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Ethical Responsibility of a Company in the Context of Digital Transformation of Work: Conceptual Model

Angelina Roša (Rosha) [1,*] and Liudmila Lobanova [2]

[1] Faculty of Engineering Economics and Management, Riga Technical University, LV-1048 Riga, Latvia
[2] Faculty of Business Management, Vilnius Gediminas Technical University (VILNIUS TECH), LT-10223 Vilnius, Lithuania
* Correspondence: angelina.rosa@rtu.lv

Abstract: The purpose of the research was to study the relationship between the elements of a company's ethical responsibility and the outcomes of the digital transformation of work, considering the dynamic processes of open innovation. Based on the results obtained, the paper proposes a conceptual model to address the following research questions. How does the ethical responsibility of a company impact the digital transformation of work? How does the digitalization of work relate to the ethical responsibility of a company? How does open innovation advance the ethical responsibility of a company? The research follows the logic of the elaboration of a conceptual model. The theoretical novelty of the article is expressed in the fact that 25 criteria, through which the relationships between the studied concepts are manifested, were identified and systematized. To assess the significance of the criteria, a survey of experts was developed and conducted to obtain a diverse opinion. Kendall's coefficient of concordance (*W*) and Pearson's chi-squared were used to measure the level of agreement of the experts' evaluation. A conceptual model established the relationship pathways as well as inbound and outbound flows, and highlighted the key findings of the research. Namely, the guiding role of open innovation as the external circumstances for corporate ethical responsibility, and the necessity to apply all elements of ethical responsibility to ensure the viable digital transformation of work.

Keywords: ethical responsibility; digital transformation; digital transformation of work; open innovation; conceptual model

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1. Introduction

Digital technologies are increasingly being adopted by companies to operate their business more successfully [1,2]. Furthermore, digitalization has brought changes in the world of work and caused a transformation in human resources, the nature of work, and employment relationships. As a consequence, new employer-employee relationships were established, new workplace behavior patterns emerged, and new norms and rules were introduced. The changes in the world of work due to digitalization are expected to be ethical and consistent with the ethical responsibilities that a company assumes.

Issues of ethical responsibility in the context of digital transformation have generated substantial interest among the academic community and business. A number of global and national initiatives have been developed to attempt to overcome the challenges and achieve sustainable development of business and society. One of the most prominent initiatives to promote steady growth is the Sustainable Development Goals (SDGs), adopted by the United Nation, which are focused on the processes of transformation from different perspectives: people, planet, prosperity, peace, and partnership [3]. The transformative nature of the SDGs allows these goals to be integrated into the company's business processes through contemporary models, i.e., the Economy of the Common Good model [4]. Scientists [5] investigate possible ways to improve regulation of corporate responsibility at the global

level that enable companies to carry out their social responsibilities and contribute toward achieving Sustainable Development Goals.

However, the relationship between the elements of ethical responsibility and outcomes of digital transformation of work in relation to human resources, the nature of work, and employment relationship has not been sufficiently studied, regardless of the existing needs. Moreover, there is a certain gap in research on how the processes of open innovation and digital transformation as a whole facilitate promoting the ethical responsibility of a company to regulate the digitalization of work.

Therefore, the purpose of the present research is to investigate the relationship between the elements of a company's ethical responsibility and the outcomes of digital transformation of work, taking into consideration the dynamic processes of open innovation, and based on the findings, propose a conceptual model to address the following research questions. How does the ethical responsibility of a company impact the digital transformation of work? How does the digitalization of work relate to the ethical responsibility of a company? How does open innovation advance the ethical responsibility of a company?

The research is being conducted in two stages. During stage 1, which took place in April–June 2022, the analysis of the scientific literature, e.g., research and conceptual papers from peer-reviewed journals and open access journals in Business and Management, United Nations General Assembly, European Commission, and European parliament documents, resulted in determining the criteria. The significance of the criteria was established in the course of the experts' opinion survey. The expert agreement was assessed using Kendall's concordance coefficient and chi-square. The conceptual model was elaborated drawing on the literature analysis and the findings of the expert opinions.

Stage 2 of the research is planned to be carried out in the companies in the Baltic States and, in real business conditions, to assess whether there is a connection between the ethical responsibility assumed by the company and the outcomes of digital transformation of work. It is planned to use several multi-criteria decision-making methods. The method of statistical simulation (Monte Carlo) will be used to determine the sensitivity of the MCDM methods. The results of the study will be used for the formation of recommendations for strengthening the ethical responsibility of companies in the context of digitalization.

Originally, ethical issues in the context of digital transformation were the subject of academic debates (e.g., [6–8]). However recently the ethical aspects governing Al and other digital technologies have become the standards at global, national, and corporate levels. At the international level, many noticeable initiatives towards the implementation of ethics in Al are provided by the governments as well as independent institutions such as the Institute for Ethics in Artificial Intelligence, the Ethics and Governance of Artificial Intelligence Initiative, euRobotics, etc. The aim of these initiatives is to increase transparency, empower usability and accountability of artificial intelligence, and to facilitate companies to develop and maintain responsible Al ecosystems. This paper analyzes the scientific literature to shed some light on milestones of corporate ethics and digital transformation, specifically, the review aims to identify the elements through which ethical responsibility is manifested in a company, to determine the outcomes of digital transformation of work, and to specify the ways open innovation may contribute in promoting ethical responsibility in a company.

2. Literature Review

2.1. The Elements of Ethical Responsibility

What is ethical responsibility

Companies' responsibilities are not only limited to responsibilities for their economic performance and sustainable development in compliance with the law and regulations, but companies are also expected to conduct their business in an ethical manner. Internal and external stakeholders expect companies to conduct business not only in conformity with the law and regulations but also in compliance with the rules of ethics and morality, particularly in cases that are not regulated by law. In other words, it is expected that companies take on ethical responsibility guided by society's expectations and universal

moral principles. The ethical responsibility of a company includes acting in compliance with moral and ethical values, accepting novel ethical norms acknowledged by society, avoiding violation of ethical norms, and being a good corporate citizen [9,10].

The position of ethical responsibility in the system of a company

Carroll [9] included ethical responsibility along with economic, legal, and philanthropic responsibilities into the pyramid of Corporate Social Responsibility (CSR), thereby illustrating the expectations that society places on companies. Assigning ethical responsibility to a separate category, Carroll [10] claimed that ethical responsibility should be considered as a factor that is incorporated into the other categories of responsibility. "Though the ethical responsibility is depicted in the pyramid as a separate category of CSR, it should also be seen as a factor which cuts through and saturates the entire pyramid" [10].

The increased role of business in society has been reflected in the priority of responsibilities that companies entail. An empirical study conducted by Baden [11] determined that for a business to grow and be trusted by society, it needs to first and foremost take ethical responsibility "for the implementation to do no harm and comply with the ethical standards and expectations of society" [11]. Weber-Lewerenz [12] raises the issue of the relationship between morality and technology in terms of evaluating corporate responsibility in the digital environment. Digitization and artificial intelligence are discussed in terms of the ethical responsibilities of developers and users. Weber-Lewerenz's scientific approach explores the challenges and potential of human-driven technologies undergoing digital transformation.

The elements of ethical responsibility through which ethical responsibility is manifested

Synthesizing definitions of business ethics, accepted by scholars and business [13–16]. Lewis [17] identified business ethics as "rules, standards, codes, or principles, which provide guidelines for morally right behavior and truthfulness in specific situations". Lewis [17] highlighted that business ethics goes further in its scope than virtue and integrity as it embraces social responsibility emphasizing the awareness of what is morally right and trustworthy in the course of an ethical dilemma. In recent years, considerable attention was drawn to ethical, legal, and social aspects related to the use of artificial intelligence in the business context to constitute trustworthy Al [18,19].

Ethical responsibility activates forces that enable companies to develop and operate their business in a sustainable way [20]. Ethical responsibility is manifested through a number of elements, such as ethical culture, ethical climate, ethical behavior of leaders and managers, self-regulated standards of conduct, ethics training programs, compliance hotlines, and control mechanisms.

Ethical culture. Ethical culture is defined as the environment that promotes ethical behavior throughout a company. Ethical culture motivates employees to behave honestly and fairly and prevents them from acting morally wrong. However, the concept of ethical culture is still the subject of study and scientific debates. A number of models have been developed to frame the criteria for the ethical culture of companies. One such model is the Corporate Ethical Virtues Model (CEV Model) which defines normative criteria, called 'corporate ethical virtues', for the ethical culture of organizations [21]. Based on this model, clarity of normative expectations regarding the conduct of employees, feasibility, supportability, and transparency are among the conditions that, as components of an ethical culture, promote ethical conduct. The scientific literature highlights the importance of an ethical culture to increase responsibility and improve motivation, especially when the company makes decisions related to the introduction of new technologies. Thus, the study conducted by Colaco and Loi [22] provides evidence that the employees' higher perception of the ethical culture of a company contributes to higher work motivation. The ethical culture is manifested through the code of ethics that contributes to the improvement of the company's internal environment [23] and brings the relevant compliance mechanisms in line with ethical standards and legal liability [24]. In the context of corporate digital strategies, the code of ethics acquires new shades of meaning. On the one hand, digital technologies allow companies to innovate faster and respond quickly to external and

internal changes, however, on the other hand, digital transformation activities are required to be consistent with ethical behavior in order to protect stakeholders and ensure that all moral standards are observed [25].

Ethical congruence. Behavior and attitude to ethical issues of the management have critical importance in shaping the ethical behavior of the employees. Kaptein [21] emphasizes that when supervisors or managers exhibit behavior that is contrary to employee and company normative expectations, employees receive "incongruent or inconsistent signals". However, if leaders and managers act in accordance with ethical expectations, their behavior serves as a pattern to reinforce the ethical responsibility of the employees [26,27].

Ethical climate. Ethical climate focuses on a shared perception of what is ethically correct and what constitutes right behavior. The concept of the Ethical Work Climate, proposed by Bart Victor and John B. Cullen [28], is still central in the scientific literature on business ethics [29]. Victor and Cullen [28] claimed that work climates contribute to a wide range of organizational outcomes, including performance, satisfaction, and innovation. Ethical climates, as a variety of work climates, "identify the normative systems that guide organizational decision making and the systemic responses to ethical dilemmas" [28]. Companies with an accurate perception of the implications of their ethical conduct have a more clear view of their risks and opportunities which leads to their sustainable performance [20].

Self-regulated conduct standards. A number of ethical issues are specific to the business environment, thereby general moral and ethical norms cannot cover all situations where ethical consideration is required. The employees might not distinguish between ethical and unethical behavior. Self-regulated conduct standards are considered drivers for ethical behavior, since moral intuition without a company's guiding frame of conduct might lead to the risk of violating ethical norms and rules [30,31]. Therefore, a company needs clearly define the policies and standards of employees' ethical conduct [21]. At the same time, the scholars claim that companies are to be proactive in developing a realistic and well-designed code of ethics [32].

Ethics training programs. To meet ethical expectations, a company needs to establish a system of support to facilitate employees proper normative orientation. The ethics training programs aim to increase awareness and bring changes in employees' behavior to align it with the ethical norms and values accepted by a company in order to make ethically responsible decisions. Frisque and Kolb [33] investigated the effects of an ethics training program on attitude, knowledge, and transfer of training. However, the scholars highlight that the effect of training may appear only after a certain period of time, in their study the researchers reported that the employees stated the changes in their attitude to the ethical issues within 90 days after training [33].

Ethics and compliance hotlines (confidential reporting). The opportunity of the employees to rise and discuss ethical issues is the background of ethical behavior. Ethics hotlines enable employees and other stakeholders to inform about violations and ethical dilemmas [34]. If moral issues are not discussed openly, they become unnoticed and unacknowledged, which can lead to an increase in moral tension and a fall in the moral authority of normative expectations [21].

Ethics control mechanism. Low transparency within a company diminishes the control environment and increases the possibilities for unethical behavior. The absence of the application of a control mechanism undermines the effectiveness of the rules and norms [21].

The key characteristics of the elements, through which ethical responsibility is manifested in a company, are consolidated in Table 1.

Table 1. Elements of ethical responsibility (Composed by authors).

Elements of ER (Criteria)	Key Characteristics	Authors
Ethical culture	aspects that stimulate ethical behavior in a company: fairness and equity, transparency, responsibility, and accountability, etc.	Kaptein [21]; Colaco and Loi, [22]
Ethical congruence	leaders and managers act in accordance with ethical expectations	Kaptein [21]; Brown et al. [26]; Schminke et al. [27]
Ethical climate	shared perception of what is ethically correct and what constitutes right behavior	Victor & Cullen [28]; Weber and Opoku-Dakwa [29]; Chappin [20]
Self-regulated conduct standards	existence of practices, actions, policies, and standards that cover issues beyond legal considerations, e.g., ethics codes of conduct	Abdelmoety et al. [30]; Tyler and Blader [31]; Kaptein [21]; Schwepker, et al. [32]
Ethics training programs	to promote ethical behavior and provide guidance	Frisque and Kolb [33]
Ethics and compliance hotlines	confidential reporting	Kaptein [21]; Calderon-Cuadrado et al. [34]
ferEthics control mechanism	to assess performance in terms of ethical norms	Kaptein [21]

The elements of ethical responsibility that were identified in the course of the literature analysis are used in the survey of expert opinions in order to evaluate the impact of ethical responsibility on the processes of digital transformation of work.

2.2. The Outcomes of Digital Transformation of Work

The fields of open innovation and digitalization have become not only trending topics for intellectual discussions, but also a more regular areas of economic and social development requiring new research and investigations. The digital transformation of work is becoming the new normal driven largely by the processes of open innovation and digitalization.

Digital transformations are a cause of rapid and even disruptive change in a majority of companies and future competitive environments [35]. According to the authors' [35] opinion, fundamentally novel models for organizations and businesses (such as Uber-type) are emerging, and traditional companies also are to consider their structure and their roles in achieving new business goals. Since digitalization at work brings challenges as well as opportunities, it is important for managers to understand the consequences of digitalization in order to eliminate the risks and increase the favorable effects [36].

The processes of digital transformation present new challenges for the activities of employees and their managers. As a result, in the context of open innovation and digital transformation, new forms of responsibility are emerging, and in 2018, one of such responsibilities was called "Corporate Digital Responsibility" (CDR) [37]. Herden, Alliu, Cakici, et al. [38] note, that CDR is becoming a hallmark of organizations and a new basis for gaining and maintaining stakeholder trust and competitive advantage. Researchers have identified twenty important topics related to CDR, summarized findings, and categorized them into three categories using the ESG (Environmental, Social, Governance) framework. These results are discussed with regard to their theoretical and managerial contributions and a hands-on guide that companies can use to implement a suitable CDR strategy [38]. Weber-Lewerenz's [39] research shows how best practices meet corporate responsibility in the digital transformation process and how the requirements of the EU for trustworthy AI and their human-friendly use are essential. Digital transformation bears a high potential for companies, is critical for success, and thus, requires responsible handling.

The processes of technological and digital transformations initiated and developed by business and science are in the zone of strategic interest for the development of the economies of countries and regions. Digital and innovation strategies have become the foundation of competitive economies. In March 2021, the European Commission presented a vision and avenues for Europe's digital transformation by 2030 [40]. The Commission proposes a Digital Compass for the EU's digital decade that evolves around four cardinal points: government, skills, environment, and business. It is expected that a minimum of 80% of the population should have basic digital skills. Secure and sustainable digital

infrastructures must become the basis for the digital transformation of businesses. It is planned that by 2030, 75% of EU companies will start using Cloud/AI/Big Data. More than 90% of SMEs will reach at least a basic level of digital intensity. Digitalization of public services must be developed in Key Public Services, which by 100% will be realized online. In e-Health, 100% of citizens must have access to medical records. In the Digital Identity area, 80% of citizens will be using digital ID.

A digitally skilled population and highly skilled digital professionals are one of the main goals for the future of EU development [41]. Digital skills will be essential to reinforce the collective resilience of a society. Basic digital skills for all citizens and the opportunity to acquire nspecializedsed digital skills for the workforce are a prerequisite to participating actively in the Digital Decade.

The proposed scenario for the development of the digital economy requires an intensive increase in the digital competence of employees and their active involvement in interaction with artificial intelligence. According to Weber-Lewerenz's [39], research in digital and AI technologies followed by human-operated technology and the evaluation of the ethical use of technology meets to the Sustainable Development Goals [3].

Digital innovation is a key driver of digital and business transformation. This process demands human transformation to complement business transformation in order to achieve long-term sustainability [42]. The environment and nature of human work take intensive transformations under the condition of digital transformations. According to Weber-Lewerenz and Vasiliu-Feltes [42], changing the culture, fostering an inclusive mindset and guaranteeing diversity are challenging yet foundational elements in building a legacy and require inclusive digital ethics leadership.

The agendas of the International Labor Organization (ILO) and the European Union (EU) are devoted to the digital transformation of work and the elimination of possible gaps in decision-making regarding the policy of digitalization of the economy and society [43]. EU Directive 2019/1152 [44] on transparent and predictable working conditions aims to strengthen the social dimension of work. However, there are new challenges and dangers associated with digitalization, automation, and robotization of work processes.

A conceptual analysis of the phenomenon of digital transformation (DT) based on an analysis of 23 unique definitions of digital transformation, led to the conclusion that the concept of DT is primarily associated with organizations [45]. The scholar also indicated that there is a great difference between the types of technologies involved and the nature of the transformation. However, in spite of differences that were found in the definitions of DT, there are also similarities that exist in most definitions, e.g., the use of common terminology [45]. Based on the findings, Vial [45] developed a conceptual definition of DT as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies" [45].

Digitalization, the process of converting information into a digital format, further develops people's behavior, skills, and knowledge to use digital applications and technology [46]. Therefore, it is reasonable to assume that DT processes in companies can be closely related to the digitalization of work and cause new problems, including those related to ethical responsibility.

Digitalization has been reshaping the way organizations operate since the invention and adoption of the Internet as the most global open innovation. However, digitalization creates not only great opportunities for organizations, but also many challenges. Understanding the digital transformation of work (DTW) requires a systematic understanding, differentiation, and integration of all dimensions of this phenomenon.

Taking into account the fact that studies of the processes of digitalization, and especially the digitalization of work, do not sufficiently emphasize aspects of the ethical responsibility of companies, this study is focused on clarifying the following: how does the digitalization of work relate to the ethical responsibility of a company concerning the

outcomes of DTW, related to human resources (workforce), to the nature of work, and to employment relationships?

Workforce (human resources). Contemporary Future of Work (FOW) discourse discusses questions about the value of labor, norms of distribution and fairness, and social order [47]. The human resource policy recommendations in the FOW literature are usually skill-oriented. Evidence from labor economics suggests not only that skills matter for employability, productivity, and wages, but also the benefits of learning beyond the job.

The researchers [48] note, that digitalization has both huge positive and also negative potential for the organization and individual employees. Thus, according to the mentioned authors, the main question is how to design a digital environment that promotes the generation and development of ideas and ensures good employee practices. To understand the requirements for the latter, it is necessary to understand the current implications of digitalization for employees. Other researchers [36] note, that the role of digitalization in business performance and labor productivity has previously been studied, and in their research focused attention on job satisfaction, and work-life balance, including the autonomy of workers as little explored areas of scientific research.

Nöhammer and Stichlberger [48] focus on the antecedents of a very specific outcome of digitalization related to employee behavior with postulated influence on innovative capacity: extended availability and subsequent insufficient detachment with its potential consequences. Based on a quantitative investigation in three steps and using structural equation modeling, those scholars establish the link between the digitalized work setting, observed behavior, and its reasons.

Digitalization has two very different effects on work, as Mengay [49] argues. On the one hand, it leads to a re-Taylorization of work, de-qualification, and a loss of workers' autonomy. On the other hand, the digitalization of work leads to new forms of indirect control and algorithmic control that can be used to manage and instrumentalize the supposed autonomy of workers to actually enable an unequal and exploitative work process.

Most of the studies have focused on how digitalization affects business efficiency and labor productivity [36]. These researchers study how digitalization affects job satisfaction, work-life balance, and worker autonomy.

Facing destructive digitalization, high-skilled employees are more likely to become entrepreneurs in unincorporated businesses [50]. Furthermore, entrepreneurship does not seem to be a viable option for low-skilled individuals affected by destructive digitalization.

Nature of work. Digital transformation brings about changes to and disruption of the very essence of work. Work tends to become more autonomous which entails both positive and negative consequences. On one side, digital transformation provides increasing opportunities for creative, flexible, and less dependent work, however, there is a growing risk of uncertainty and instability in labor relationships due to a new digital environment [51].

The innovative nature of work due to digitalization is a visible effect. Remote and hybrid work, and reduction of strenuous or repetitive work are regular positive factors, understood by many scholars and business practitioners [49–51].

Digitalization is one of the most dynamic phenomena of our age, and its opportunity and risk are closely intertwined [46]. Scholars pay attention to some risks, when digitalized work produces large amounts of personal data about where, what, when, and with whom employees work, and its seamless flow of information creates opportunities for efficiency; however, it also enables intrusive employee control, which threatens established standards of privacy at work.

Employment relationships. The scholars [51] indicate that despite the very real threats of unemployment, job insecurity, precariousness, and surveillance, technology may also encourage the emergence of a work culture that shifts the scales toward a relational realm rather than a transactional one. The above-mentioned authors also indicated the DTW phenomena that are opposite in their consequences. On the one hand, this is increasing opportunities for creative, flexible, and less dependent work, and on the other hand, uncertainty and instability in labor relationships due to a new digital environment [51].

Other sources [50], explore the relationship of the new wave of digitalization of professions with entry into various types of entrepreneurship. Researchers have shown that highly skilled and ICT employees facing disruptive digitalization have an increased likelihood of becoming entrepreneurs with unincorporated businesses.

Under the context of the digital transformation of work, many essential aspects of robotics and AI developments include great social challenges and health and safety risks [52]. Authors underline that robotics is not only a matter of science, technology, and innovation policy, but also a social and health issue, which will include many social and cultural challenges. As the scientists note, it is equally important to ensure that industrial and service designers of robot systems are aware of these issues and are provided with guidance to create compliant and ethical systems. Achievements in open innovation are an important open resource to realize strategic objectives in this area.

Digitalization has opened up new methods to promote socialization in all types of organizations, generally, and businesses specifically [53]. The authors of this study summarize, that stakeholders prefer those businesses which are inclined towards social norms and virtues. By Khattak and Yousaf [53] in the era of digitalization, digital social responsibility (DSR) has become the strategic decision for all kinds of business organizations.

The direct link between Digital Social Responsibly and Corporate Social Responsibility performance was tested by scholars [53], who proposed that DSR and CSR performance have a significant relationship. These findings support that CSR performance is developed with the help of DSR where organizations follow ethical standards, practices, laws, and codes for the social well-being of the stakeholders. It is important to note that the synergy between digital transformation processes and corporate ethical and social responsibility opens up new opportunities for companies to implement digital ethical responsibility (DER) measures.

Some scholars indicate a positive correlation between digitalization and increased organizational sustainability [54]. They note, that on the one hand workers would be freed from the bonds of time, location, and social circumstances restrictions, but on the other hand, workplaces, where workers are constantly controlled and deprived of freedom. Remote and hybrid working models and accelerated digitalization of human resources processes were introduced in most organizations worldwide as a consequence of the COVD-19 pandemic. This digital revolution in the workplace was forced by extraordinary circumstances, thus its impact had not been anticipated before. When the digital environment of work has become the new normal [55], this motivated some authors [54] to study the new work reality. The phenomenon of the gig economy has given rise to new forms of activity where those in the gig economy participate in spot labor markets and "gig workers" usually get jobs through online platforms and may never meet their "employer" [56].

The key outcomes (criteria) of the areas of digital transformation of work concerning human resources, the nature of work, and the employment relationships are consolidated in Table 2.

Table 2. Outcomes of digital transformation of work (Composed by authors).

Areas of DTW	Key Outcomes (Criteria)	Authors
Workforce (Human Resources)	creation of new jobs; occupational flexibility; job losses for some professions; influence on innovative capacity; job loss for low-skilled people; skill-oriented workforce policy; disbalance of work/life; new methods to promote socialization and value or work	Cijan et al. [36]; Nöhammer, Stichlberger [48]; Schlogl et al. [47]; Khattak, Yousaf [53]
Nature of work	innovative nature of work, remote and hybrid work, reduction of strenuous or repetitive work, digitalized environment, new forms of control, unreliability of digital systems, problems with data ownership and privacy, labor market disruptions	Fossen, Sorgner [50]; Mengay [49]; Rodriguez-Lluesma et al. [51]; Nöhammer, Stichlberger [48]; Barley et al. [56]; Kettunen, Laanti [35]
Employment relationships	non-standard employment relationships; different types of entrepreneurship; growth-oriented entrepreneurship based on digitalization and AI; precarity of employment; data-centered decision-making and flexible structures; increasing organizational sustainability; digital social responsibility (DSR)	Kuzior et al. [54]; Fossen, Sorgner [50]; Khattak, Yousaf [53]; Kettunen, Laanti [35]

In summarizing, it is possible to formulate a systematic definition of the digital transformation of work activity. The digital transformation of work is the process and the result of the digitalization of work processes that transform the nature of work and employment relationships challenging the human resources (workforce). All identified outcomes of the digitalization of work are used in the expert survey as the criteria for investigation of how the ethical responsibility of a company is related to the DTW processes.

3. The Processes of Open Innovation and Digital Transformation for Promoting Ethical Responsibility of a Company

In the contemporary conditions of rapidly developing technologies, companies realize, that the alignment of an ethically responsible attitude with the demands on innovativeness is one of the core pillars of a company's sustainable performance [20].

Nowadays, the concept of ethical responsibility acquires special significance with regard to new processes taking place in the field of open innovation and digitalization. In line with contemporary scientific knowledge, a group of scholars put forward the view regarding the need to revise theories and conduct new empirical research relating to digital and open innovation environments [57].

The emergence of new markets, the development and improvement of business models, and the growing importance of innovation—these and other changes are largely due to the digital evolution changes. The scholars propose a number of ways to intensify the transformation process as a result of digitalization using an open innovation approach. One such example is Digital Innovation Hubs which have proved to be an effective tool for knowledge and technology transfer and innovation promotion [58].

In the scientific literature, digital transformation is understood as both a technological achievement and a socio-cultural process. As a sociocultural process, digital transformation is defined as "the process of adapting firms to the new organizational forms and skill sets needed to remain viable and relevant in a digital landscape" [59]. DT is also defined as the process by which companies respond to changes in their environment as a result of the use of digital technologies, which leads to the alteration in value creation Vial [45] and discovers the ways for new open innovation possibilities.

Digital transformation brings about changes to and disruption of the very essence of work, thus work tends to become more autonomous which entails both positive and negative consequences. On one side, digital transformation provides increasing opportunities for creative, flexible, and less dependent work, however, on the other side, there is a growing risk of uncertainty and instability in labor relationships due to a new digital environment [51].

A company's ethical responsibility in the context of digital transformation of work is tracking changes in value creation paths. Ritter and Pedersen [55] analyzed phases in digitization and showed that after 2010 the digital environment of work has become the new normal. For this reason, digital technologies are recognized as a common business fact and widespread practice, but not as something special or extraordinary [55]. Nevertheless, Leikas, Koivisto, and Gotcheva [60] argue for the reasonable design and use of new technologies based on the real needs of individuals and the community to avoid "developing technology for technology's sake" [60]. They also highlight the importance of conducting an ethical analysis for a new technology to ensure that this innovation brings value by helping to strengthen the work strategies and improve their consistency with the overall company's strategy.

Another important aspect of taking ethical responsibility by companies in the context of digital transformation and open innovation is the implementation of digital social responsibility. For example, Puriwat and Tripopsakul [61] point out that "during the COVID-19 pandemic, online and digital platforms have been increasingly realized as important mechanisms for businesses undertaking and implementing socially responsible activities—digital social responsibility (DSR)".

Hence, the first part of the article was focused on the analysis of scientific literature on the issues of ethical responsibility, digital transformation of work as well as the processes of open innovation as the drivers to promote ethical responsibility in a company. Based on the finding of the literature analysis, the core criteria of ethical responsibility and digital transformation of work were identified in order to evaluate their significance and establish their relationship in the course of the expert survey. The second part of the paper outlines the methodology of the research. Then the analysis of the expert survey is presented, followed by discussion. The article concludes with the conceptual model of the place of ethical responsibility in the context of digital transformation of work, practical implications, and further research are also discussed.

4. Materials and Methods

The research follows the logic of the elaboration of a conceptual model. First, the literature review was carried out to analyze the context of the research in the fields of ethical responsibility, digital transformation, and open innovation. The literature analysis aimed to determine the criteria through which the relationship between ethical responsibility and digital transformation of work are manifested. Based on the criteria derived, the survey of experts is developed and conducted to obtain a multi-perspective opinion on the linkage among the phenomena being investigated. Ultimately, a conceptual model was developed to establish the impact pathways as well as inbound and outbound flows.

The criteria that allow the evaluation of the relationship between ethical responsibility and digital transformation of work contain 25 indicators under four categories (Table 3): including 7 elements of a company's ethical responsibility and 18 outcomes of digital transformation of work (concerning 6 outcomes related to human resources; 6 outcomes related to nature of work and 6 outcomes related to employment relationships).

Table 3. The criteria for the evaluation of the relationship between ethical responsibility and digital transformation (Composed by authors).

4 Categories of 25 Criteria			
Elements of Company's Ethical Responsibility	**Outcomes of Digital Transformation of Work**		
	Concerning Human Resources	**Concerning the Nature of Work**	**Concerning Employment Relationships**
1. Ethical culture (aspects that stimulate ethical behavior in a company: fairness and equity, transparency, responsibility, and accountability, etc.); 2. Ethical congruence (leaders and managers act in accordance with ethical expectations); 3. Ethical climate (shared perception among managers and employees of what is ethically correct and what constitutes right behavior); 4. Self-regulated conduct standards (existence of practices, actions, policies, and standards that cover issues beyond legal considerations, e.g., ethics codes of conduct); 5. Ethics training programs (to promote ethical behavior and provide guidance); 6. Ethics and compliance hotlines (confidential reporting); 7. Ethics control mechanism (to assess performance in terms of ethical norms).	1. Creation of new jobs and places of work for high-skilled employees; 2. Occupational flexibility (transformative impacts on jobs, occupations, professions); 3. Job losses for some professions due to digitalization of work and artificial intelligence bias; 4. Influence on innovative capacity, higher opportunities for self-realization, and job satisfaction (due to digitalization); 5. Job loss for low-skilled people and exclusion of certain groups in society (e.g., those with lower digital literacy); 6. Disbalance of work/life (work/life balance blurring)	1. Innovative nature of work in the digitalized environment pushing saving of time; 2. Remote and hybrid work, more worker autonomy; 3. Reduction of strenuous or repetitive work (good working practices of employees); 4. New forms of control (direct, indirect, algorithmic) and better information dissemination; 5. Unreliability of digital systems, problems with data ownership and privacy; 6. Labor market disruptions (e.g., jobs lost due to automation, artificial intelligence, and robotics)	1. Non-standard employment relationships (employment on the basis of short-term contracts: freelance, crowdsourcing, project work) and autonomy (less dependence on the organization); 2. Different types of entrepreneurship (digitalization of occupations with entry into different types of entrepreneurship); 3. Growth-oriented entrepreneurship based on digitalization and AI; 4. Precarity of employment (casual, temporary employment, lack of job security, lower salaries, and limited social protection); 5. Data centered decision making and flexible structures (to control the labor process and improve heteronomy of work); 6. Increasing organizational sustainability as a result of digitalization

The relationship between the elements of ethical responsibility and the outcomes of digital transformation of work as well as the significance of each criterion was evaluated on the course of the survey of expert opinions.

A Survey of Expert Opinion

The aim of the survey is to gain expert views about the relationship between a company's ethical responsibility and the digital transformation of work, considering the dynamic processes of open innovation.

The experts were provided with the following definitions based on the analysis of the literature and adopted for the study:

- Ethical responsibility is the performance of a company that does not cause harm to others and conforms to society's ethical norms and expectations.
- Digital transformation of work is the process and result of the digitalization of work processes that transform the nature of work and employment relationships challenging the workforce.
- Open innovation is the use of purposeful inflows and outflows of technologies, knowledge, and ideas to advance internal innovation.

The expert questionnaire includes several blocks of questions based on criteria identified in the course of the analysis of scientific literature (Appendix A). The questions presented to the experts for the assessment related to:

I the elements through which ethical responsibility of a company is manifested,
II the outcomes of digital transformation of work: the following aspects of the consequences of the digital transformation of work activity were identified: direct impact on human resources (workforce); the impact on the nature of work itself, and the changes in employment relations.,
III the external context including open innovation dynamic processes and processes of digital transformation.

Based on the identified issues, the following questions were formulated for the experts:

I How does digital transformation of work IMPACT the elements of company's ethical responsibility? Evaluate the significance of each element of the company's ethical responsibility for the digital transformation of work, taking all elements as 100%.
II How is the ethical responsibility of a company RELATED to the single outcomes of the digital transformation of work concerning human resources (workforce)/the nature of work/the employment relationships. Evaluate the significance of each outcome of digital transformation of work (concerning human resources/the nature of work/the employment relationships) for the company's ethical responsibility, taking all outcomes as 100%.
III What circumstances drive companies to take on ethical responsibilities? Sven statements were also provided to collect experts' opinions about the relationship between open innovation and the ethical responsibility of a company.

According to Belton and Stewart's principles of identification of quality evaluation criteria, such a group of criteria for each stage of the evaluation process was offered [62,63]. The results of the expert survey were analyzed by using quantitative methods of data analysis. The following assumptions were taken into consideration. The significance of the criteria ω_j, where j is the number of criteria, might be represented by the statistical data, the judgment of experts, as well as the values of technological characteristics of the explored process [64]. Subjective weights of criteria and objective weights of criteria are normally singled out. Subjective weights of criteria are calculated based on the assessments by highly qualified specialists—experts. Objective weights evaluate the structure of the data array at the time of evolution. The influence of criteria on the evaluated process as well as the significance of criteria are different [65]. However, whatever the method of evaluation of weights, the overall principle of the weight evaluation is identical: the most significant criterion is assigned the largest weight. The obtained weights are normally normalized,

specifically, the sum of weights is equal to one: $\sum_{j=1}^{m} \omega_j = 1$. There are various methods for the evaluation of the weight criteria. Experts can evaluate the significance of criteria using different rating systems, such as ranking the criteria based on their significance, the direct evaluation of the weights when the sum of the evaluations is equal to one (or 100%), the use of other scales with normalization of the results [66].

In the present study, the subjective weights of criteria are calculated based on the evaluation of 15 experts. The experts directly evaluated the significance of the criteria using a 100.00 percent scale (the sum of the weights of the criteria should be equal to 1 or 100.00 percent). A 100.00 percent scale was taken for evaluation in order to use the weights of the criteria in the further study [65]. The Likert scale was used to identify the mean. Each expert completed the questionnaire individually. All experts were sent official letters inviting them to take part in the study. After receiving confirmation of consent to participate in the study, the experts were sent a link to an online questionnaire.

When experts were asked to evaluate the significance, their evaluations were used to determine the weights of every criterion. Meanwhile, a general decision of the experts is meaningful for further research only if the expert opinions are in agreement. Therefore, the consistency of the experts' evaluation was measured using Kendall's coefficient of concordance (W) and Pearson's chi-squared [64,67].

An expert opinion survey was conducted in May 2022 in Latvia and Lithuania. The experts were elected based on the following criteria: education (Master's degree and higher); practical, academic, and/or scientific experience in one of some fields related to digital technologies, human resources, or innovation; breadth of interests and willingness to participate in the research. Fifteen experts were selected based on the established criteria (Table 4).

Table 4. The selection criteria of experts by education, experience in years, and area of experience (Composed by authors).

No	Education	Experience in Years	Area of Experience
1	PhD	more than 10 years	practical; academic; research
2	PhD	more than 10 years	practical; academic; research
3	PhD	more than 10 years	practical; academic; research
4	PhD	more than 10 years	practical; academic; research
5	PhD	more than 10 years	academic; research
6	PhD	more than 10 years	academic
7	MSc	more than 10 years	practical; academic; research
8	MSc	more than 10 years	practical
9	MSc	more than 10 years	practical
10	MSc	more than 10 years	practical
11	MSc	6–10 years	practical
12	PhD	6–10 years	practical; academic
13	PhD	3–5 years	practical; academic; research
14	PhD	3–5 years	practical; research
15	PhD	3–5 years	academic

Almost all experts have practical experience, most of them have theoretical knowledge of ethical corporate responsibility, digital transformation of work, and/or open innovation, and a third of respondents also have academic and research experience in these areas of knowledge. Ten experts have more than 10 years of experience, two—from 6 to 10 years and three—from 3 to 5 years.

5. Results

In accordance with the logic of the study design, the experts were first asked to evaluate the overall impact of the digital transformation of work on the elements of a company's ethical responsibility, keeping in mind that almost in any company all elements

of ethical responsibility derived from the literature analysis can be identified. Another set of questions suggested assessing the relationship of individual outcomes of digital transformation of work with the ethical responsibility of the company, recognizing that all outcomes of DTW can be manifested in organizations.

How does digital transformation of work IMPACT the elements of company's ethical responsibility?

The impact of digital transformation of work on the ethical responsibility of a company on seven criteria was assessed by experts on a 5-point Likert scale (where 1 = no impact at all; 5 = extreme impact). Ethical responsibility was presented in terms of the elements through which the ethical responsibility of a company is manifested, while the digital transformation of work was understood as a whole. The collected data were analyzed quantitatively using descriptive statistics. The three measures of central values, i.e., mean, median, and mode are closely connected by the empirical relationship. The mean of data was calculated to indicate a central tendency of the data. The median value was obtained after sorting the data in ascending order. The value of mode was calculated to indicate which appears most often in the given data, i.e., the observation with the highest frequency of data. The standard deviation was used to measure the dispersion, i.e., how data were spread out from the mean. The mean, median, mode, and standard deviation were calculated by using the formulas in Excel. Standard deviation allowed us to measure the variability of the responses. A score close to zero indicates a relevant consistency in responses. The results are presented in Table 5.

Table 5. Evaluation of DTW impact on the elements of company's ethical responsibility (Composed by authors).

Elements of Company's Ethical Responsibility	Mean	Median	Mode	Standard Deviation (SD)
Ethical culture	3.60	4	3	0.8288
Ethical congruence	3.20	3	3	1.0142
Ethical climate	3.60	4	4	0.9856
Self-regulated conduct standards	3.87	4	4	0.6399
Ethics training programs	3.20	3	3	0.6761
Ethics and compliance hotlines	3.20	3	3	1.2649
Ethics control mechanism	3.27	3	3	0.9612

The most impactful criterion recognized by the experts was self-regulated conduct standards, which include the existence of practices, actions, policies and standards that cover issues beyond legal considerations, e.g., ethics codes of conduct (mean = 3.87). The expert survey also revealed that the digital transformation of work can influence the ethical climate, manifested in the general perception of managers and employees about what is ethically correct and what constitutes correct behavior, and ethical culture, including aspects that stimulate ethical behavior in the company: fairness and impartiality, transparency, responsibility, and accountability, etc. (mean = 3.6 for both elements).

According to expert opinions, the mechanism of ethical control turned out to be less influential (mean = 3.27). The existence of ethics and compliance hotlines (confidential reporting), and ethics training programs, which could become important to promote ethical behavior and provide guidance and ethical congruence when leaders and managers act in accordance with ethical expectations (mean = 3.2) complete the list of elements.

In summarizing, the following question arises: how these assessments of the impact of DTW on ethical responsibility established by experts will be aligned with the alternative evaluation during stage 2 of the current research in the companies of the Baltic States.

How is the ethical responsibility of a company RELATED to the single outcomes of DTW concerning human resources (workforce), the nature of work, and the employment relationships?

The relation between the ethical responsibility of a company and single outcomes (separate consequences) of the digital transformation of work was established by the

experts' evaluation of these criteria on a 5-point Likert scale, where 1 = not related at all, 5 = extremely related.

Table 6 summarizes the results of the evaluation of how the ethical responsibility of the company is related to certain consequences of DTW as apparent important outcomes.

Table 6. Evaluation of how ethical responsibility of a company is related to the outcomes of DTW concerning human resources, the nature of work, and employment relationships (Composed by authors).

Outcomes of Digital Transformation of Work				
Related to human resources (workforce)	Mean	Median	Mode	Standard Deviation (SD)
Creation of new jobs and places of work for high-skilled employees	3.60	4	4	0.6399
Occupational flexibility (transformative impacts on jobs, occupations, professions)	3.60	4	4	0.9904
Job losses for some professions due to digitalization of work and artificial intelligence bias	2.87	3	3	0.8619
Influence on innovative capacity, higher opportunities for self-realization, and job satisfaction (due to digitalization)	3.67	4	3	1.0465
Job loss for low-skilled people and exclusion of certain groups in society (e.g., those with lower digital literacy)	2.80	3	3	1.2799
Disbalance of work/life (work/life balance blurring)	3.53	3	3	0.9155
Related to the nature of work	Mean	Median	Mode	SD
Innovative nature of work in the digitalized environment pushing saving of time	3.73	4	4	1.2799
Remote and hybrid work, more worker autonomy	4.07	4	5	0.8837
Reduction of strenuous or repetitive work (good working practices of employees)	3.47	3	3	0.9904
New forms of control (direct, indirect, algorithmic) and better information dissemination	3.67	4	4	1.1127
Unreliability of digital systems, problems with data ownership and privacy	3.87	4	4	0.7432
Labor market disruptions (e.g., jobs lost due to automation, artificial intelligence, and robotics)	3.20	3	4	0.8619
Related to employment relationships	Mean	Median	Mode	SD
Non-standard employment relationships (employment on the basis of short-term contracts: freelance, crowdsourcing, project work) and autonomy (less dependence on the organization)	3.80	4	4	1.0142
Different types of entrepreneurship (digitalization of occupations with entry into different types of entrepreneurship)	2.80	3	2	1.0142
Growth-oriented entrepreneurship based on digitalization and AI	3.33	3	4	0.7237
The precarity of employment (casual, temporary employment, lack of job security, lower salaries, and limited social protection)	3.40	3	3	0.7368
Data centered decision making and flexible structures (to control the labor process and improve heteronomy of work)	3.40	3	3	1.0556
Increasing organizational sustainability as a result of digitalization	2.80	3	3	1.0142

Relation of the ethical responsibility of a company to the outcomes of DTW concerning human resources

According to the experts' view, it was found that three outcomes of DTW associated with human resources are more strongly related to the ethical responsibility of the company. All three criteria are united by the common meaning of unlocking the potential of human resources in the context of DTW, by providing conditions for the growth of qualifications, self-realization, and job satisfaction due to digitalization. Influence on innovative capacity, higher opportunities for self-realization, and job satisfaction average of 5-points is 3.67 (SD 1.0465). Occupational flexibility (transformative impacts on jobs, occupations, and professions) and creation of new jobs and places of work for high-skilled employees with an average of 5-points are 3.60 (SD 0.9904 and 0.6399, respectively).

However, job loss for low-skilled people is recognized by experts as less related to ethical responsibility. Job losses for some professions due to digitalization of work and artificial intelligence bias rated 2.87 (SD 0.8619), also job loss for low-skilled people and exclusion of certain groups in society (e.g., those with lower digital literacy) average is 2.8 (SD 1.2799).

Relation of the ethical responsibility of a company to the outcomes of DTW concerning the nature of work

It was found that DTW outcomes associated with the nature of work are significantly related to the ethical responsibility of the company. The criterion remote and hybrid work, and more worker autonomy (4.07 on 5-point scale; SD 0.8837) was rated as the most associated with ethical responsibility. This can be explained by the fact that remote and hybrid work has become more intensive during the COVID-19 pandemic.

Another strong factor according to the expert opinions is related to the insecurity of digital systems and issues of data ownership and confidentiality (mean = 3.87; SD 0.7432), which is a new challenge for the ethical responsibility of companies. According to experts, the innovative nature of work in the digital environment can also be relevant from the standpoint of ethical responsibility (mean =3.73; SD 1.2799).

Labor market disruptions and job losses due to automation, artificial intelligence, and robotics can be addressed through ethical accountability (average of 5-points scale is 3.20; SD 0.8619).

Relation of the ethical responsibility of a company to the outcomes of DTW concerning the employment relationships

The digitalization of the work environment promotes non-standard labor relations (such as employment based on short-term contracts: freelancing, crowdsourcing, project work) and the autonomy of workers who are less dependent on the organization (score 3.80 on a 5-point scale; SD 1.0142). Data-centered decision making, e.g., "Ethics-by-design", and flexible structures contribute to controlling the labor process and improving the heteronomy of work, were evaluated by the experts in 3.40 on a 5-point scale (SD 1.0556). The precarity of employment, manifest in casual, temporary employment, lack of job security, lower salaries, and limited social protection, were also evaluated in 3.40 (SD 0.7368).

Different types of entrepreneurship (digitalization of occupations with entry into different types of entrepreneurship) average, on a 5-point scale, 2.80 (SD 1.0142). Increasing organizational sustainability as a result of digitalization was not considered significant (average of 5-points scale 2.80; SD 1.0142).

In summarizing, it makes sense to note that the following outcomes can be recognized as the most related to the ethical responsibility of companies: influence of innovative capacity, higher opportunities for self-realization, and job satisfaction due to digitalization related to human resources, remote and hybrid work, more worker autonomy related to the nature of work and non-standard employment relationships more related to employment relationships.

Evaluation of the significance of elements of the company's ethical responsibility and the outcomes of the digital transformation of work

The evaluation consisted of experts' evaluations. Fifteen experts were asked to give percentage values to each criterion in every group so that the total percentage in one group was summed up to 100 percent. Such allocation allowed us to verify the validity of selected criteria.

The experts evaluated the significance of the criteria by assigning to these criteria a rank number. Therefore, the percentage values of experts' evaluations were turned into ranks. The highest ranking—rank 1—was assigned to the most important criteria, and the lowest ranking (rank 6 or rank 7 depending on the number of criteria) was given to the least important one. Then, the concordance coefficient W (Equation (1)) and x^2 (Equation (2)) are determined.

$$W = \frac{S}{\frac{1}{12} \cdot m^2(n^3 - n) - m \cdot \sum T_i} \quad (1)$$

$$x^2 = \frac{S}{\frac{1}{12} \cdot mn(n+1) + \frac{1}{n-1} \sum T_i} \quad (2)$$

where m—the number of compared objects or elements;

n = the number of criteria,

T—the number of experts,

S—deviation of the means of the sum of squares of the experts' assessment from the overall average.

The value of concordance coefficient W shows if the assessment of experts agrees. The values can vary between 0 and 1 when a W value close to 0 shows inconsistent assessment and a value close to 1 shows that the assessment agrees. The x^2 value shows

the consistency of experts' assessment if it is higher than the critical value x^2_{kr} from the table of x^2 distribution.

The criteria were distributed according to their importance. Table 7 shows the distribution of criteria of the first category: the elements of ethical responsibility, as evaluated by experts and then ranked.

Table 7. Evaluation of the significance of elements of a company's ethical responsibility (Composed by authors).

Elements of Company's Ethical Responsibility	Results of Calculation by Method 1		Results of Calculation by Method 2		
	W	Rank	Rank Sum	*W*	Rank
Ethical culture	0.16	2	54	0.17	2
Ethical congruence	0.12	6	32	0.10	6
Ethical climate	0.15	3	50	0.16	3
Self-regulated conduct standards	0.18	1	63	0.2	1
Ethics training programs	0.11	7	29	0.09	7
Ethics and compliance hotlines	0.13	5	39	0.12	5
Ethics control mechanism	0.14	4	48	0.15	4
Total	1		315	1	

The significance of the criteria was calculated by two methods. Method 1: based on the criteria evaluation matrix of 15 experts, the mean value was calculated and the following weights were obtained and then the criteria were ranked. Method 2: according to Kendall's theory, the weights are to be ranked. Based on the data of the survey, a summary matrix of ranks is compiled. The sum of ranks was calculated and normalized. On the basis of obtaining the sum of ranks the weight indicators of the considered criteria are calculated.

The concordance coefficient $W = 0.25$, coefficient $x^2 = 22.23$ (is more than $x^2_{kr} = 12.59159$), which means that the results can be accepted and used in further research. The estimation of concordance coefficient W showed that the consistency of the experts' opinion is low, however, the x^2 value is higher than the critical value x^2_{kr} from the table of x^2 distribution. This proves that the results can be accepted.

Evaluating the significance of the elements of ethical responsibility for the digital transformation of work, experts recognized that self-regulated conduct standards which identify the company's conduct values are of great significance in the face of work transformation due to digitalization. Ethics codes of conduct are assumed to be one of the common means for self-regulation of a company's ethical behavior. The experts identified that both ethical culture and ethical climate are significant and influence the changes taking place in the world of work as a result of digital transformation. The results show that the other components of a company's ethical infrastructure, such as ethics control mechanism and ethics and compliance hotlines, which refer to formal and informal control systems and channels for consultation, investigation, and assessment of ethical performance, can also impact the digitalization of work processes. Fewer experts' concern about such issues as ethical congruence and ethics training programs is more likely due to the insufficient investigation and debates around these topics [68].

Table 8 shows the distribution of criteria of the second category: outcomes of digital transformation of work (concerning human resources), as evaluated by experts and then ranked.

The concordance coefficient $W = 0.23$, coefficient $x^2 = 17.21$ (is more than $x^2_{kr} = 11.07050$) which means that the results can be accepted and used in further research. The consensus of experts' opinions is low, however, the value of x^2 is higher than the critical value x^2_{kr} from the distribution table of x^2. Based on that, the results can be accepted.

Table 8. Evaluation of the significance of outcomes of digital transformation of work (concerning human resources) for ethical responsibility (Composed by authors).

Outcomes of Digital Transformation of Work (Concerning Human Resources)	Results of Calculation by Method 1		Results of Calculation by Method 2		
	W	Rank	Rank Sum	*W*	Rank
Creation of new jobs and places of work for high-skilled employees	0.178	3	35.5	0.2	3
Occupational flexibility (transformative impacts on jobs, occupations, professions)	0.185	2	38	0.21	2
Job losses for some professions due to digitalization of work and artificial intelligence bias	0.147	5	21	0.12	5
Influence on innovative capacity, higher opportunities for self-realization and job satisfaction (due to digitalization)	0.204	1	42.5	0.24	1
Job loss for low-skilled people and exclusion of certain groups in society (e.g., those with lower digital literacy)	0.119	6	15	0.08	6
Disbalance of work/life (work/life balance blurring)	0.167	4	27	0.15	4
Total	1		179	1	

The changes caused by the digitalization of work have influenced human resources and have led to the outcomes the significance of which for the ethical responsibility of a company has become the subject of the experts' evaluation. By experts' opinion, the innovative capacity of a company due to digitalization, which provides higher opportunities for the employees for their self-realization, and thus contributes to an increase in job satisfaction, is highly related to the ethical conduct of both company and employees. The flexible employment and creation of new jobs for high-skilled employees are also significant for shared perception of ethical criteria among the company's members. At the same time, negative outcomes, such as disbalance of work/life, job losses due to lack of new technologies maturity on the one hand, and low qualification of some group of employees, on the other hand, affect the acceptance of ethical responsibility. Analyzing the sequence of ranks, it may be assumed that the experts place the priority on the positive outcomes of digital transformation of work that might encourage and boost ethically responsible behavior.

Table 9 shows the distribution of criteria of the third category: outcomes of digital transformation of work (concerning the nature of work), as evaluated by experts and then ranked.

Table 9. Evaluation of the significance of outcomes of digital transformation of work (concerning nature of work) for ethical responsibility (Composed by authors).

Outcomes of Digital Transformation of Work (Concerning the Nature of Work)	Results of Calculation by Method 1		Results of Calculation by Method 2		
	W	Rank	Rank Sum	*W*	Rank
Innovative nature of work in the digitalized environment pushing saving of time	0.170	3	40	0.18	3
Remote and hybrid work, more worker autonomy	0.233	1	51	0.23	1
Reduction of strenuous or repetitive work (good working practices of employees)	0.141	5	31	0.14	5
New forms of control (direct, indirect, algorithmic) and better information dissemination	0.167	4	38.5	0.17	4
Unreliability of digital systems, problems with data ownership and privacy	0.172	2	43	0.19	2
Labor market disruptions (e.g., jobs lost due to automation, artificial intelligence, and robotics)	0.118	6	21.5	0.10	6
Total	1		225	1	

The concordance coefficient $W = 0.17$, coefficient $x^2 = 12.63$ (is more than $x^2_{kr} = 11.07050$) which means that the results can be accepted and used in further research.

The outcomes resulting from changes in the nature of work due to the digital transformation are related to new forms of work, different working conditions, accessibility of data ownership, etc. The experts have a view that remote and hybrid work leading to more worker autonomy is the significant outcome and can be related to a large extent to employees' ethical behavior and their moral responsibility. The experts also consider that the issues of data ownership and privacy are of great importance for ethical concern. However, despite the widespread discussion among scholars and businesses about morality and privacy, this outcome is placed in the second position, giving way to employees' autonomy.

Table 10 shows the distribution of criteria of the fourth category: outcomes of digital transformation of work (concerning employment relationships), as evaluated by experts and then ranked.

Table 10. Evaluation of the significance of outcomes of digital transformation of work (concerning employment relationships) for ethical responsibility (Composed by authors).

Outcomes of Digital Transformation of Work (Concerning Employment Relationships)	Results of Calculation by Method 1		Results of Calculationby Method 2		
	W	Rank	Rank Sum	*W*	Rank
Non-standard employment relationships (employment on the basis of short-term contracts: freelance, crowdsourcing, project work) and autonomy (less dependence on the organization)	0.205	1	49.5	0.22	1
Different types of entrepreneurship (digitalization of occupations with entry into different types of entrepreneurship)	0.133	6	24	0.11	6
Growth-oriented entrepreneurship based on digitalization and AI	0.159	4	36	0.16	4
Precarity of employment (casual, temporary employment, lack of job security, lower salaries and limited social protection)	0.197	2	46	0.20	2
Data centered decision making and flexible structures (to control the labor process and improve heteronomy of work)	0.171	3	42.5	0.19	3
Increasing organizational sustainability as a result of digitalization	0.135	5	27	0.12	5
Total	1		225	1	

The concordance coefficient $W = 0.16$, coefficient $x^2 = 11.96$ (is more than $x^2_{kr} = 11.07050$) which means that the results can be accepted and used in further research. Estimation of the concordance coefficient W showed that the consensus of experts' opinions is low, however, the value of x^2 is higher than the critical value x^2_{kr} from the distribution table of x^2. This proves that the results can be accepted.

Employment relations are changed in the course of digital transformation, and the outcomes of this transformation affect the opportunities, challenges, and threats for the integration and promotion of the principles of ethical responsibility in a company. Experts believe that non-standard employment relationships and autonomy are at the top rank position, and the relationship between these outcomes and ethical responsibility is significant. The second rank position also deserves attention since the experts highlighted the significance of complying with ethical norms to prevent precarity of employment. Under this category, the risks of violation of the norms of ethics related to employment relations in the context of digital transformation are viewed by experts as more challenging.

What circumstances drive companies to take on ethical responsibilities?

The data presented are based on the assessments of experts who were asked to determine to what extent open innovation advances the ethical responsibility of a company. Assessing the circumstances that encourage companies to assume ethical obligations according to the five factors presented (Figure 1), the experts gave preference to the factor of corporate reputation and image (average of 5-points is 4.26; SD 0.8837). The desire to enhance corporate reputation and image through the adoption of ethical responsibility, publicly presented to society through the media, is consistent with the second most important factor—the wide availability and transparency of information as a result of the

development of digital technologies (mean = 3.93; SD 0.8837). The company's ability to absorb external innovative resources and combine them with its own innovative achievements, as well as the company's financial capabilities as circumstances that encourage companies to take ethical responsibility, were rated as medium significant (by mean= 3.73; SD 0.7037 and SD 0.8837, respectively). Such a factor as a competitive environment that promotes the development and strengthening of a company's competitive advantages is the least conducive to encouraging companies to take on ethical obligations (mean = 3.66; SD 0.8997).

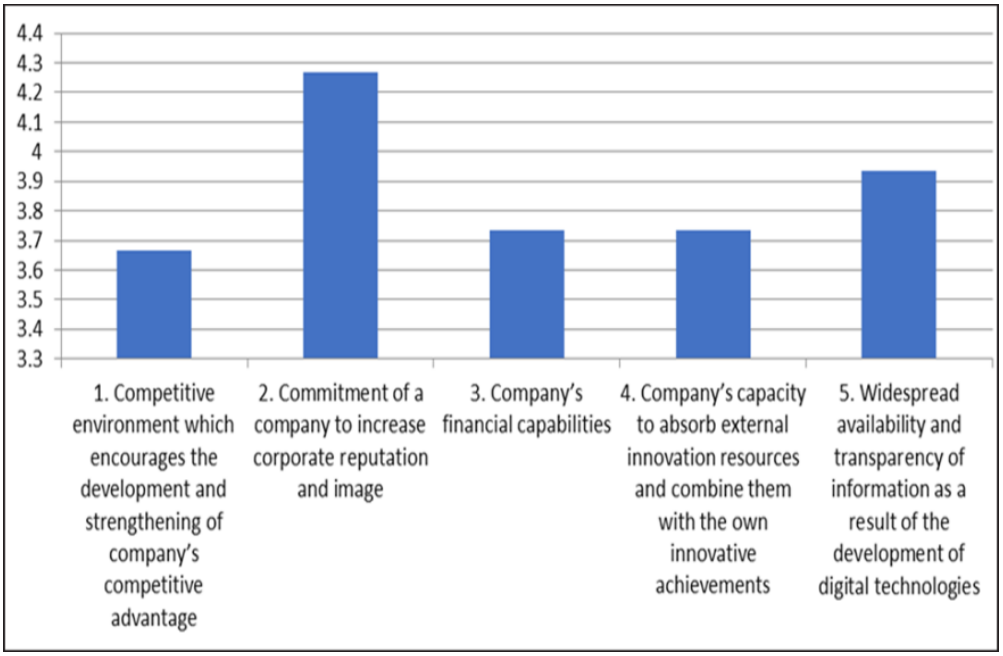

Figure 1. Circumstances that drive companies to take on ethical responsibilities (Composed by authors).

Based on an assessment of the circumstances that encourage companies to make ethical commitments, it is possible to suggest that the importance of corporate reputation and image, in the presence of wide availability and transparency of information as a result of digital technologies, may push companies to make ethical commitments related to the digital transformation of work.

Relationship between open innovation and ethical responsibility

The experts' assessment of the relationship between open innovation and the ethical responsibility of companies (Figure 2) revealed that ethics can help raise awareness of issues important for fair treatment of users in innovation processes (mean = 4.06; SD 0.7037). Ethics also encourages innovators to address human values, such as privacy and autonomy, throughout the design process (mean = 3.86; SD 0.8338).

Therefore, it might be concluded that not only the process of open innovation influence the promotion of ethical responsibility in a company, but ethical responsibility also can contribute to increasing awareness of the ethical issues that are crucial for fair treatment of the stakeholders, including companies, in innovation dynamic processes. Ethical responsibility assumed by a company can be strengthened by accepting new norms and values as a result of inbound knowledge transfer. At the same time, outbound transfer of knowledge enables the company to share its ethical principles in the field of innovation and digital transformation with definers of innovation and other groups of stakeholders.

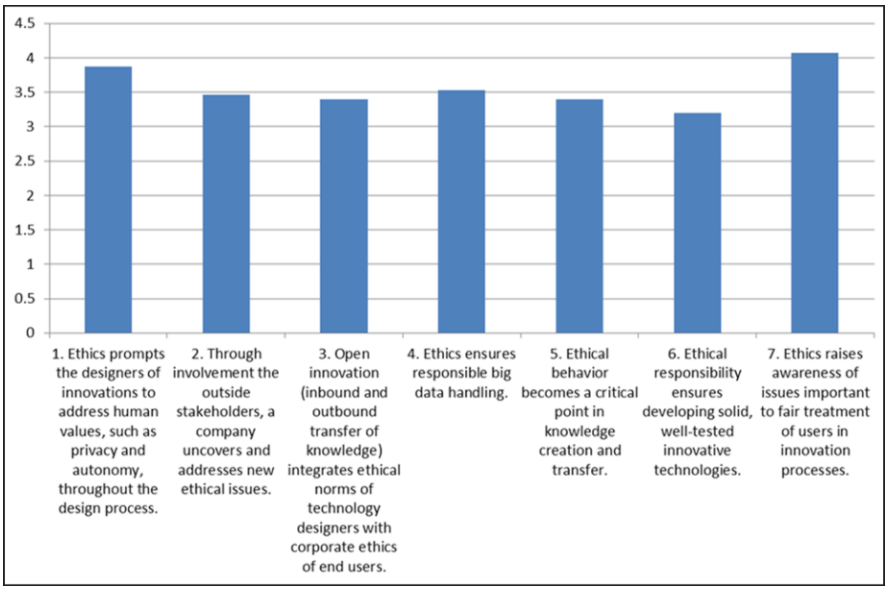

Figure 2. Relationship between open innovation and ethical responsibility (Composed by authors).

6. Discussion

6.1. The Importance of Ethical Responsibility for the Processes of Digital Transformation of Work in a Company

Ethical responsibility is manifested through a number of elements the significance of which for the digital transformation of work was evaluated by the experts. The reason for the evaluation was that the changes in the world of work due to digital transformation are expected to be in a line with the company's responsibilities, including ethical responsibilities, and the moral values of the stakeholders. The overall view of the results obtained in the course of the expert survey leads to the conclusion that, all elements are significant to a certain extent, since the difference in weights is insignificant. It is also possible to explain why the experts acknowledged that self-regulating standards of conduct are considered the most significant criteria. Clear standards can precisely indicate what attitudes are considered ethical and what behaviors are expected from management and employees when a company introduces new technology into a work context. Among the elements that manifest ethically responsible behavior, ethical congruence of leaders and managers and ethics training programs are considered less significant compared to other criteria. Insufficient attention to training is also highlighted in the scientific literature, the scholars argue that the impact of ethical training programs is not yet sufficiently investigated [68].

6.2. The Context of Digitalization of Work for the Ethical Responsibility Assumed by a Company

The results of the current research are in line with the studies in the fields of digital technologies and ethical issues [69]. Positive outcomes of digital transformation of work, such as the creation of new jobs and occupational flexibility, advance ethical behavior and enhance the perception of ethical responsibility. Remote and hybrid work, leading to greater worker autonomy, is the most important criterion and can be linked to a large extent to the ethical behavior of employees and their moral responsibility. Analyzing the results of employment relationships, it was revealed that non-standard labor relations and autonomy are in the first place, and the relationship between these results and ethical responsibility is significant.

Therefore, the digitalization of work opens up prospects for professional and even personal well-being for innovative employees who easily adapt to the new conditions of a digital work environment and autonomous labor relations. It is in that context that the ethical responsibility of a company should essentially protect all employees from a new form of discrimination—discrimination based on belonging to the digital reality of work.

6.3. Open Innovation as One of the External Circumstances to Promote Ethical Responsibility in a Company

Open innovations attract a wide range of stakeholders, especially when new technologies are created. The stakeholders might affect the innovative process from different perspectives including ethics. Each party involved adheres to the standards of morality and ethics that they accept. While communicating, the external and internal stakeholders have the opportunity to share their values and adopt the other's ethical norms and rules and thus become more ethically responsible. The study supports the findings of the previous research that if a company has the capacity to absorb external innovations and integrate them with internal innovations, the company can bring social open innovations and innovative approaches to ethics [70,71].

Innovative approaches and open innovation culture [72] in the digitalized environment and better information dissemination lead to new forms of ethical responsibility that comprise self-regulated mechanisms for formal and informal ethically-based systems, hotlines, and feedback.

6.4. The Conceptual Model of the Ethical Responsibility and the Digital Transformation of Work in a Company

Based on the literature review and the result of the experts' opinion survey the conceptual model is elaborated (Figure 3). The model displays the position of ethical responsibility related to the processes of digital transformation of work in a company.

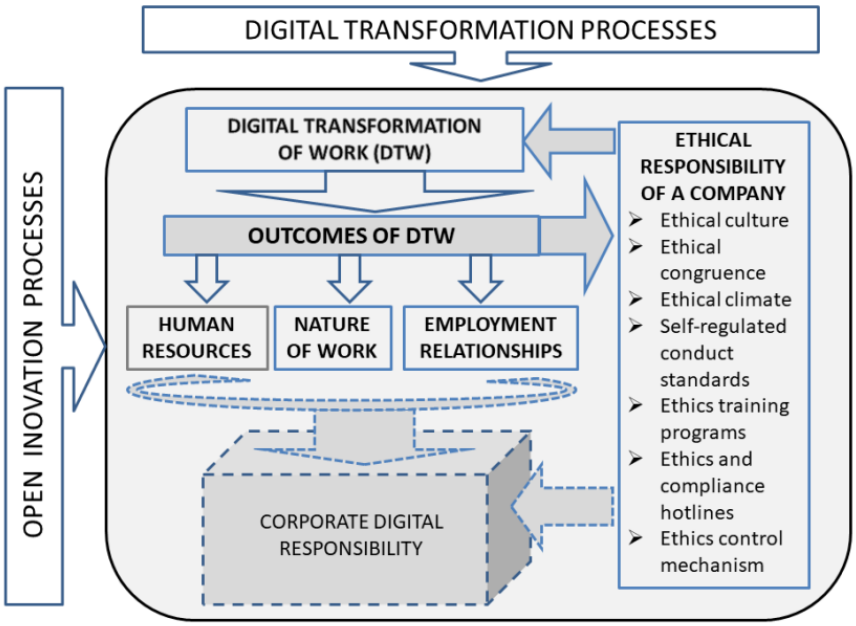

Figure 3. The conceptual model of the place of ethical responsibility in the processes of digital transformation of work (Composed by authors).

Conceptually, the model establishes the link between the ethical responsibility of a company and the digital transformation of work. The model contains external and internal components. Open innovation processes and processes of digital transformation are elements of an external framework focused on an open environment from which companies feel the transformational impact.

Internal framework of the model consists of the elements of ethical responsibility and outcomes of digital transformation of work (DTW). The model highlights that the presence of all the elements through which ethical responsibility is manifested is important when a company is experiencing the digital transformation of work. Digital transformation of work is considered in terms of the outcomes of the constituent parts of work, namely human resources, the nature of work, and employment relations. The model considers the

outcomes which are obtained owning to the digital transformation of work and indicates that both ethical responsibility and the outcomes of DTW are related to each other. On the base of the literature analysis, the model is complemented by a component that is the subject of further research, namely corporate digital responsibility. Corporate digital responsibility integrates the process of digital transformation with a company's ethical responsibility and allows a company to establish and maintain its credibility and trust [37].

The elaborated conceptual model will take approbation in the companies of Baltic states during stage 2 of the research.

7. Conclusions

The aim of the research was to determine the relationship between the ethical responsibility of a company and the digital transformation of work to elaborate a conceptual model for further investigation.

The analysis of the scientific literature identified 25 criteria under four categories: elements of ethical responsibility, outcomes of digital transformation of work concerning human resources, outcomes of digital transformation of work concerning the nature of work, and outcomes of digital transformation of work concerning to employment relationship. The identified criteria constitute the basis of the experts' opinion survey.

The survey of expert opinions reveals the level of significance of each criterion for the digital transformation of work (elements of ethical responsibility were evaluated) and ethical responsibility of a company (outcomes of digital transformation of work were evaluated). The external processes, namely open innovation and digital transformation, as the drivers to promote ethical responsibility in a company were also under consideration.

The literature analysis and the survey of experts have resulted in the development of a conceptual model which determined the interconnectedness of a company's ethical responsibilities and digital transformation of work taking into consideration the dynamic processes of open innovation. This conceptual model provides a framework that clarifies how and under what conditions the relationship between ethics and digital transformation can contribute to the sustainable development of a company.

The highlights of this research consist of the following:

1. Conceptually, the research has shown the relation between the elements of a company's ethical responsibility and the outcomes of digital transformation of work.
2. The processes of open innovation and digital transformation can be seen as the external circumstances advancing ethical responsibility to guide a company's decisions about changes in work due to digitalization.
3. To ensure that the digital transformation of work follows the path of ethical compliance and meets the moral expectations of stakeholders, it is necessary to use all the elements through which ethical responsibility is manifested.
4. Outcomes of DTW that provide positive effect (i.e., employees' self-realization, flexible employment) are more significant for stimulating ethical conduct of both company and employees.
5. Increasing non-standard employment relationships and work autonomy due to digitalization highlight the need to pay more attention to ethical standards and the acceptance of ethical responsibility by both the company and employees.

8. Limitations and Practical Implications

The study has limitations, acknowledged by its authors, some of which can be addressed in further research. Regarding the theoretical framework, it was not the aim of the study to provide an extended analysis of the literature that covers all aspects of business ethics including philosophical and social issues. The scientific literature in the field of ethics was selected for the analysis so that to explore the diverse manifestations of ethical responsibility in a company.

Regarding the empirical evidence, taking into consideration the complexity of the study fields (ethical responsibility, digital transformation of work, and open innovation) it

was rather difficult to attract experts who are proficient in all these fields. The research was focused on a sample of 15 experts. Further research may be addressed to the comparison of the results obtained in this study with the results obtained from the investigation of ethical conduct of the companies in the process of digitalization of work.

Practical implications. The present study made several contributions to the theoretical literature related to the mutual influence of ethical responsibility of a company and digital transformation in the field of work. It was proposed to consider ethical responsibility through a set of elements including ethical culture, ethical climate, ethical behavior of leaders and managers, self-regulated standards of conduct, ethics training programs, compliance hotlines, and control mechanisms. Such an approach allows us to obtain a realistic view of the company's ethical conduct. The current study also suggested relating the elements through which ethical behavior is manifested to the outcomes of the digitalization of work. Such an approach enables scientists to deepen and expand this topic in order to investigate and open a novel perspective for discussion about potential opportunities and risks related to ethical issues in the context of the digital transformation of work. Further research could be built on the investigation of corporate digital responsibility (CDR), i.e., how this strategy impacts the changes occurring in the field of work.

The proposed conceptual model serves as the foundation for recommendations for the strengthening ethical responsibility of a company in the context of digital transformation of work and uncovers an opportunity for a company to apply business strategies overcoming threats and using the benefits of its ethical conduct. The conceptual model has been prepared for its further testing in the companies of the Baltic States.

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Appendix A

EXPERT OPINION SURVEY

Ethical responsibility and digital transformation of work

Dear Expert!

The expert opinion survey is a part of the research conducted by the scholars of Riga Technical University (Latvia) and Vilnius Gediminas Technical University (Lithuania).

The aim of this survey is to gain your view about the relationship between company's ethical responsibility and digital transformation of work, considering the dynamic processes of open innovation.

The following definitions are accepted for the current research:

- Ethical responsibility is the performance of a company that does not cause harm to others and conforms to society's ethical norms and expectations.
- Digital transformation of work is the process and result of digitalization of work processes that transform the nature of work and employment relationships challenging the workforce.
- Open innovation is the use of purposeful inflows and outflows of technologies, knowledge, and ideas to advance internal innovation.

It should take approximately 30 min to complete the questionnaire.
If you have any questions please contact us at e-mail: angelina.rosa@rtu.lv
We appreciate your participation in the survey!
Question 1. How does digital transformation of work IMPACT the elements of company's ethical responsibility?

	No Impact at All 1	Slight Impact 2	Moderate Impact 3	High Impact 4	Extreme Impact 5
1. Ethical culture (aspects that stimulate ethical behavior in a company: fairness and equity, transparency, responsibility and accountability, etc.)					
2. Ethical congruence (leaders and managers act in accordance with ethical expectations)					
3. Ethical climate (shared perception among managers and employees of what is ethically correct and what constitutes right behavior)					
4. Self-regulated conduct standards (existence of practices, actions, policies and standards that cover issues beyond legal considerations, e.g., ethics codes of conduct)					
5. Ethics training programs (to promote ethical behavior and provide guidance)					
6. Ethics and compliance hotlines (confidential reporting)					
7. Ethics control mechanism (to assess performance in terms of ethical norms)					

Question 2. Evaluate the significance of each element of company's ethical responsibility for digital transformation of work, taking all elements as 100%

	Significance for Digital Transformation of Work (=100%)
1. Ethical culture	
2. Ethical congruence	
3. Ethical climate	
4. Self-regulated conduct standards	
5. Ethics training programs	
6. Ethics and compliance hotlines	
7. Ethics control mechanism	

Question 3. Human resources (workforce). How is ethical responsibility of a company RELATED to the single outcomes of the digital transformation of work concerning human resources (workforce)?

	Not Related at All 1	Slightly Related 2	Moderately Related 3	Highly Related 4	Extremely Related 5
1. Creation of new jobs and places of work for high-skilled employees					
2. Occupational flexibility (transformative impacts on jobs, occupations, professions)					
3. Job losses for some professions due to digitalization of work and artificial intelligence bias					
4. Influence on innovative capacity, higher opportunities for self-realization and job satisfaction (due to digitalization)					
5. Job loss for low-skilled people and exclusion of certain groups in society (e.g., those with lower digital literacy)					
6. Disbalance of work/life (work/life balance blurring)					

Question 4. Evaluate the significance of each outcome of digital transformation of work (concerning human resources) for the company's ethical responsibility, taking all outcomes as 100%?

	Significance for the Company's Ethical Responsibility (=100%)
1. Creation of new jobs and places of work for high-skilled employees	
2. Occupational flexibility (transformative impacts on jobs, occupations, professions)	
3. Job losses for some professions due to digitalization of work and artificial intelligence bias	
4. Influence on innovative capacity, higher opportunities for self-realization and job satisfaction (due to digitalization)	
5. Job loss for low-skilled people and exclusion of certain groups in society (e.g., those with lower digital literacy)	
6. Disbalance of work/life (work/life balance blurring)	

Question 5. Nature of work. How is ethical responsibility of a company RELATED to the single outcomes of the digital transformation of work concerning the nature of work?

	Not Related at All 1	**Slightly Related 2**	**Moderately Related 3**	**Highly Related 4**	**Extremely Related 5**
1. Innovative nature of work in the digitalized environment resulting in saving of time					
2. Remote and hybrid work, employees' greater autonomy					
3. Reduction of strenuous or repetitive work (decent work conditions)					
4. New forms of control (direct, indirect, algorithmic) and better dissemination of information					
5. Unreliability of digital systems, problems with data ownership and privacy					
6. Labor market disruptions (e.g., jobs losses due to automation, artificial intelligence, and robotics)					

Question 6. Evaluate the significance of each outcome of digital transformation of work (concerning the nature of work) for the company's ethical responsibility taking all outcomes as 100%?

	Significance for the Company's Ethical Responsibility (=100%)
1. Innovative nature of work in the digitalized environment resulting in saving of time	
2. Remote and hybrid work, employees' greater autonomy	
3. Reduction of strenuous or repetitive work (decent work conditions)	
4. New forms of control (direct, indirect, algorithmic) and better dissemination of information	
5. Unreliability of digital systems, problems with data ownership and privacy	
6. Labor market disruptions (e.g., jobs losses due to automation, artificial intelligence, and robotics)	

Question 7. Employment relationships How is ethical responsibility of a company RELATED to the single outcomes of the digital transformation of work concerning employment relationships?

	Not Related at All 1	**Slightly Related 2**	**Moderately Related 3**	**Highly Related 4**	**Extremely Related 5**
1. Non-standard employment relationships (employment on the basis of short-term contracts: freelance, crowdsourcing, project work) and autonomy (less dependence on the organization)					
2. Different types of entrepreneurship (digitalization of occupations with entry into different types of entrepreneurship)					
3. Growth-oriented entrepreneurship based on digitalization and AI					
4. Precarity of employment (casual, temporary employment, lack of job security, lower salaries and limited social protection)					
5. Data centred decision making and flexible structures (to control the labour process and improve heteronomy of work)					
6. Increasing organizational sustainability as a result of digitalization					

Question 8. Evaluate the significance of each outcome of digital transformation of work (concerning employment relationships) for the company's ethical responsibility, taking all outcomes as 100%?

	Significance for the Company's Ethical Responsibility (=100%)
1. Non-standard employment relationships (employment on the basis of short-term contracts: freelance, crowdsourcing, project work) and autonomy (less dependence on the organization)	
2. Different types of entrepreneurship (digitalization of occupations with entry into different types of entrepreneurship)	
3. Growth-oriented entrepreneurship based on digitalization and AI	
4. Precarity of employment (casual, temporary employment, lack of job security, lower salaries and limited social protection)	
5. Data centred decision making and flexible structures (to control the labour process and improve heteronomy of work)	
6. Increasing organizational sustainability as a result of digitalization	

Question 9. To what extent, do you agree, that the following circumstances drive companies to take on ethical responsibilities?

	Strongly Disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly Agree 5
1. Competitive environment which encourages the development and strengthening of company's competitive advantage					
2. Commitment of a company to increase corporate reputation and image					
3. Company's financial capabilities					
4. Company's capacity to absorb external innovation resources and combine them with the own innovative achievements					
5. Widespread availability and transparency of information as a result of the development of digital technologies					

Question 10. To what extent, do you agree with the following statements?

	Strongly Disagree 1	Disagree 2	Undecided 3	Agree 4	Strongly Agree 5
1. Ethics prompts the designers of innovations to address human values, such as privacy and autonomy, throughout the design process.					
2. Through involvement the outside stakeholders, a company uncovers and addresses new ethical issues.					
3. Open innovation (inbound and outbound transfer of knowledge) integrates ethical norms of technology designers with corporate ethics of end users.					
4. Ethics ensures responsible big data handling.					
5. Ethical behavior becomes a critical point in knowledge creation and transfer.					
6. Ethical responsibility ensures developing solid, well-tested innovative technologies.					
7. Ethics raises awareness of issues important to fair treatment of users in innovation processes.					

Question 11. What is the highest degree or level of education you have completed?

- Bachelor's Degree
- Master's Degree
- Doctorate Degree (PhD)

Question 12. How long have you been working in one or some of the fields related to digital technologies, human resources or innovation?

- 3–5 years
- 6–10 years
- more than 10 years

Question 13. How would you characterize your experience? If more than one answer is relevant, select all that apply?

- practical experience
- academic experience
- research experience

That is all the questions we would like to ask you. If you would like to add any other aspects that are actual in this field of research, please use the space below.

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