the protocol while certain auditing tasks could be agreed-upon as part of smart contracts in an op-

erative sense. The audit charter would need to be submitted as a formal proposal to the token-holders. Whoever does not agree with a majority vote on the audit charter, can withdraw their funds and/or fork off. A major obstacle would be that the standards require the establishment of the role of a CAE. This in combination with the mentioned authority would pose a major point of centralization giving them more factual as well as implied power which goes against the idea of a full DAO. Selecting a CAE includes very strict vetting of candidates e.g. for conflicts of interest, trustworthiness, work experience, education, and other characteristics. Should a fully anonymized setup be selected for a DAO, this could become a difficult exercise, especially considering that all token-holders would need to perform their own due diligence if the selection process is not delegated. The latter would again entail more centralization, which may not be preferred by investors specifically choosing a DAO to invest in because of its conceptual benefits. Should the DAO setup allow for audit delegates who make decisions on behalf of the owners, all roles and responsibilities would have to be defined as part of the AC and the DAO protocol. As you will see in the next sub-section, the fact that each token-holder represents a fraction of management can lead to independence and objectivity issues especially if internal auditors hold and are paid in native tokens. If they do not, it would need to be clarified by what standard they are internal as compared to external auditors.

The audit charter would need to consider on-chain and off-chain subjects because the responsibility of IA does not end with the blockchain and the smart contracts. If the work of CAE and auditors is remunerated as part of smart contracts, not only will the completion of off-chain work be difficult to verify since effective oracles, that need to be audited themselves, must be in place. In general, it will be difficult to avoid double-governance in a DAO which could affect IA work too (see Loncarevic, 2023).

Related standard: 1000 - Purpose, Authority, and Responsibility

ii. Independence and Objectivity

One of the first things for entrants to the audit profession to learn is that internal auditing retains their professionalism and image from the stakeholders through holding the standard of organizational independence and personal objectivity prominently up high. Independence means that decision-makers provide organizational pre-conditions for the CAE to report their results directly to the executive management and board (or sub-committee) without the interference of a filtering entity in between. Process independence is also covered under the major standard which means that IA should not be included in regular operations or at least in the few cases where it is inevitable safeguards must be provided. Objectivity means that you should and cannot properly audit an area that you recently worked in, where a spouse or close friend works, or have any other conflict of interest. Internal auditors should even refrain from activities that give the impression that their expert opinion could be influenced. To combat impartiality, auditors should ongoingly consider any conflicts of interests and validate both independence and objectivity constantly (see Bünis & Gossens, p. 36-40, 2016; see also Eulerich, p. 5-6, 2018).

As we will see in section "C. Benefits" the setup of a DAO may bring advantages due to the fact that autonomous audit procedures do not have a conflict-of-interest in operations although the individuals designing the procedures and controls could have them. Also reporting lines are transparently pre-defined and stakeholders can verify the on-chain independence of a hypothetical internal audit function. However, the fully decentralized setup of a DAO brings certain obstacles to the table in terms of complying with independence and objectivity related standards. The first one, is that the CAE needs direct access to senior management and the board. There is, however, no CAE but also no board that they could direct their auditing results to. If the CAE forwards audit reports to the full population of token-holders, they would also transmit high risk findings to a large anonymous crowd with unknown intentions and loyalties. A loophole in the code discovered by IA and transmitted to all token-holders could quickly be exploited by some individuals. Moreover, there needs to be an entity that can receive confidential reports on behalf of token-holders, evaluate them, and make final decisions regarding a potential implementation of audit recommendations. For objectivity reasons IA must not submit formal proposals to token-holders since they would not be impartial at the time of a follow-up audit. A pre-appointed audit committee could instruct certain developers to draft solutions for identified audit objectives through the definition of smart contracts. However, not only would this lead to centralization at more than one instance but also the setup would not work in a fully anonymous environment. Token-holders on the other hand as co-owners of the DAO would require certain confidential documentation to evaluate the audit committee's or delegate's work, which again poses the threat of exposing high risks to unknown individuals.

Another major obstacle in a full DAO is uncertainty regarding conflicts-of-interests of auditors. While anonymity and geographic dispersion aids in the fact that there is naturally (presumably) less acquaintance between the participants and therefore fewer incentivization for an auditor to not report a discovery because someone close was involved. Meanwhile, the real loyalty and conflicts-of-interests off-chain are a black box to the endeavor, meaning that objectivity is difficult to verify. Real loyalties of auditors are unknown and if the incentivization structure as part of the smart contracts is not sophisticated, the anonymous auditor may decide to opt for exploiting a discovered loophole themselves because it is more lucrative, and the consequences are negligible. It is furthermore difficult to establish that an auditor does not own the DAOs native tokens, engages in votes, and therefore participates in managing activities producing another conflict of interest. Therefore, IA standards regarding independence and objectivity may be difficult to comply with in a fully decentralized and anonymous DAO (see Loncarevic, 2023).

Related standard: 1100 - Independence and Objectivity

iii. Reporting and Acceptance of Risks

There are various other potential obstacles to full compliance with IA standards and some of those arise in operational auditing areas, which is elaborated on specifically in a second research paper. Therefore, all operational auditing implications from audit planning through engagement planning, to conducting the audit, and others were considered only to the level where it affects governance issues. Since the cumulation of the audit work is to be found in the main deliverable – the audit report – the most important governance aspects of the audit work itself is summarized in this section. Audit reports in practice vary regarding content, layout, length, detail etc. but generally include objectives, scope, and results as minimum requirements to provide recommendations for future improvements. In general, the look of the audit deliverable will depend on the organizations' decision makers' preferences, i.e. that of senior management and the board (see Eulerich, p. 272- 274, 2018). For the overall report but also for individual findings certain risk classification categories may be used that could also give an indicator of who should address those findings (see Bünis & Gossens, p. 157-160, 2016). Audit reports are disseminated to only a small number of individuals who are knowledgeable and involved in the area in question to prevent malicious use of the information.

Internal audit will determine an implementation coordinator, often a local manager from the audited area, and set implementation deadlines. Communication between IA and these coordinators can have a big impact on the result of the implementation work. After the deadline has passed at the latest, IA usually conducts some type of follow-up activity to evaluate if and how recommendations were implemented by the entity in question. Should the auditee not agree with a certain recommendation or risk assessment and decide to refuse implementation, IA will have to evaluate the concerns brought forward. Should they remain with their position regarding the addressing of open and unaddressed risks, the matter gets escalated to senior managers who will make final decisions on how the situation should be handled. They can either accept the risk (and take the responsibility), urge the auditee to implement the recommendation, or take some different type of action. Either way the follow-up procedure may then be closed (see Bünis & Gossens, p. 161-163, 2016; see also Eulerich, p. 275-279, 2018). Note that for example cost-driven managers with a larger risk appetite are more likely to accept certain risks and vice versa. Therefore, the degree of influence and value added an IA department can provide will also depend on risk appetite, strategy, and corporate culture.

In a DAO taking into consideration the token-holders' preferences regarding audit reporting can be difficult. In a different publication regarding operational obstacles to complying with IA standards in DAOs, we have already established that rectifying errors and omissions in reports, which is a mandatory sub-standard of internal auditing, can be difficult once smart contracts have been concluded and certain information is already engraved into the (almost) immutable blockchain. Also, auditors are not incentivized to do so if the remuneration was already paid out and their reputation could be influenced. Additionally, from a governance perspective, it would be difficult to establish the right reporting lines in a DAO. It is unclear who the auditee is in the first place, who can be assigned an implementation coordinator, and how their participation in the audit and implementation phase is incentivized. As mentioned before, it is not in the best interest of a DAO to provide sensitive information regarding potentially fatal risks to a large pool of anonymous token-holders. Some of them may be competitors who might use the information in a way that is not in the best interest of the DAO. Others could directly exploit identified loopholes. A greater obstacle is that even in the case where a DAO has defined delegates who autonomously handle these matters in a smaller circle e.g. by having an

audit committee, a steering committee, or IT development committee, the period between making a formal proposal to amend a code to address a coding error and the time the proposal was passed by majority vote, could be long enough for one individual from the crowd of token-holders to e.g. drain funds. Mind that this is not only an unacceptable drawback but it would also mean that DAO enthusiasts would have to concede in favor of substantially more centralization points, which many may not support.

Furthermore, it is neither clear who the audit reports can be sent to and who will oversee implementing recommendations, nor who will be in charge once a dispute between IA and the auditee arises. There is no hierarchy where the issue could be escalated to and as established before, the ultimate instance of token-holders may not be a good point because of security reasons but also because the majority may not have the expertise or resources to make a sophisticated decision. The related standards may be one of the most difficult to comply with should a DAO be selected as an organizational form (see Loncarevic, 2023).

Related standards: 2400 - Communicating Results, 2500 - Monitoring Progress, 2600 - Communicating the Acceptance of Risks

B. Challenges

Choosing a DAO as an organizational form will impact standard compliance in different ways. In some cases, there are no hard conceptual obstacles to complying with them, but some unique aspects challenge it. That includes the fact that while governance may be transparently established as part of the protocol and the smart contracts there will be off-chain happenings that can pose the risk of double- or counter-governance that affects the DAO and its IA function. For standards regarding the audit charter this fact will need to be reflected in a way that smart contracts and oracles cannot always fully embrace. Anonymity proves to be a challenge for roles and responsibilities in an IA function. DAOs are also prone to implied governance, i.e. individuals who are more prominent in the project and can influence the voting process to a certain degree. Mob democracy, herd majority, whales of the DAO, as well as hard forks add additional governance challenges to the DAO as a whole. As the example of "the DAO" has shown, the governance of the utility blockchain can influence the governance of the native token and vice versa which can limit auditor authority.

Trusted auditing/crowd auditing, as proposed in the literature analysis section, entails other challenges like establishing appropriate oracles for smart audit procedures and validating an auditor's expertise for each new audit subject. The trial-and-error strategy used as part of that concept could be risky in the initial stages and having alternating auditors would mean losing organizational experts.

Any arrangements made through smart contracts would need to be made between the CAE and the majority of token-holders if no different arrangement is made as part of the program. However, involving the token-holders can be a time- and resource-consuming process whereas we have also established that they do not always have the capacity to make the most adequate decisions. If, for example, a smart contract is set up for an audit engagement of the purchasing practice of the DAO, the IA employee in charge would need to define individual auditing tasks and oracles that provide profound evidence that audit work was performed in an appropriate manner. In this case it would be difficult for a token-holder to understand the meaning and implications of each of these smart contracts. If the protocol allows for the CAE to establish SCs with individual auditors, it will limit the power of the collective and lead to a centralized type of organization. Not all audit work can be quantified and if remuneration is tied to quantifiable input data, auditors are incentivized to push the least number of buttons to trigger payment. This would massively increase audit risk and lower audit quality. Take for example the task of performing a risk assessment for each subject in the audit universe. If the smart contract self-concludes once each item has a risk rating, auditors are incentivized to guess and enter random numbers instead of putting the effort into performing sophisticated risk analyses.

In this very computerized environment, the smart contracts themselves pose a control risk and would need separate audit activities to validate the proper setup of the agreement and the oracles. This does not only increase audit cost massively but also gives developers more power shifting some of the implied governance rule to them. Performing changes to audit assignments and scope or the rectification of errors and omissions may not only be difficult on the blockchain/concluded SC, but auditors are also disincentivized to execute them. Corporate culture, ethics, tone-at-the-top and other factors varying to a large extent in a geographically dispersed project can affect the harmony and success of the venture and increase the risk of hard forks further. To see a more elaborate list of

challenges to complying with IA standards in a DAO context also refer to the dissertation this research paper is based on (see Loncarevic, 2023).

C. Benefits

The flipside to the obstacles and challenges regarding standard compliance are various new ways the technological features can contribute to it. All the audit evidence is transparently documented on an immutable blockchain. Additionally, all governance related issues including access rights, reporting channels, authority etc. are defined as part of majority consensus agreements. In addition to audit evidence, also auditor work may be timestamped and documented for an independent review e.g. as part of the quality assurance and improvement program. The performed audit procedures are known and can be coordinated with other stakeholders including external audit, compliance, the fraud department etc. more easily. The CAE as well as auditors are incentivized to perform their duties timely and in a way that is pre-defined in the smart contract to trigger remuneration. While this is more an operational aspect, it is still worth mentioning that IA will be able to test full populations more efficiently instead of just a number of samples through automation.

In a DAO, there is no hierarchy and no discrimination against any of the participants based on ethnicity, gender, age, disability etc. The voting rights are simply determined by the number of tokens you own. Diverse participants in a DAO with diverse backgrounds can contribute to global and local risks while providing their unique expertise and preferences regarding risk appetite and the steering of the project. All decision-making is transparent and there is no principal-agent problem in theory because the collective of management is incentivized to maximize their own shareholder value. Conflicts of interests may also be removed in that regard also because there may be no hesitance to openly report audit issues related to the sphere of a well-known co-worker in an anonymous context. The design therefore appears to be more objective also because the code could transparently exclude auditing rights for auditors whose private key was involved in the transactions at question. The system could allow for smart contracts that narrowly define the sensitive data auditors are allowed to review based on a need-to-know principle and access is timestamped and documented. The other side of the coin shows that the audit charter can guarantee the access for IA and no discussions with auditees are required.

The reporting process would be timelier, in some cases even in real time, and the protocol could define automated dissemination based on certain characteristics, e.g. the risk rating of an observation. The technological features of the blockchain provide improved opportunities for continuous audit activities and mass data analytics. The falsification of audit evidence is more difficult reducing some of the audit risk. Generally, the lack of hierarchy means there may be fewer instances trying to interfere with reporting, improving compliance with standards regarding organizational independence. Despite token-holder voting having its drawbacks, all IA assignments have a larger backing from the DAO project owners. Moreover, sophisticated incentive schemes in smart contracts can align the interests of token-holders and internal auditors. This aspect can also be used to incentivize optimal and timely implementation of audit recommendations. Decisions on risk acceptance of decision-makers is transparently documented on the BC. Should IA represent one form of partial centralization in a DAO as part of e.g. an audit committee, it may have the opportunity to strengthen its standing in the project and avoid being sidelined. A more complete list of benefits can be viewed in the underlying dissertation (see Loncarevic, 2023).

VI. CONCLUSION & FUTURE OUTLOOK

The results regarding the application of well-established governance-related internal auditing standards to blockchain-based DAOs, showed that there are some obstacles to fully complying with some of the standards, should a fully decentralized and anonymous DAO be selected as an organizational form. The standards require the appointing of a chief audit executive (CAE) which is an aspect that presents some form of centralization while independence and objectivity standards may be difficult to comply with conceptually in this type of setup. It is unclear who has the authority to perform audits and write reports but also who will be the recipient of the results. The collective of token-holders cannot be addressed with high-risk audit findings because one anonymous individual could exploit loopholes before they can be fixed. Moreover, conflicts of interests as well as true loyalties are difficult to discover while counter-governance off-chain can complicate all IT governance on-chain. Furthermore, it is not defined who the auditees are in the context and whether developers are incentivized to participate in the audit process, for example as interview partners providing key information on the genesis of business processes. Submitting proposals to fix high risks and loopholes provide enough time for individual participants to

exploit those weaknesses. The lack of hierarchy means that there is no adequate authority that can make decisions on risk acceptance in case of a dispute about an audit recommendation between the auditor and the auditee. These obstacles can lead to an IA function in a DAO generally not conforming with the standards. This means that DAOs in general could be barred from incorporating in industries and legislations where establishing a standard-abiding IA function is mandatory. Moreover, it was not only displayed that choosing a DAO as an organizational form has many benefits and challenges but will also lead to complying with the standards in a considerably different way.

The results address both standard and law-making bodies as well as DAO enthusiasts showing fundamental implications of combining the two vastly different concepts of IA and DAOs. There may be new standards required for emerging technologies that have the potential to address risks in a different way and some flexibility is required to provide a platform for transformative ideas like DAOs. Blockchain enthusiasts need to consider giving up some decentralization and anonymity to strengthen security and being able to run their business legally. Moreover, the research paper could point quality assessors of IAs in DAOs to weak spots and strengths. Most importantly, it shows that the role of IA will, like many other professions, be subject to substantial changes but may have the opportunity to become an important point of reference for managers and token-holders regarding new risks and opportunities of groundbreaking technologies (see Loncarevic, 2023).

VII. REFERENCES

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REVIEW PAPER

THE INFLUENCE OF NATIONALISM AND REALISM ON SHAPING OF THE POLITICAL THOUGHT IN RUSSIA WITH SPECIAL EMPHASIS ON THE PUTIN ERA

Selma Delalić[1], **Ermin Omeragić**[2]

[1]***International Burch University***, *Sarajevo, Bosnia and Herzegovina*
[2]***International Burch University***, *Sarajevo, Bosnia and Herzegovina*

Correspondence concerning this article should be addressed to Selma Delalić, International Burch University, Sarajevo, Bosnia and Herzegovina. E-mail: selma.delalic@ibu.edu.ba

ABSTRACT

Nationalism as an idea, movement and ideology denotes tendency of members of an ethnic group towards the establishment of an ethnically pure territory. Achieving this political goal, with superiority in relation to others as a guiding idea, often leads to jeopardizing sovereignty and territorial integrity and oppression and exploitation of other people. Nationalism has been a significant feature of the Russian society for centuries. Traditionally, the focus of Russian nationalism has been the preservation and strengthening of a large and powerful multi-ethnic state. Opposed to this imperial nationalism stands ethno-nationalism focused on the struggle for the interests of ethnic Russians. One of the main drivers of the Russian nationalism in the past couple of decades has been the country's economic situation and the political tensions with the West. The Russian nationalist sentiment grew stronger after the annexation of Crimea and the beginning of war in Ukraine, being justified with a strong nationalist political narrative focused on ethnic Russians and the protection of their rights. Contrary to nationalists, realists advocate a more pragmatic approach to international relations, focusing on economic and social development. The aim of this paper is to research to what extent nationalism and realism have shaped political thought in Russia.

Keywords: Russia, Vladimir Putin, nationalism, realism, ideology

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THE INFLUENCE OF NATIONALISM AND REALISM ON SHAPING OF THE POLITICAL THOUGHT IN RUSSIA WITH SPECIAL EMPHASIS ON THE PUTIN ERA

Selma Delalić and Ermin Omeragić

Introduction

In order to fully understand Russian nationalism, one should start from the general concept of nationalism. Nationalism, in the broadest sense, denotes the superiority of one nation, which shares common values such as culture, tradition, language and religion, in relation to another and is often manifested by aggressiveness. Nationalism is manifested by the desire for all members of a certain ethnic group, or a nation, to share a common territory. In other words, the achievement of this political goal often comes at the expense of the sovereignty and territorial integrity of the country where a certain ethnic group lives as a minority. In case they are the majority, they seek to 'remove the different and less valuable', since nationalists are characterized by pronounced intolerance, which, in the most extreme form, can result in ethnic cleansing and genocide (Hobsbawm, 2022).

It goes without saying that the interests of the nation can be interpreted in various ways. However, satisfying national interests is possible at the expense of the nation itself and its resources or at the expense of other nations. In the first case, the people have a need primarily for freedom, independence, just government and the like, and in the second, the people who satisfy their needs at the expense of other peoples want to have power and the right to oppress and exploit other peoples for their own purposes (Vujačić & Radović, 2013). From this arise two types of nationalism. The first can be called national liberation, and the second imperialist. Of course, some combination is also possible: some nations may try to be independent from others, but at the same time they are ready to take away the freedom of another nation. In order to achieve that, different ideologies and combinations thereof are used (Kolstø & Blakkisrud, 2016).

Max Weber emphasizes that national consciousness, which is one of the foundations of nationalism, is a "common political destiny", and leads to the formation of communities based on common memories, which often have a stronger force than the ties of cultural, linguistic or community based common origin. They are the ones who "give the last decisive note to national consciousness" (Weber, 1994, p. 18) Weber further notes that the appeal of nationalism is far wider. One gets a sense of prestige for one begins to feel "ethnic honor", which is probably the only type of status superiority available to the masses, as Vujacic and Radovic (2013) imply the specific honor of the masses because it is available to anyone who originally belongs to the community and believes in it subjectively.

According to Konstantin Krylov, nationalism is a general concept, and racism is one of the theories that relies on a certain type of nationalism. There is also "national socialism", "Nazism" (it is the same as "fascism") - an exotic type of racism. So, it can be said that every racist is a nationalist, but not every nationalist is a racist. Following this tendency, it can be concluded that every Nazi is a racist, but every racist is not a Nazi (Pain, 2016). Therefore, it is necessary to determine more precisely what exactly nationalism is trying to convey (Sakwa, 2008). Nationalism claims that: 1) nations have interests (from which it follows that different nations can have different interests) and 2) every nation has the right and even must protect its interests in case they are violated - not only by other nations, but also by, say, the government or some social groups. As opposed to nationalism stands realism, which rejects ancient myths, historical mistakes and unrealistic imperialist ambitions, and accepts the real situation and endeavours to act accordingly. The focus of this paper is the relationship and struggle between these two ideologies.

Early Russian Nationalism

The early beginnings of Russian nationalism can be found in the "Russian Party" movement from the 1950s, which was active until the end of the 1980s. With the collapse of the Soviet Union, another nationalist/fascist movement called "Russian National Unity" appeared on the Russian political scene, which did not last long, but still gave rise to several radical groups irresistibly reminiscent of modern neo-Nazi groups in Europe. It was these radical groups that encouraged the political activity of neo-Nazi skinheads, such as BORN, a military national-fascist organization, responsible for a dozen murders. The main political goal of these groups has been: 1) establishing of an ethnic Russian state, which would encompass territories in which the Russians have traditionally lived for centuries, and 2) the cancellation of the internal administrative division into republics, regions and regions, especially those with a majority Muslim population. In addition, Russian nationalists have a pronounced nostalgia for the Soviet Union, and advocate for a return to the borders of the USSR and the fight against Russophobia (Mendras, 2012; Tishkov, 1997).

In this context, thousands of Russian nationalist movements throughout the former Soviet Union propagate the restoration of the former Russian state, which led to the introduction of the concept of the "Russian World" and the provision of wholehearted assistance to such organizations. Although the focus of the world public has long been the traditional ethnic and religious nationalism, following the dissolution of the Soviet Union, imperial nationalism with a strong nationalist-militaristic ideology has, very robustly and aggressively, entered the political scene, the type of nationalism which, in Putin's opinion, is "the most proper, most genuine, and most effective" nationalism (Mitrokhin, 2023, p. 1). This type of nationalism, often referred to as the territorial nationalism, advocates the protection of the rights of Russians in the former Soviet space and is based on hatred towards the leaders of the newly formed states since they embarked on the path of independence, separating from Mother Russia. The goal of this nationalism is to restore the former borders of the Soviet Union. Unfortunately, there are many those who are ready to give their lives for this cause.

On the eve of the collapse of the Soviet Union, in November 1990, Boris Yeltsin in a historic speech in Kiev announced the end of the 300-year rule of the Russian emperors and the Soviet totalitarian regime, further emphasizing that Russia will not neither determine nor dictate the future fate of Ukraine. In order to oppose Mikhail Gorbachev's attempts to preserve the Soviet Union[1], Yeltsin strongly emphasized the oppressed position of Russians within the Soviet Union. In this context, he advocated the restoration of Russia through its liberation from the burden of other republics. Namely, after the Bolsheviks came to power in 1917, they announced a merciless fight against inequality and Russian chauvinism, and the upliftment of oppressed peoples living in the periphery of the country (Zelikow, 2021). Unlike other republics, which enjoyed political sovereignty, and possessed their own cultural and educational institutions with their own language, Russia was the only Soviet republic that did not have its own academy of sciences, capital city, or communist party, because all of these overlapped with the Soviet ones.

The address of the Russian nationalist, Valentin Rasputin, at the session of the Congress of the Communist Party, held in May 1989, in which he expressed his open dissatisfaction with the treatment of Russia, did not remain without resonance among the public:

> Perhaps it is Russia that should secede from the Union, since you accuse her of all your misfortunes and since her backwardness and awkwardness obstruct your progressive aspirations? … We could then pronounce the word 'Russian' without fear of being rebuked for nationalism, we could talk openly about our national identity … Believe me, we're fed up with being scapegoats, with being mocked and spat upon (Givens, 1996).

The long-standing Russian dissatisfaction coupled with the extremely difficult political and economic situation caused by Gorbachev's reforms resulted in the emergence of numerous separatist movements. Repression under Stalin and the war in Afghanistan further strengthened this sentiment. Dmitry Likhachev, a cultural historian who survived the Gulag said that the communist regime "humiliated and robbed Russia so much, that Russians can hardly breathe" (Riasanovsky, 1996, p. 143). Furthermore, Boris Yeltsin, who managed to mobilize a huge number of supporters, pointed out, *inter alia* that the Soviet Union has been subsidizing the countries of Central Asia for decades to the detriment of Russia. 'Enough feeding the other republics![2] was wholeheartedly accepted Yeltsin's statement from 1990, followed by shouts against Mikhail Gorbachev. Yeltsin, in the spirit of realism, strongly advocated the spiritual, national and democratic (read pro-Western) awakening of Russia. The August 1991 failed coup attempt by the Communists further cemented Boris Yeltsin's position and paved the way for his election as the first President of the Russian Federation. Declaration of independence in the former Soviet republics soon followed, crushing Mikhail Gorbachev's dreams of revitalizing and preserving the Union (Neumeyer, 2022).

Today, nationalism is a significant feature of the Russian society and at the same time dominates public discourse. Its main feature is ethnic

1 During Gorbachev's perestroika and glasnost, every attempt by the Soviet republics to establish greater political and cultural autonomy was brutally thwarted. One of the well known examples were the large demonstrations in Tbilisi in April 1989, when Soviet troops suppressed the demonstrations with massive use of force and brutality. In his farewell speech, Gorbachev emphasized that one of his greatest concerns was that „the people in this country are no longer citizens of a great power".
2 The first Russian president who raised the status of Russians, within the Soviet Union, as first among equals, was Stalin. Nikita Khrushchev continued this commitment, especially due to the fact that the Russians were largely responsible for the victory over Nazi Germany. Russians have been given the status of 'big brother' especially in relation to the Caucasian peoples, with the Russian language as the official language and the dominance of Russian culture and history.

issues. This new ethno-nationalism comes in different forms, the most important of which are racism and xenophobia, as well as a new intellectual movement of 'national democracy' that tries to replicate conservative Western European nationalist forces. Traditionally, the focus of Russian nationalism has been the preservation and strengthening of a large and powerful multi-ethnic state capable of projecting its influence overseas, not so much racial purity and ethnic issues. These traditional nationalists were usually called 'statists' (*gosudarstvenniki*), while the pejorative term used for them was 'imperialists' (*impertsy*). Opposed to this type of nationalists are ethno-nationalists, whose focus is the struggle for the interests of ethnic Russians, and not so much the Russian state. What is curious is that these two groups are strongly opposed to each other to such an extent that they hate each other (Neumeyer, 2022).

Russian National Interests in the Early 1990s and a Bitter Lesson in Political Realism

In the early 1990s, the new Russian state found itself in an extremely difficult situation, hyperinflation ate up savings, several million workers did not receive salaries for months, criminal structures took control of most of the economy, and industrial production collapsed. Energy supply has become a matter of national security and survival of the nation. "Russia was hit by probably the worst economic depression ever to hit the industrialized world" (Rywkin, 2008, p. 15). In addition, Russia lost its international status, and democratic reforms failed. In other words, instead of bringing progress, democracy has caused chaos and an even higher crime rate. As a result, people began to value order and stability more than freedom and democracy, longing for a strong leader who would reinstate order and restore Russia's great power status. Along with nostalgia for the Soviet Union, regret for the former Russian empire based on religion, autocracy and nationalism began to surface (Oliker, 2009).

Following the end of the Cold War, Russia, a country with a thousand-year tradition of imperial statehood, found itself in a political, ideological and identity vacuum. In these circumstances, Russian state and the Russian people learned an important lesson of political realism. Namely, the withdrawal of Soviet troops from the former Soviet space turned these regions into a sphere of direct Euro-Atlantic influence (Lynch, 2001). Numerous internal economic, political and social problems diverted Russia's attention from developing a coherent foreign policy. In order to obtain the status and privileges of the former Soviet Union, early admission to international institutions, partnership with the West and financial support for the economic revival of the country, Russia mainly supported and followed the foreign policy initiatives and decisions of the USA and the EU. In the words of Yevgeny Primakov: "Russia has become 'guided' through the waterway of United States politics" (Primakov 2010).

However, instead of building partnership relations and getting closer to Russia, transatlantic institutions continued to expand towards Russia, placing under its sphere of influence former Warsaw Pact members. Of particular concern was the expansion of NATO, which the Russians viewed as the American post-Cold War neo-containment doctrine, whose goal was the encirclement of Russia and its neutralization in the traditional spheres of influence. Moscow frequently felt humiliated and argued that its interests and goals were not being taken into account (Asmus, 2008). Therefore, instead of becoming democratic and cooperative, Russia became hostile and authoritarian. Russian conformism gradually faded away. Over time, this sentiment will grow into truly expansionist policies. In the second half of the 1990s, especially after Vladimir Putin came to power, the Russian state became stronger, its national interests and foreign policy priorities were clearly defined. Russia began to behave like the great power it had been in the tsarist era. Many passionate Russians started to support anti-Western foreign policy against what they called „Western arrogance" (Galeotti, 2019).

When it comes to the development of the Russian political thought, it is important to note that the first Russian president, Boris Yeltsin, was elected in 1991 at a time when there were strong struggles between two political factions, one advocating change and the other that favored the preservation of the communist order. It was exactly Yeltsin who struck the final blow to the old communist system. In the same period, the former sources of legitimacy of the Russian government - ideology, the Communist Party and the army - slowly began to disappear. The only ideological aspect of Yeltsin's rule was anti-communism. During almost a decade of his rule, Yeltsin put significant efforts into making Russia's return to communism impossible (Melvin, 2022).

Vladimir Putin's Realism and the Renewal of the Russian Nationalism

In early 2000, Vladimir Putin inherited a weak, corrupt and paralyzed state, on the verge of disintegration. Russian foreign policy was in shambles, relations with the West deteriorated, especially after the war in Kosovo. His strategic goal, from the very beginning, was to rebuild Russia and restore its former glory and power. By the end of his first term, Putin had revitalized the Russian national idea by restoring the Russian identity symbols of the Tsarist and the Soviet era. As during Imperial Russia, political culture was defined based on the trinity of religion, autocracy and nationalism (Mankoff, 2011) Russian foreign policy has undergone a dramatic evolution based on Russian national interests and the concept of multipolarity. Power, order and the re-establishment of Russia's international influence, rather than democracy and human rights, are the focus of the Kremlin's political thinking. The new concept of Russian national interests includes the preservation of Russia's historical sphere of influence (with special emphasis on the former Soviet space), respect for the rights and protection of ethnic Russians in the former Soviet republics, participation in the resolution of conflicts concerning Russian interests, and prevention of the establishing of anti-Russian blocs, both military as well as political, and active involvement in international economic activities (Tsygankov, 2018).

After a decade of weakness of the Russian state, in the first two terms of Putin's rule, Russia managed to return to the international scene, regaining influence in some part of the neighbourhood and beyond. Putin restored national pride and made Russia a great power again. The new Russian reality is characterized by intensified confrontational rhetoric towards the West. Russia developed a new national idea, based on religion and nationalism, emphasizing the country's unique path as a great power, rejecting Western values and their understanding of democracy and human rights. Indeed, the essential determinant of Putin's rule is the absence of democracy, xenophobia, control of the press and the restriction of basic human rights (Biryukov & Sergeyev, 2018).

It is important to note that the Russian nationalism and realism were two ideologies that played an important role in shaping the country's political scene during Putin's rule. Nationalism in Russia is not a new phenomenon, and it has been a powerful force for centuries. However, it has taken on new meaning and importance in recent years due to several factors, including the country's economic struggles, political tensions with the West, and rising social unrest (Soldatov & Rochlitz, 2018). One of the main drivers of the Russian nationalism in the past couple of decades has been the country's economic situation. Despite Russia's vast natural resources and wealth, the economy was struggling, with high inflation, low growth rates, international sanctions and a lack of investment. Nationalism provided a sense of pride and identity for many Russians, who felt that their country was under attack from outside forces. The Kremlin encouraged this sentiment, promoting the idea that Russia was a powerful and independent nation that needed to defend its interests against foreign powers (Mendras, 2012).

Realism, on the other hand, emphasized the need for practical solutions and a clear-eyed view of Russia's strengths and weaknesses. Realists argue that the country needs to focus on its core strengths, such as its military and energy resources, while addressing its weaknesses, such as corruption and a lack of innovation. Realists also recognize the importance of international relations, arguing that Russia needs to engage with other countries on a pragmatic basis. They believe that the country should focus on building partnerships with other countries that share its interests, rather than relying solely on its own strength (Soldatov & Rochlitz, 2018).

Both nationalism and realism had their champions in the Russian political establishment, being two important ideologies that shaped the country's political landscape. Nationalists, such as Vladimir Zhirinovsky, emphasized the need for a strong leader who could defend the country's interests and restore its pride. Realists, such as Prime Minister Dmitry Medvedev, argued for a more pragmatic approach focused on economic and social development. Despite their differences, both nationalism and realism reflected the deep-seated concerns and anxieties of the Russian people. They also highlighted the country's complex relationship with the outside world, as Russia struggled to balance its desire for autonomy and independence with the realities of global interdependence (Pavlovsky, 2016). While they had their differences, they both reflected the concerns and anxieties of the Russian people and highlighted the country's complex relationship with the outside world.

In the context of nationalism, Alexander Dugin occupies a special place, as a prominent philosopher, political thinker and leader of Russian nationalism, due to his strong influence on the development of political thought, philosophy, internal and external policy, but also nationalism in Russia thanks to his concept of Eurasianism and Fourth Political Theory. The former proposes a distinctive cultural, political, and economic identity for Russia that rejects Western liberal democratic standards and highlights Russia's geopolitical uniqueness as a bridge between Europe and Asia (Dugin, 2012). The latter is an appeal for Russia to establish its own intellectual path consistent with its distinctive Eurasian identity, in defiance of the dominant political doctrines of liberal democracy, communism, and fascism. Dugin's ideas have made him a powerful figure in Russian politics, and they have contributed to a revival of Russian nationalism by shaping policy, social values, and the national consciousness (Clover, 2016).

The emphasis on each of these ideologies shifted slightly in response to the changing political and economic climate. Nationalism remained a powerful force in Russia, as many citizens continued to feel a sense of pride and loyalty to their country. However, there was a growing recognition that Russia needed to be more pragmatic in its approach to international relations, particularly in light of the country's economic struggles and the ongoing war in Ukraine. Realism gained greater prominence a decade ago, as the country's leaders began to recognize the importance of addressing Russia's economic weaknesses and building stronger ties with other countries. The government launched a series of economic reforms aimed at modernizing the economy and attracting foreign investment. This included efforts to reduce corruption, promote innovation, and diversify the economy away from its reliance on oil and gas exports (Galeotti, 2019).

At the same time, Russian leaders recognized the need for more constructive engagement with the international community. President Vladimir Putin called for a "reset" in relations with the United States, and the government worked to improve relations with other countries, including China, India, and Germany. Despite these efforts, tensions between Russia and the West continued to simmer, particularly following the outbreak of the war in Ukraine. Nationalists within Russia saw this as evidence of a broader effort to contain and undermine Russia, and they pushed for a more confrontational stance towards the West (Biryukov & Sergeyev, 2018). Realists, on the other hand, emphasized the need for a more refined approach. They recognized that Russia's economic and political interests were deeply intertwined with those of other countries, and they argued for a more cooperative approach that focused on building partnerships and resolving conflicts through dialogue.

Russian politics in the last ten years was marked by a series of significant events and changes. The period saw a shift in the country's political landscape, as well as a growing recognition of the need for economic and political reform. In 2012, Vladimir Putin returned to the presidency for a third term after serving as prime minister for four years. This sparked widespread protests across Russia, as many citizens expressed frustration with what they saw as a lack of political freedom and democratic institutions. Despite the protests, Putin maintained a firm grip on power, and his government pursued a series of policies aimed at bolstering Russia's position in the international community. This included a greater emphasis on nationalism and a more assertive foreign policy, particularly in relation to the crisis in Syria (Marten, 2017).

The government also recognized the need for economic reform, as Russian economy faced with myriad economic challenges. The government launched a series of economic reforms aimed at modernizing the economy and promoting innovation, although progress was slow. The tensions between Russia and the West escalated in the wake of the Crimea annexation. This led to the imposition of economic sanctions on Russia by the United States and the European Union, which had significant negative consequences on the country's economy. In response, the government launched a series of measures aimed at reducing Russia's reliance on the West and building stronger ties with other countries, particularly China. This included a major gas deal with China, as well as efforts to improve relations with other countries, such as Germany and India (Szostek & Hutchings, 2015).

While the government maintained a firm grip on power and pursued a more assertive foreign policy, there was also a growing recognition of the need for economic and political reform. Putin's government faced increasing criticism from civil society groups, who pushed for greater political freedom and an end to corruption (Soldatov & Rochlitz, 2018). The 2020 constitutional amendments

provided a chance for various players to pursue their conceptions of national identity, resulting in yet another, if relative, triumph for those, within the establishment, who wish to push the ethnic Russian nationalist political agenda. While members of the working group with opposing viewpoints were underrepresented, their victory was made possible by the constitution itself. The amendments will undoubtedly impact Russian politics in profound ways for many years to come.

The Russian nationalism became stronger with the rise of Putin's ambitions, and annexation of Crimea, which was exactly done under the shield of uniting all Russian speaking people under one roof and historical pretext of land possession. The takeover of Crimea is still framed as repairing a past mistake. The majority of Russians regard the annexation as an important achievement, and since 2014, Russian military pride and the country's global influence have grown. The Crimea motif has been widely used by governmental authorities. The nationalist ambitions only grew bigger with war which started in 2022 against Ukraine. In the beginning of 2020, Russian President Vladimir Putin came forward with the ideas of a series of constitutional modifications aimed at ensuring his authority in the years ahead. Simultaneously, the modifications permitted ideological perspectives on national identity to be included into the Constitution (Szostek & Hutchings, 2015).

Since the summer 2020, the Russian language has gained symbolic importance as not just the official language but also the language of all people who can speak it, implicitly referred to as those who founded the state. These provisions, which included support for compatriots out of the Russian borders, continue the shift in Russia's nation-building from a civic to an ethnic vision of nation, challenging existing thoughts of borders of the country. Many governmental actions were made between 2012 and 2019 to protect the "right" interpretations of the past, reflecting the rising importance of the successful country narrative (Biryukov & Sergeyev, 2018). For example, state authorities described the accepted forms of commemorating the Great Patriotic War. Putin approved legislation in May 2014 that criminalizes the revival of Nazism, the public degradation of monuments of Russian military pride, and the dissemination of false information about the country's defense. In the presidential world, reminiscing the past has a morally obligatory component: it is the responsibility and moral duty of the current generation to understand their place in the line of generations that came before them. The story of the triumphant country connects to the notion of patriotic allegiance in this way.

In spring of 2014, as a response to the Euromaidan upheaval in Kyiv, the Kremlin embraced far stronger Russian nationalist rhetoric. The annexation of Crimea was justified to the Russian people in radical nationalist terms. Putin's popularity has risen dramatically since the onset of the crisis. Interestingly, in terms of Russia's two dominant types of nationalism - imperial nationalism and ethnonationalism - the annexation of Crimea made it possible for Putin to sit on two chairs: because the peninsula's population is primarily ethnic Russians, this act could be presented as both uniting the Russian lands in a powerful Russian state and a protection of ethnic Russians who are located out of Russian borders (Perovich, 2014).

On March 18, 2014, the same day the Crimea was annexed, Putin gave a speech in the Russian Duma, the focus of which was the justification of this act of aggression. Some of the arguments presented fall into the category of traditional political narrative, such as the need to preserve a strong Russian state and dissatisfaction with the arbitrariness and hypocrisy of the Western world. However, the novelty in this speech was the reference to the Russian people as an ethnic entity, emphasizing how "Russian people have become one of the largest divided nations in the world, if not the largest" (Putin, 2014), clearly emphasizing ethnic Russians, and not the multi-ethnic peoples of Russia. It is interesting that the term he used '*ruskii narod*' is a term that until then had been used only in an ethnic sense, not in the sense of a political nation for which the term '*rosiiskii narod*' was used (Kolsto & Blakkisrud, 2016). Putin's annexation of Crimea resulted in record public support.

Furthermore, immediately prior to authorizing the Russian military forces to invade Ukraine, Vladimir Putin made a statement giving forth what he said to be the historical grounds for this "special operation". This is a version of the thesis that Ukrainians ("Little Russians"), Byelorussians ("White Russians"), and Russians ("Great Russians") have been, and continue to be, fundamentally one country connected by blood and culture since the period of "Kyivan Rus" (Breuilly & Halikiopoulou, 2022). To comprehend Russia's invasion of Ukraine, researchers must consider many aspects of nation-

alism that fuel this war. Beginning with Russian imperial nationalist ideas to Ukraine's mobilization and battle for survival, contradictory national narratives and the conflicts that underpin them have been produced and continue to be moulded by the current international order (Breuilly & Halikiopoulou, 2022).

Conclusion

The setting for the emergence of Russian nationalism was a state that, in demographic terms, was significantly more Russian than it had been before to 1991. After the Soviet Union disintegrated, the proportion of ethnic Russians increased from just over 50% in the USSR to 81% in Russia. Observers noted that Russia now had the opportunity, for the first time ever, to evolve into a "nation-state" based on a high degree of shared identity and values (Tishkov, 1997). To embody this new non-ethnic national notion, the names 'rossiiskii' and 'rossiiane' - non-ethnic words for 'Russian' and 'Russians' - were introduced. Yet, twenty years later, the endeavour to construct a rossiiskii country appears to have been abandoned for all practical purposes. The term "rossiiane" is connected to the Eltsin era, and it has been abandoned, along with shock treatment, the oligarch economy, and other parts of the failed transition to Western-style pluralist ideals and ideology of liberalism. Although the 'national question' remains a simmering issue, government under Vladimir Putin has effectively centralized the Federation and disempowered the influence of the republics' powerful non-Russian elites (Tishkov, 1997).

Putin's understanding of domestic, foreign and security policy goes along with the school of realism, often showing signs of open opportunism and calculation. The aggression against Ukraine was motivated by strong ethno-nationalism, i.e., in his opinion, the need to protect ethnic Russians from criminal policies in Ukraine, carried out by Ukrainian neo-Nazis and nationalists, whose activities experienced a kind of boom after Yanukovych's departure from power in 2014. The protection of Russians in the former Soviet space, 25 million of them, has been a clearly articulated goal of Russian foreign policy since the beginning of the 1990s and is an important determinant of Russia's relations with neighbouring countries. However, despite the strong rhetoric, Russia lacked the capacity and resources to significantly help ethnic Russians in the diaspora. All the fraternal help and support eventually came down to granting dual citizenship, organizing various associations, and spreading cultural influence through the formation of the "Russian World". However, in some cases concern for the brothers took on a strong security feature, which is especially reflected in the case of the Russian military intervention in Abkhazia and South Ossetia, which was justified by the need to protect the Russians in these parts of Georgia. Russian dissatisfaction was further intensified due to the expansion of NATO and the EU and the practical encirclement of Russian territory, which awakened age-old fears (Melvin, 2022).

Nationalism has been one of the biggest and most consistent sources of national pride is Russian history. After all, Vladimir Putin, at the Valdai Forum in 2018, called himself "the most proper, most genuine, and most effective nationalist." (Mitrokhin, 2023) The morally obligatory elements of the political narrative have recently been emphasized by the state authorities, who have even modified several state policies as a result. Issues with the state's legitimacy persist even with the new, ideologically strengthened Constitution. Still, Russian imperial aspirations may seem to have existed forever. Even somewhat educated media frequently portrays the Kremlin's desire to rule over its neighbours as having shifted from the tsars to Stalin and then to Putin. It is important to keep in mind that Russia rejected empire. In actuality, the USSR was brought down in 1990–1991 by Russian secessionism, along with separatist movements in the republics. Yeltsin merged the interests of Russia's conservative nationalists and liberal democrats through an uneasy coalition in order to reject Mikhail Gorbachev's bid to maintain the union. Yeltsin argued that Russians, the majority people in the Soviet Union, was oppressed. To revitalize Russia, he urged independence from burdensome others.

To conclude, nationalism is deeply rooted in Russians and the Russian contemporary leadership does not lag behind in following nationalist ambitions of their predecessors. And there seems to be no attempts to lower these ambitions. Following the dissolution of the Soviet Union, Russia's foreign policy goals were determined by the desire to compensate for the loss of its superpower status, baffled national identity, and a hurt national pride. As Russia continues to grapple with economic and political challenges, the ideologies will likely continue to play an important role in shaping the country's future. Finally, Russian nationalism and realism continue to play important roles in the country's politics, although the emphasis on each of these

ideologies shifted slightly in response to changing circumstances. While nationalism remains a powerful force, there was a growing recognition of the need for a more pragmatic and cooperative approach to international relations, as Russia sought to address its economic challenges and build stronger ties with other countries.

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