DEVELOPMENT OF COMPETENCES FOR THE NEEDS OF TOMORROW'S LABOUR MARKET

Beata Poteralska[1]*, Joanna Łabędzka[2], Katarzyna Brożek[3]

[1, 2, 3] Jan Kochanowski University in Kielce, Faculty of Law and Social Sciences, Poland

Abstract: The management of organisations functioning in the contemporary world, which is characterised by volatility, uncertainty, complexity, and ambiguity (VUCA), requires specific future-oriented competences from employees. The paper aims to discuss the possibility of applying foresight and Futures Literacy approaches, known for dealing with uncertainty, in the process of developing such competences. Against the background of the state-of-the-art analysis comprising (1) the contexts, in which uncertainty is tackled in foresight and Futures Literacy exercises, and (2) the contexts, in which the future of work is analysed in connection with foresight and Futures Literacy, the authors discuss and confirm the possibility of applying the mentioned anticipation approaches to develop future-oriented competences, namely competences on the individual level, enabling one to cope with the increasing uncertainty characterising the VUCA world. The focus of the paper relates to the aspects that are still understudied or require additional strengthening: (1) the development of competences on an individual level using foresight and Futures Literacy approaches, and (2) incorporating foresight and Futures Literacy at the level of higher education. The paper presents examples of activities undertaken in this area, however, their number is still limited.

Keywords: competences, foresight, future labour market, Futures Literacy, higher education, uncertainty, VUCA

JEL classification: I23, M12

---

[1] Beata Poteralska, Assoc. Prof., ul. Uniwersytecka 15, 25-406 Kielce, Poland,
beata.poteralska@ujk.edu.pl, https://orcid.org/ 0000-0002-4670-0024
[2] Joanna Łabędzka, PhD, ul. Uniwersytecka 15, 25-406 Kielce, Poland, joanna.labedzka@ujk.edu.pl,
https://orcid.org/ 0000-0003-1409-7926
[3] Katarzyna Brożek, PhD, ul. Uniwersytecka 15, 25-406 Kielce, Poland,
Katarzyna.Brozek@ujk.edu.pl, https://orcid.org/ 0000-0001-8031-6766
* Corresponding author: Beata Poteralska, beata.poteralska@ujk.edu.pl

Introduction

The management of a contemporary organisation assumes the understanding and acceptance of volatility, uncertainty, complexity, and ambiguity, characterising the VUCA world. The trendy managerial acronym VUCA refers to turbulence observed in the business landscape (Kaivo-oja & Lauraeus, 2018a), a rapidly changing society facing uncertain futures (Mangnus et al., 2021), and unpredictable change (Bennett & Lemione, 2014). In the VUCA world, the nature of work and market requirements change rapidly (Bakhshi et al., 2017; Schulte et al., 2020). It means that the management of organisations – whose effective activity is determined by the possessed human resources – must take into account the need for employees with competences necessary to function in these dynamically changing conditions.

As a result of changes on the labour market, skill mismatch, the persistently high level of uncertainty of the environment and an increased risk in business activity noticed by entrepreneurs (Dębkowska et al., 2022), it is necessary to develop so-called future-oriented competences. The authors identify them on the basis of an analysis of reports of recognised international organisations, such as the OECD, JRC, WEF, and a search the Web of Science database (Poteralska et al., 2022). Klowden & Lim (2021) mention that competences in the future will comprise two categories: STEM (science, technology, engineering, and maths) and "soft skills" (Sala et al., 2020). Particular attention should be paid to the competences of graduates who are entering the current labour market. It is necessary for them, as the future workforce, to have general competences for living and working in the 21st century, not only to possess job specific skills. These general skills comprise so-called "21st century skills" (Voogt et al., 2013) (by the authors of the paper called future-oriented competences), which include amongst others collaboration, communication, problem-solving skills, and critical thinking (Matysik, 2016; Habets et al., 2020). They are not new competences however, they are of increasing importance and necessary in the 21st century (Habets et al., 2020). Competences of a general nature such as entrepreneurial thinking, network management, strategic thinking, complex critical-thinking, proactive thinking, and open mindedness are of key importance because of the character of the contemporary interconnected world where technological innovations are disseminated quickly (Kaivo-oja & Lauraeus, 2018; Felder et al., 2019; Kononiuk et al., 2021).

The list of future-oriented competences mentioned by scholars is consistent with the list of the top skills indicated by employers. According to employers, apart from specific professional skills, the ability to function in business in conditions of uncertainty is increasingly more valuable. Competences such as cooperation skills, stress resistance, time management skills, willingness for continuous development, creativity, interpersonal skills, empathy, and adaptability will rise in importance (PARP Report, 2020; Dębkowska et al., 2022).

The ability to function in a future that is unknown and turbulent is emphasised. Future literacy, adaptability, and exploratory thinking are stressed in the European sustainability competence framework (Bianchi et al., 2022). Bacigalupo et al. (2016) also emphasise that coping with uncertainty, ambiguity, and risk, which refers to

dealing with complex challenges and handling a constantly changing environment characterised by a high degree of uncertainty, is another essential competence that is directly related to living in the VUCA world. It is noticeable that the key competences of the future indicated by both researchers and practitioners indicate the importance of the skill related to the ability to cope with uncertainty. In such a situation, competences of forward thinking, anticipation and agility are required to "hold a clear competitive advantage and a mandate in the future" (Silva, 2015). To be successful in the VUCA environment the application and development of, among others foresight, which enables one to face discontinuous change (Keller et al., 2015), and Futures Literacy (Miller & Sandford, 2018) are proposed.

The application of foresight supports the determination of future-oriented competences and creating scenarios of the future. The application of the Futures Literacy approach stimulates more conscious thinking about the future and a critical look at one's visions and assumptions about the future. It helps one to prepare for an uncertain future.

The paper aims to discuss the possibility of applying foresight and Future Literacy approaches, known for dealing with aspects of uncertainty in the process of developing future-oriented competences. It attempts to answer the research question: Is it justifiable to apply foresight and Futures Literacy approaches to develop future-oriented competences necessary to operate in the situation of increasing uncertainty characterising the VUCA world?

The paper is structured as follows: After listing the competences of the future needed in the VUCA world, the authors state the need to develop such competences that enable one to cope with the uncertainty characterising the current labour market. The authors suggest that foresight and Futures Literacy already applied to cope with uncertainty are appropriate approaches, which could be used to develop future--oriented competences.

To reply to the research question, a state-of-the-art analysis is conducted with respect to two areas. Firstly, the authors focus their research on two aspects: 1) analysing the context of applying foresight and Futures Literacy with respect to dealing with uncertainty, and 2) analysing how foresight and Futures Literacy approaches are used with reference to the future of work.

Next, the authors discuss, against the background of the state-of-the-art analysis, how these modern anticipation methods can be used for the purpose of developing competences of the future at the higher education level with reference to students and graduates entering the labour market. Examples of attempts to equip individuals with such competences are presented.

The conclusions comprise the main results, indicating that the tools in question can be successfully applied to develop future-oriented competences, enabling one to cope with uncertainty that characterises the contemporary labour marker.

Methodology

The paper is focused on a specific aspect related to the possible application of foresight or Futures Literacy approaches to develop students' and graduates' competences needed to cope with uncertainly.

In the paper, competence is defined as a skill or personal ability that is required to be effective on the job (Brownell, 2008). Future-oriented competences are those necessary to function in the turbulent environment in the VUCA world. They comprise, among others, the aspect of "the ability to cope with uncertainty and complexity" (Schola Europaea, 2018). When we mention uncertainty, it is understood as "a situation which involves imperfect and (or) incomplete information, and which affects the predictability of outcomes" (Bacigalupo et al., 2016). To be able to reduce uncertainty in a complex volatile environment, it is justifiable to focus on the future using foresight (Magruk, 2017) and Futures Literacy (Miller & Sandford, 2018).

The authors of the paper assume that because foresight and Futures Literacy approaches enable one to prepare for the future and deal with uncertainty, they could also be applied to develop future-oriented competences – in the case of the paper – competences that students and graduates should be equipped with when entering the changing labour market.

Foresight is a well-established tool used, among others, for developing shared long-term visions, generating research priorities, scanning future threats and opportunities, and for formulating future-oriented long-term strategies (Barré & Keenan, 2008; Poteralska & Sacio-Szymańska, 2014). Foresight means a systematic look into the future, enabling one to draw conclusions for the present (Cuhls, 2003). Futures Literacy is a practical skill that can be defined as the capacity to identify, design, target and deploy anticipatory assumptions and related imaginary futures (Miller & Sandford, 2018; Miller, 2018).

Firstly, in the course of the literature review, an analysis was conducted of contexts in which uncertainty is tackled in foresight and Futures Literacy exercises. For this purpose, publications in the Web of Science from the years 2015-2022 were analysed. While searching WoS, the criteria "foresight, uncertainty" and "Futures Literacy, uncertainty" were applied. Special attention was paid to papers directly related to applying foresight or Futures Literacy in the context of the VUCA world. Next, taking into account the focus of the paper on the competences needed on the future labour market, the authors of the paper searched the Web of Science database and analysed the papers using the criteria: "future of work, foresight" and "future of work, Futures Literacy".

On the basis of the state-of-the-art analysis and taking into account the authors' experience in conducting foresight and Futures Literacy projects, the possibility of using foresight and Futures Literacy to develop future-oriented competences necessary to cope with uncertainty characterising the future labour market is discussed. The paper ends with a conclusion that the analysed anticipation approaches are appropriate for developing future-oriented competences. Some examples of activities already undertaken in this area are presented.

State of the art

The scope of the state-of-the-art analysis covers the aspects of dealing with uncertainty by means of anticipation approaches (foresight and Futures Literacy) and ways of applying them in the context of the future of work (Table 1).

Table 1. Scope of state-of-the-art analysis

Dealing with uncertainty using foresight or Futures Literacy approaches		Foresight and Futures Literacy in context of future of work	
Level	Authors	Aspect	Authors
Macro (regional, sectoral, national, global)	Shevchenko et al., 2018; Magruk, 2020; Rudov et al., 2020; Mangnus et al., 2021	Copying with uncertainty and discontinuous change with reference to future of work	Keller et al., 2015; Bakhshi et al., 2017; Rhisiart et al., 2017; Laukonnen et al., 2018; Millar et al., 2018
Organisation	Silva, 2015; Jafari & NiliPourTabataba'i, 2017; Kaivo-oja & Lauraeus, 2018a; Kaivo-oja & Lauraeus, 2018b; Tiberius, 2019; Mangnus et al., 2021; Almansoori et al., 2022		
Individual	Rhisiart et al., 2015; Tiberius, 2019; Mangnus et al., 2021		

Source: Authors' compilation on basis of state-of-the-art analysis

Firstly, the authors of the paper analysed different aspects of dealing with uncertainty using foresight and Futures Literacy approaches. In the course of the literature review, scientific publications from the Web of Science were analysed with the keywords "foresight, uncertainty" and "Futures Literacy, uncertainty". In total, approximately 350 publications were collected, out of which, 180 were initially analysed and out of them, 54 were assumed as worth further detailed analysis.

The literature review indicates that foresight and Futures Literacy approaches are used to cope with uncertainty at different levels: the general level (regional, sectoral, national, global) and focused on an organisation, and on an individual. Foresight is emphasised as a tool helping to manage VUCA (Kaivo-oja & Lauraeus, 2018b; Almansoori et al., 2022), especially in the conditions of hyper-competition and technological disruption (Kaivo-oja & Lauraeus, 2018a). With respect to the general level, it is used to cope with uncertainty with reference to interdisciplinary areas and cross-issue problems for the needs of planning different futures taking into account specific needs and expected results (Magruk, 2017). Among others, it is applied in the process of planning science, technology and innovation policy to help to manage uncertainty and ensure the consistency of policy with the future needs of society and available capabilities (Shevchenko et al., 2018; Rudov et al., 2020). On the organisational level, strategic foresight is employed to cope with the changing environment in which institutions operate (Kaivo-oja & Lauraeus, 2018a; Kaivo-oja & Lauraeus, 2018b; Almansoori et al., 2022). New areas of applying foresight at the organisational level to cope with uncertainty are searched for. One of them concerns the possibility of applying foresight to support project management (Silva, 2015).

Use of the data from foresight, among others the identified weak signals, help to reduce uncertainty both by the organisation and individual managers in the process of strategic decision making (Jafari & NiliPourTabataba'i, 2017). However, there is still a need to develop a perspective in foresight that focuses more on the individual

level (Kamprath & Mietzner, 2015). Individuals should be empowered to act in complex situations. The need to develop skills, e.g. of creative thinking of foresight exercise participants and skills of management and facilitation on the side of foresight exercise organisers is emphasised.

Apart from foresight, also the Futures Literacy approach is used to cope with uncertainty. Futures Literacy means "being comfortable with deep uncertainty" (Maier et al., 2016) and "being able to re-perceive the present through the eyes of many challenging futures" (Wack, 1985).

Scenarios are among of the most popular methods used in foresight and also applied in Futures Literacy exercises. It is common practice to apply the scenario technique to deal with uncertainty thanks to considering various possible future states to enhance the ability to anticipate and to plan for change (Tiberius, 2019). Nevertheless, relatively little attention is paid to the learning effects of the scenario process on participants, especially using the Futures Literacy approach (Rhisiart et al., 2015).

The second stage of the literature review concerned analysis of whether the aspect of coping with uncertainty and discontinuous change by means of foresight and Futures Literacy referred to the context of the future of work. Scientific publications from the Web of Science were analysed with keywords "future of work, foresight" and "future of work, Futures Literacy". After reading the abstracts and taking a cursory look at the papers, 58 papers were analysed in more detail, out of which 34 were selected as the final base for the state-of-the-art analysis. It was noticed that the aspects of the future of work and enhancing future-oriented competences are linked to the uncertainty and discontinuity of changes. New competences are needed to cope with uncertainty characterising the dynamically changing environment. They include, among others, enhancing agility, flexibility, and resilience (Millar et al., 2018). These competencies can be enhanced, among others, thanks to applying strategic foresight, capacity building, venturing under uncertainty (Millar et al., 2018), and developing Futures Literacy skills (Wilenius & Pouru, 2020). The application of foresight and Futures Literacy approaches help one to prepare for the future in the aspect of dealing with uncertainty, including the current and future labour market.

Results

The conducted state-of-the-art analysis shows that foresight and Futures Literacy can be used to equip individuals with competences of dealing with uncertainty, however, the aspect of developing competences at an individual level needs further strengthening.

In general, competences can be acquired thanks to formal, non-formal, and informal education (Sala et al., 2020). The paper is devoted to the development of competences within higher education. It is not enough for students and graduates to have specific professional knowledge and skills, but it is of key importance for them to be equipped with competences that would enable them to cope with the challenges of their new circumstances (Mielkov et al., 2021). Nonetheless, most foresight studies focus on the general or organisational level and the level of individual employees

within firms is often neglected (Kamprath & Mietzner, 2015), although the competences of staff are of key importance for being able to cope with external changes (Michna, 2016). Kamprath & Mietzner (2015) advocate developing a complementary perspective in foresight literature focused on the individual level.

It is necessary to embed uncertainty in the teaching-learning process (Yarygin et al., 2019; Vaganova et al., 2019). The traditional approach to education and training is losing its relevance, whereas the approach of educating in a way enabling a student to quickly adapt to constantly changing conditions and to act in conditions of uncertainty is gaining relevance (Vaganova et al., 2019; Rodionov et al., 2021).

Universities are already under pressure to deliver graduates that are highly employable (Bridgstock, 2009), while on the other hand, both the life and work of university graduates is combined with growing uncertainty (Garcia-Garcia et al., 2021). UNESCO (2021) calls for the contribution of universities in strengthening the capacities for foresight and Futures Literacy as well as advancing understanding of the role the future plays.

At present, both the education system and formal training system often do not respond appropriately to cope with future needs or develop future-oriented competences. Higher education institutions should rely on megatrends that shape the future of education (Pinkovetskaia et al., 2020); however, in reality they slowly update their curricula with respect to global challenges and market needs (Kononiuk et al., 2021). It is often related to the lack of education practitioners of the awareness and experience in applying approaches to the future such as foresight or Futures Literacy (Beni, 2018). Moreover, formal training organised at enterprises is often focused on developing technical competences (World Economic Forum, 2020).

In times when universities are looking for the most relevant methods to develop students' competences enabling them to successfully cope with modern conditions (Mielkov et al., 2021), it is suggested that foresight and Futures Literacy approaches are among the most effective tools in this area (Dedov et al., 2021). The curricula should be diversified to include foresight and Futures Literacy approaches to equip students with tools that enable them to anticipate the future and adapt quickly (Dan--Suteu & Giorgi, 2019).

On the individual level, future-oriented competences, also called future thinking competences or 21st century competences, such as "anticipating and estimating consequences, dealing with uncertainty and future changes or envisioning possible futures" (Beagon et al., 2022) are of key importance and they should be cultivated in higher education. Students participating in foresight exercises acquire competences to create possible futures, select the desired future(s) and build appropriate action programmes in the present by taking the desired future(s) into account (Gáspar et al., 2021). Students develop competences to cope with the future that is uncertain and unpredictable.

At present, workshops using foresight and Futures Literacy approaches are already being organised to, among others, shape the competence of coping with uncertainty (Forte et al., 2020) and to develop creativity, which is one of the key future-oriented competences (Bourmistrov & Amo, 2022). The ACTVOD workshop (Lauttamaki, 2016), a workshop based on scenario intervention methodology (Bourmistrov & Amo,

2022), and foresight sessions for students of professional educational institutions (Dedov et al., 2021), may serve as an example here. The organisers aimed at developing new abilities at the individual level, namely equipping participants with tools to enhance their creative capacity thanks to applying the foresight approach.

Another activity supporting university students comprises a special training course aimed at career planning and personal development (Kononiuk & Rollnik-Sadowska, 2022). It assumes the use of the foresight approach to support professional and personal development and apply the Futures Literacy approach to let students experience various ways of "using the future" in the context of their future profession.

Moreover, some formal changes in curricula at universities have already been implemented. The Technological University Dublin introduced the Future of Work module into the curriculum (Hennigan et al., 2020). The module is aimed at preparing students for the dynamically changing world of work, characterised by uncertainty and unpredictability.

Conclusions

The effective management of organisations functioning in a turbulent environment, which are forced to deal with uncertainty, requires staff with appropriate competences enabling them to effectively function in such conditions. The authors of the paper analyse whether approaches known for dealing with the future, among others in the aspect of uncertainly – namely foresight and Futures Literacy – can be applied to develop such competences. The conducted analyses enable the authors to confirm that the mentioned approaches are appropriate for developing future-oriented competences, including creativity, dealing with uncertainty, unpredictability, and quick adaptation to the changing environment, that is, competences needed to function in the VUCA world.

The authors searched for examples of such undertakings. A limited number of examples of workshops and activities aimed at developing future-oriented competences by means of foresight and Futures Literacy are identified and briefly presented in the paper.

The authors focus on the perspective of an individual, – mainly of a student or a university graduate as the future workforce. There is still a need to strengthen the perspective in foresight focusing on this – the individual level. In further research the authors would like to widen their analysis of developing the competences in question on an individual level and to propose own approaches to develop future-oriented competences of individuals, e.g. in a formula of workshops with the use of creative methods.

References

Almansoori, B. S. A., Asmai, S. A., & Kamalrudin, M. (2022). Mediation Model of Strategic Foresight Influencing Dynamic Capability. *International Journal of Sustainable Construction Engineering and Technology*, *13*(2), 120-133.

Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). *EntreComp: The Entrepreneurship Competence Framework*. Publication Office of the European Union. EUR 27939 EN. DOI: 10.2791/593884

Bakhshi, H., Downing, J., Osborne, M., & Schneider, P. (2017). *The Future of Skills: Employment in 2030*. Pearson and Nesta.

Barré, R., & Keenan, M. (2008). Revisiting Foresight Rationales: What Lessons from the Social Sciences and Humanities?. In: C. Cagnin, M. Keenan, R. Johnston, F. Scapolo, & R. Barré (Eds.), *Future-Oriented Technology Analysis* (pp. 41-52). Springer. DOI: 10.1007/978-3-540-68811-2_4

Beagon, U., Kövesi, K., Tabas, B., Nørgaard, B., Lehtinen, R., Bowe, B., Gillet, C., & Spliid, C. M. (2022). Preparing Engineering Students for the Challenges of the SDGs: What Competences Are Required?. *European Journal of Engineering Education*, DOI: 10.1080/ 03043797.2022.2033955

Beni, N. N. (2018). Presenting a Framework for Foresight in Education. In: F. Uslu (Ed.). *Proceedings of 5th International Conference on Education and Social Sciences (INTCESS 2018)*, Istanbul, Turkey, 1072-1078.

Bennett, N., & Lemione, G. J. (2014). What a Difference A Word Makes: Understanding Threats to Performance in a VUCA World. *Business Horizons*, *57*(3), 311-317. DOI: 10.1016/j.bushor.2014.01.001

Bianchi, G., Pisiotis, U., & Cabrera Giraldez, M. (2022). *GreenComp. The European Sustainability Competence Framework*. JRC Science for Policy Report. Publications Office of the European Union.

Bourmistrov, A., & Amo, B. W. (2022). Creativity, Proactivity and Foresight. *Technological Forecasting and Social Change*, *174*, 121215. DOI: 10.1016/j.techfore.2021.121215

Bridgstock, R. (2009). The Graduate Attributes we've Overlooked: Enhancing Graduate Employability through Career Management Skills. *Higher Education Research & Development*, *28*(1), 31-44.

Brownell, J. (2008). Leading on Land and Sea: Competencies and Context. *International Journal of Hospitality Management*, *27*(2), 137-150. DOI: 10.1016/j.ijhm.2007.11.003

Cuhls, K. (2003). From Forecasting to Foresight Processes – New Participative Foresight Activities in Germany. *Journal of Forecasting*, *22*(2-3), 93-111. DOI: 10.1002/for.848

Dan-Suteu, S. A. & Giorgi, G. (2019). Future Studies, Forecast and Foresight – Critical Considerations and Relevany Findings, 15th International Scientific Conference on eLearning and Software for Education (eLSE) – New Technologies and Redesigning Learning Spaces. *New Technologies and Redesigning Learning Spaces*, *1*, 130-137.

Dedov, N. P., Fantalova, E. B., Vaganova, O. I., Lapshova, A. V., & Kuznetsov, V. A. (2021). Role of Foresight Sessions in Professional Self-Development of Students. *Revista de la Universidad del Zulia. 3ª época*, *12*(35), 504-515. DOI: 10.46925//rdluz

Dębkowska, K., Kłosiewicz-Górecka, U., Szymańska, A., Ważniewski, P., & Zybertowicz, K. (2022). *Kompetencje pracowników dziś i jutro*. Polski Instytut Ekonomiczny.

Felder, F., Grayling, A., Steinberg, L., & Bentley, T. (2019). *Future of Education and Skills 2030: Reflections on Transformative Competencies 2030*. OECD.

Felknor, S. A., Streit, J. M. K, Chosewood, L. C., McDaniel, M., Schulte, P. A., & Delclos, G. L. (2020), How Will the Future of Work Shape the OSH Professional of the Future? A Workshop Summary. *International Journal of Environmental Research and Public Health*, *17*(19), 7154. DOI: 10.3390/ijerph17197154, 2020

Garcia-Garcia, F. J., Moctezuma-Ramirez, E. E., & Yuren, T. (2021). Learning to Learn in Universities 4.0. Human Obsolescence and Short-Term Change. *Teoria de la educacion*, *33*(1), 221-241. DOI: 10.14201/teri.23548

Gáspar, J., Hideg, É., & Köves, A. (2021). Future in the Present: Participatory Futures Research Methods in Economic Higher Education – The Development of Future Competencies. *Journal of Futures Studies*, *26*(2), 1-18, DOI: 10.6531/JFS.202112_26(2).0001

Habets, O., Stoffers, J., Van der Heijden, B., & Peters, P. (2020). Am I Fit for Tomorrow's Labor Market? The Effect of Graduates' Skills Development during Higher Education for the 21st Century's Labor Market. *Sustainability*, *12*(18), 7746. DOI: 10.3390/su12187746

Hennigan, R., Jennings, M., & Coleman, M. (2020). Multi Modal Delivery: Preparing Undergraduate Students for the Future of Work. *INTED2020 Proceedings*, 5524-5524. DOI: 10.21125/inted.2020.1497

Jafari, M. J., & NiliPourTabataba'i, S. A. (2017). Corporate Foresight and Its Effect on Innovation, Strategic Decision Making and Organizational Performance (Case Study: Iranian Banking Industry). *Foresight*, *19*(6), 559-576. DOI: 10.1108/FS-07-2017-0035

Kaivo-oja, J. R. L., & Lauraeus, I. T. (2018a). *Disruption Management and the Orchestration of Dynamic Capabilities: Seeking Dynamic Smart Disruptor Profile*. 10th International Scientific Conference on Business and Management, 353-361.

Kaivo-oja, J. R. L., & Lauraeus, I. T. (2018b). The VUCA Approach as a Solution Concept to Corporate Foresight Challenges and Global Technological Disruption. *Foresight*, *20*(1), 27-49. DOI: 10.1108/FS-06-2017-0022

Kamprath, M., & Mietzner, D. (2015). The Impact of Sectoral Changes on Individual Competences: A Reflective Scenariobased Approach in the Creative Industries. *Technological Forecasting and Social Change*, *95*, 252-275. DOI: 10.1016/j.techfore.2015.01.011

Keller, J., Markmann, C., & von der Gracht, H. A. (2015). Foresight Support Systems to Facilitate Regional Innovations: A Conceptualization Case for a German Logistics Cluster. *Technological Forecasting and Social Change*, *98*, 15-28. DOI: 10.1016/j.techfore.2013.12.031

Klowden, K., & Lim, Q. (2021). *Future of Work: Insights for 2021 and Beyond*. Milken Institute.

Kononiuk, A., & Rollnik-Sadowska, E. (Eds.) (2022). *Replay Your Futures – Labs for Exploring Undiscovered Pathways*, Lukasiewicz Research Network – Institute for Sustainable Technologies, Radom.

Kononiuk, A., Sacio-Szymańska, A., Ollenburg, S., & Trivelli, L. (2021). Teaching Foresight and Futures Literacy and Its Integration into University Curriculum. *Foresight and STI Governance*, *15*(3), 105-121. DOI: 10.17323/2500-2597.2021.3.105.121

Laukonnen, R., Biddel, H., & Gallagher, R. (2018). *Preparing Humanity for Change and Artificial Intelligence: Learning to Learn as a Safeguard Against Volatility, Uncertainty, Complexity and Ambiguity*. OECD. DOI: 10.31234/osf.io/g5qwc

Lauttamaki, V. (2016). ACTVOD-Futures Workshop – A Generic Structure for a One-Day Workshop. *Foresight*, *18*(2), 156-171. DOI: 10.1108/FS-01-2015-0003

Magruk, A. (2017). Concept of Uncertainty in Relation to the Foresight Research. *Engineering Management in Production and Services*, *9*(1), 46-55. DOI: 10.1515/emj-2017-0005

Maier, H. R., Guillaume, J. H., van Delden, H., Riddell, G. A., Haasnoot, M., & Kwakkel, J. H. (2016). An Uncertain Future, Deep Uncertainty, Scenarios, Robustness and Adaptation: How Do They Fit Together?. *Environmental Modelling & Software*, *81*, 154-164. DOI: 10.1016/j.envsoft.2016.03.014

Mangnus, A. C., Oomen, J., Vervoort, J. M., & Hajer, M. A. (2021). Futures Literacy and the Diversity of the Future. *Futures*, *132*, 102793. DOI: 10.1016/j.futures.2021.102793

Matysik, S. (2016). Kompetencje pracownicze jako element strategii przedsiębiorstwa. *Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie*, *24*(2), 17-26. DOI: 10.17512/znpcz.2016.4.2.02

Michna, M. (2016). Zasoby ludzkie jako kluczowy czynnik sukcesów w przedsiębiorstwach przyszłości. *Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie*, *23*(1), 130-136. DOI: 10.17512/znpcz.2016.3.1.13

Mielkov, Y., Bakhov, I., Bilyakovska, O., Kostenko, L., & Nych, T. (2021). Higher Education Strategies for the 21st Century: Philosophical Foundations and the Humanist Approach. *Revista Tempos e Espaços em Educação*, *14*(33), e15524. DOI: 10.20952/revtee.v14i33.15524

Millar, C. C., Groth, O., & Mahon, J. F. (2018). Management Innovation in a VUCA World: Challenges and Recommendations. *California Management Review*, *61*(1), 5-14. DOI: 10.1177/0008125618805111

Miller, R., & Sandford, R. (2018). Futures Literacy: The Capacity to Diversify Conscious Human Anticipation. In: R. Poli (Ed.). *Handbook of Anticipation* (pp. 1-20). Springer. DOI: 10.1007/978-3-319-31737-3_77-1

Miller, R. (2018). *Transforming the Future: Anticipation in the 21st Century*. Taylor & Francis.

Magruk, A. (2020). Uncertainties, Knowledge, and Futures in Foresight Studies – A Case of the Industry 4.0. *Foresight and STI Governance*, *14*(4), 20-33. DOI: 10.17323/2500-2597.2020.4.20.33

PARP Report. (2020). *Rynek pracy, edukacja, kompetencje. Aktualne trendy i wyniki badań*. PARP.

Pinkovetskaia, I., Berezina, N., & Sverdlikova, E. (2020). The Main Reasons for the Exit of Entrepreneurs from Business. *Amazonia Investiga*, *9*(26), 68-73. DOI: 10.34069/AI/2020.26.02.7

Popper, R. (2008). How Are Foresight Methods Selected?. *Foresight*, *10*(6), 62-89. DOI: 10.1108/14636680810918586

Poteralska, B., & Sacio-Szymańska, A. (2014). Evaluation of Technology Foresight Projects. *European Journal of Futures Research*, *2*(1), 26. DOI: 10.1007/s40309-013-0026-1

Poteralska, B., Łabędzka, J., & Brożek, K. (2022). Identification and Development of Future--Oriented Competences. In: J. Stankevičienė, V. Skvarciany, D. Jurevičienė, A. Šimelytė, I. Lapinskaitė, V. Davidavičienė, I. Meidutė-Kavaliauskienė, I. Korsakienė, R. Skačkauskienė, R. Tamošiūnienė & R. Bublienė (Eds.). *Proceedings of 12th International Scientific Conference "Business and Management 2022"*, Vilnius Gediminas Technical University, Lithuania, http://bm.vgtu.lt/. DOI: 10.3846/bm.2022.854

Rhisiart, M., Miller, R., & Brooks, S. (2015). Learning to Use the Future: Developing Foresight Capabilities Through Scenario Process. *Technological Forecasting and Social Change*, *101*, 124-133. DOI: 10.1016/j.techfore.2014.10.015

Rhisiart, M., Störmer, E., & Daheim, C. (2017). From Foresight to Impact? The 2030 Future of Work Scenarios, *Technological Forecasting and Social Change*, *124*, 203-213. DOI: 10.1016/j.techfore.2016.11.020

Rieckmann, M. (2012). Future-Oriented Higher Education: Which Key Competencies Should Be Fostered Through University Teaching and Learning?. *Futures*, *44*(2), 127-135. DOI: 10.1016/j.futures.2011.09.005

Rodionov, M. A., Tsarapkina, J. M., Kulagina, J. A., Morozova, I. M., & Tkacheva, N. A. (2021). Formation of Students' Competitiveness in the Vuca World. *Revista Eduweb*, *15*(3), 171-181. DOI: 10.46502/issn.1856-7576/2021.15.03.14

Rudov, E. V., Petukhova, M. S., Dobryanskaya, S. L., Sadokhina, T. A., & Kapustyanchik, S. Y. (2020). Algorithm for the Development of the Strategy for Scientific and Technological Development of the Crop Sector of the Novosibirsk Region. *IOP Conference Series: Earth and Environmental Science*, *421*(3), DOI: 10.1088/1755-1315/421/3/032032

Sala, A., Punie, Y., Garkov, V., & Cabrera Giraldez, M. (2020). *LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence*. Publications Office of the European Union. DOI: 10.2760/922681, JRC120911

Schola Europaea. (2018). *Key Competences for Lifelong Learning in the European Schools*. Office of the Secretary-General.

Shevchenko, E. V., Pomogaev, V. M., Stukach, V. F., & Tretiak, V. P. (2018). Integration of Foresight into Science, Technology and Innovation Policy Planning. *31st International-Business--Information-Management-Association Conference*: *Innovation Management and Education Excellence through Vision 2020*, I-XI, 3264-3277. https://ibima.org/

Silva, M. (2015). A Systematic Review of Foresight in Project Management Literature, Conference on ENTERprise Information Systems (CENTERIS). *International Conference on Project MANagement (ProjMAN) / International Conference on Health and Social Care Information Systems and Technologies (HCist)*, *64*, 792-799.

Tiberius, V. (2019). Scenarios in the Strategy Process: A Framework of Affordances and Constraints. *European Journal of Futures Research*, *7*(7). DOI: 10.1186/s40309-019-0160-5

UNESCO. (2021). *Reimagining our Futures Together. A New Social Contract for Education* (Report from the International Commission on the Futures of Education). United Nations Educational, Scientific and Cultural Organization.

Vaganova, O. I., Korostelev, A. A., Smirnova, Z. V., Abramova, N. S., & Dolmatov, S. N. (2019). Improving Teachers' Professionalism Through the Development of Creativity. *International Journal of Innovative Technology and Exploring Engineering*, *8*(8), 630-634.

Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to Learning and Schooling in the Digital Networked World of the 21st Century. *Journal of Computer Assisted Learning*, *29*(5), 403-413. DOI: 10.1111/jcal.12029

Wack, P. (1985). Scenarios: Shooting the Rapids. *Harvard Business Review*, 139-150.

Wilenius, M., & Pouru, L. (2020). Developing Futures Literacy as a Tool to Navigate an Uncertain World. In: *Humanistic Futures of Learning, Perspectives from UNESCO Chairs and UNITWIN Networks*, UNESCO.

World Economic Forum. (2020). *The Future of Jobs Report 2020*. https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

Yarygin, O. N., Korostelev, A. A., Akhmetov, L. G., & Maseleno, A. (2019). Modeling of Competence as a Tool of Goal Setting for Education in Modern Society. *International Journal of Recent Technology and Engineering*, 7(6S5), 72-77.

ROZWÓJ PRZYSZŁOŚCIOWYCH KOMPETENCJI NA POTRZEBY RYNKU PRACY

Streszczenie: Zarządzanie organizacjami funkcjonującymi we współczesnym świecie, charakteryzującym się zmiennością, niepewnością, złożonością i niejednoznacznością, wymaga posiadania przez pracowników przyszłościowych kompetencji. Artykuł ma na celu przedyskutowanie możliwości zastosowania podejść foresight i Futures Literacy, znanych z wykorzystania na potrzeby radzenia sobie z niepewnością, także w obszarze rozwoju tego typu kompetencji. Na bazie analizy stanu wiedzy – obejmującej: 1) konteksty, w jakich niepewność jest uwzględniana w przedsięwzięciach foresight i Futures Literacy, oraz 2) konteksty, w których przyszłość pracy jest analizowana w powiązaniu z zastosowaniem metod foresightu i Futures Literacy – dokonano analizy i potwierdzenia możliwości zastosowania wspomnianych podejść antycypacyjnych w celu rozwoju przyszłościowych kompetencji: kompetencji na poziomie indywidualnym umożliwiających radzenie sobie z rosnącą niepewnością charakteryzującą świat VUCA. Artykuł odnosi się do aspektów, które jeszcze nie są dostatecznie zbadane: 1) rozwoju kompetencji na poziomie indywidualnym z wykorzystaniem podejść foresightu i Futures Literacy oraz 2) szerszego wprowadzenia foresightu i Futures Literacy do szkolnictwa wyższego. W artykule przedstawiono przykłady, dotychczas nielicznych, działań podjętych w tym obszarze.

Słowa kluczowe: kompetencje, foresight, przyszły rynek pracy, Futures Literacy, szkolnictwo wyższe, niepewność, VUCA