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COMPARISON OF THE DEMAND FOR GREEN COMPETENCES IN VARIOUS INDUSTRIES

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Purpose: Green competences are a more and more popular topic in academia. Researchers are trying to describe them in detail and connect them with the economical results of mostly business organizations. The EU approach also strengthens the concept by introducing the rules of non-financial reporting (ESG) obligation for SME from 2026.
Design/methodology/approach: The goal of this study is to determine whether green competencies are a part of labour market demand and what are the differences between four selected industries: medical, creative, business and IT. The web-scraping allowed for quantitative analyses of the competence demand.
Findings: Only in 1% of the job offers there is direct information on green competences. It is then justified to analyse the labour market based on pre-green competences such as communication, teamwork, openness, and creativity, thus those are the ones both strongly connected with the green competence theories and already widely introduced to the labour market.
Research limitations/implications: The research is due to some limitations. First of all, it allowed for comparison only 4 industries. The industries were chosen based on their attractiveness in national intelligent specializations, but do not show the whole picture of a labour market. All the data was scrapped from the pracuj.pl portal, which is mostly the source of job offers for specialist and middle management form business related industries. The last limitation worth mentioning is that the research is based on a quantitative approach.
Originality/value: The surprising results of the lack of green competences in labour demand draws the gap between research and theoretical approach and the business demand.
Keywords: green competence, labour market, pre-green competence, ESG.
Category of the paper: research paper.

1. Introduction

As the global economy changes toward sustainability and innovation, understanding the role of green competencies in the labour market becomes increasingly important. Industries such as modern business services, ICT, creative industries, and the medical industry are aligning workforce capabilities and policies with the goals of a green economy. By analysing job advertisements and identifying both green and indirectly related pre-green competencies, the research aims to assess how deeply these values have been embedded into recruitment practices and the labour market itself. The study also assesses the degree to which each industry is prepared to integrate green competencies into its workforce, offering information on the current gap between theoretical discourse and practical application in the labour market.

1.1. Modern Business Services

The modern business services sector includes Shared Service Centres (SSC), Business Process Outsourcing (BPO), Information Technology Outsourcing (ITO) and Research and Development (R&D). Business processes include all kinds of administrative, human resources, and billing functions, as well as customer relations and R&D work. The analyses indicate that people who started their career in this sector have a wide range of opportunities to advance in the labour market and are perfectly suited to any organisation (Wiśniewska, Dolot, 2017).

The modern business services sector in Poland has grown rapidly in recent years. The consequence of the quantitative and qualitative development of the sector is a continuous dynamic increase in the level of employment. Krakow, Wroclaw, Tricity, Lodz and Bydgoszcz have a clear local specialisation, which results from a particularly high share of jobs in the modern business services sector concerning total jobs (Kuźmicki, Linkiewicz, 2021).

The data presented in the ABSL report also confirm that the modern business services sector is entering a stage of rapid transformation. With the growth of knowledge-based services, which account for more than 55.5 percent of all services, and the increasing role of mid-office processes, the share of which exceeded 50% for the first time, the attention of companies is shifting from growth understood mainly as employment growth to qualitative factors - productivity, sophistication, automation, and innovation. Nearly 75% of respondents to the ABSL survey confirmed that by the end of the first quarter of 2025, they plan to implement a transformation strategy. In most cases, this strategy is geared toward automating processes (91.3%), standardising them (79.8%), and implementing or expanding AI (70.2%). In most cases, this strategy is geared toward automating processes (91.3%), standardising them (79.8%) and implementing or expanding AI (70.2%). At the same time, more than 80% of those surveyed confirmed that the transformation of the current business model will be significant, very significant or fundamental, with the biggest changes expected in terms of increasing the use of AI and virtualisation. At the same time, more than 80% of those surveyed confirmed that

the transformation of the current business model will be significant, very significant or fundamental, with the biggest changes expected in terms of increasing the use of AI and virtualisation. Thus, upskilling trends, although already strong, are gaining momentum (ABSL, 2024).

1.2. Information and Communications Technology

Information and Communication Technologies (ICT), interchangeably referred to as information and communication technologies, ICT, or information technology, is a family of technologies that process, collect, and transmit information in electronic form. ICT is one of the elements that plays an important role in every sector of the economy. CT is one of the elements that plays an important role in every sector of the economy. The ICT sector is a key pillar of the knowledge economy, whose development has become a priority challenge for many countries (Parys, 2024). The ICT sector is a key pillar of the knowledge economy, its development has become a priority challenge for many countries (Parys, 2024).

Polish ICT companies specialising in the production and sale of computer hardware make most of their profits thanks to exports - almost two-thirds of their revenues come from overseas sales, while companies specialising in ICT services made around a quarter of their revenues from exporting their services. Polish ICT companies specialising in the production and sale of computer hardware make most of their profits thanks to exports - almost two-thirds of their revenues come from overseas sales, while companies specialising in ICT services made around a quarter of their revenues from exporting their services. The value of exports and imports of ICT products grew by 15% and 18%, respectively (Polish Agency for Enterprise Development, 2023).

According to the Polish Economic Institute, in 2022 the gross value added generated by the ICT sector amounted to approximately 6% of global GDP. According to the Polish Economic Institute, in 2022 the gross value added generated by the ICT sector amounted to approximately 6% of global GDP. It should be noted that IT services represented the largest share of this value. Between 2000 and 2022, the IT services sector increased its value almost twice as fast as the rest of the global economy, showing how important an engine of growth the industry has become over the past two decades (Polski Instytut Ekonomiczny, 2024).

1.3. Creative industry

The creative economy is that part of the overall economy that uses creativity and intellectual capital as the primary factor of production. It includes three components: creative industries, the digital sector, and the cultural sector. The creative economy is the economy of the future - for the term reflects the change that is taking place in the economy with successive industrial revolutions, technological advances, and digitization. The creative economy is the economy of the future - for the term reflects the change that is taking place in the economy with successive industrial revolutions, technological advances, and digitization. Its function is both to directly

create GDP and to indirectly influence other sectors of the economy by stimulating innovation and knowledge transfer (Polski Instytut Ekonomiczny, 2020).

The development of creative industries is positively reflected in many aspects of the economy. Goods and services that are the result of the activities of entities belonging to the creative industries are characterized by an element of creativity and innovation, which significantly translates into building and strengthening the competitive position of the economy (Firlej, Leś, 2022).).

The cultural and creative sectors play an important role in the Polish economy. In 2021, these sectors generated about PLN 31.2 billion in added value, and if we include the indirect impact, it was about PLN 82.4 billion (3.58 percent of GDP). Advertising companies are responsible for the largest share. However, the economic importance of the creative sectors is not limited to the value added generated directly by these entities. Entities counted among the creative sectors procure products and services from other entrepreneurs, which translates into the development of the economy as a whole (Święcicki et al., 2023).

1.4. Medical industry

The demand for medical services in Poland is increasing year after year (PIU, 2019). The market for medical services is dynamic. Population growth or the trend of an ageing population means that the quality and availability of services should increase. Population growth or the trend of an ageing population means that the quality and availability of services should increase. Poles use medical services in both public and private form (Smarżewska, 2020).

Although the Polish healthcare market faces challenges, local and international investors recognize its high attractiveness and growth prospects. Although the Polish healthcare market faces challenges, local and international investors recognize its high attractiveness and growth prospects. This is evidenced by a more than 8% increase in healthcare spending between 2023 and 2028. This is evidenced by a more than 8% increase in healthcare spending between 2023 and 2028. Despite significantly higher public healthcare spending, projected growth is higher in the private sector (Strategy & Polska, 2024). Despite significantly higher public healthcare spending, projected growth is higher in the private sector (Strategy & Polska, 2024).

By 2027, the value of the telemedicine market in Poland is expected to reach PLN 4.5 billion, an increase of 300 percent compared to 2020. The introduction of innovative technologies such as the Internet of Things (IoT) in medicine could save PLN 2-3 billion annually by improving treatment efficiency and reducing medical errors. The future of Poland's healthcare sector will largely depend on its ability to adapt and implement these innovative solutions, which can significantly improve healthcare quality and reduce operating costs (Strategy & Polska, 2024). The future of Poland's healthcare sector will largely depend on its ability to adapt and implement these innovative solutions, which can significantly improve healthcare quality and reduce operating costs (Strategy & Polska, 2024).

1.5. Green Competencies

This new concept is still in the process of implementation from a business perspective. According to Łapiński et al. (2022), green competencies are related to all interactions between environment and human activity.

UNIDO defines the essence of green competencies as the knowledge, skills, values, and attitudes needed to live, develop, and support a sustainable and resource-efficient society (https://www.unido.org/stories/what-are-green-skills, 19 February 2023). According to Kozar (2017), green competencies of employees are the result of their knowledge and skills in applying pro-environmental solutions within the company.

According to Bugdol and Stańczyk (2021), green competencies include knowledge of the ecological use of resources and waste reduction; an ecological attitude characterised by responsibility for the state of the natural environment; and ecological behaviour, such as, for example, recycling waste, segregating rubbish (paper, glass, plastic, batteries), saving electricity and water, saving paper by using electronic media, commuting by public transport.

Cabral and Lochan (2019) indicate that green competencies consist of the following: (1) green knowledge - refers to general knowledge of the natural environment; (2) green skills - skills of a professional and general nature that are necessary for green occupations, but also for other occupations affected by the green transition; (3) green awareness - refers to awareness of the impact of human activities on the environment; (4) green attitudes - understood as individuals' perceptions of the value of protecting the environment; (5) green capabilities - important for self-development and increasing productivity in the green economy; (6) green behaviours that support environmental sustainability (Cabral, Lochan, 2019).).

Having discussed the issue of green competencies, Górniak (2014) distinguishes between behavioural and functional competencies. Discussing the issue of green competencies, Górniak (2014) distinguishes between behavioural and functional competences. The former defines the so-called ‘soft’ skills. The former defines the so-called ‘soft’ skills. Green behavioural competences indicate how employees must behave in order to do their job properly, i.e., in such a way that they do not contribute to any environmental risks. Among the soft competencies thus understood, the authors distinguish: creative environmental thinking, the ability to adapt to dynamic changes in the environmental field, openness to acquiring environmental knowledge, the ability to communicate one's environmental knowledge, experience, and beliefs in an appropriate manner, ethical environmental behaviour, the ability to manage people under environmental risk. On the other hand, green functional competences are the so-called ‘hard’ skills. They indicate what employees need to know in order to do their job well. They indicate what employees need to know in order to do their jobs well. Among green functional competencies, Górniak (2014) distinguishes: expertise in the economical use of raw materials and in waste segregation, the ability to drive in an energy-efficient manner, knowledge of and compliance with laws, occupational health and safety.

Knowledge of the nature and structure of green competencies determines the right choice of methods for their development and can thus support corporate sustainability efforts directed towards, among other things, the fourth goal belonging to the group of seventeen Sustainable Development Goals (SDGs). This goal aims to provide inclusive and equitable quality education and promote lifelong learning opportunities for all, and its key indicators include "ensuring that by 2030 all learners have the knowledge and skills needed to promote sustainable development, including, inter alia, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and recognition of cultural diversity and the contribution of culture to sustainable development". This goal aims to provide inclusive and equitable quality education and promote lifelong learning opportunities for all, and its key indicators include "ensuring that by 2030 all learners have the knowledge and skills needed to promote sustainable development, including, inter alia, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and recognition of cultural diversity and the contribution of culture to sustainable development".

2. Methods

The goal of this study is to determine whether green competencies are a part of labour market demand and what are the differences between four selected industries. As Green competencies are understood according to Górniak (2014), the main research goal is supported by 4 objectives:

1. Identification of job offers and initial assessment of the research sample.
2. Creating the list of competencies required in the analysed industries by using key words such as green, environment, waste, raw, energy.
3. Analysing the Green Competencies.
4. Comparing the industries.

It is important to state that the research objectives are at the same time the research procedure itself. The exploratory and confirmatory research approach was introduced in the research. Exploratory part related to analysing theories and listing the words and roots indicating green competencies and pre-green competences. The confirmation approach was executed while the selected industries were compared with the Górniak theory.

All research analyses were performed with the use of MS Excel and SPSS30.

3. Results

The research procedure reflects the specific objectives of this study. The first step of the research procedure was the identification of job offers. This was done using the web-scraping method, obtaining data available on websites, including the Pracuj.pl portal as the most popular website with job offers in Poland. Offers were identified within selected areas on the Pracuj.pl portal (number of jobs offers):

1. Doctors/Medical Support for Medical Industry (733).
2. Commercials/Graphics/Creation/Photography for Creative industry (404).
3. IT Administration for Information and Communication technology (2915, excluding software development).
4. Advisory/Consulting for the Modern Business Services industry (482).

The second and third steps were related to the search for key words. The Górniak theory was selected as the basis for this investigation, but the competencies mentioned there are strictly related to the environment. That is why researchers decided to introduce general roots indicating green competencies, as well as the term pre-green competence understood as a generated version of the green competence, out of which the green one may emerge.

The roots of the words and the words indicating green competences in general were established as follows:

- Gree*.
- Ecolo*.
- Environm*.
- Natura*.
- ESG.
- Sustainab*.
- Segregation*.

Identifying the green competencies in the database based on the key words (number of offers containing the selected version of a key word):

- Grea* - 10 indications all connecetd with green competences.
- Ecolo* - 4 indications connected with green competences.
- Environm* - 11 indications refeared to the natural environment, others were related to the technology or medical terms.
- ESG - 15 indications.
- Sustainabl* - 47 indications.
- Segregation* - 0 indications.

The above-mentioned analysis states that green competences are embedded in labour advertisements in only about 1%. It makes green competences impossible to analyse in a more detailed way. That is why the concept of pre-green competences is introduced.

The next step of the analysis was to determine the importance of pre-green competences in job offers between the industries. The analysis is presented in Table 1.

Table 1.
Pre-green competences in job offers

			Industry				Total
			Medical	Creative	Business	IT	
Creativity	Mentioned	N	13	175	22	47	257
		%	1,8%	43,3%	4,6%	1,6%	5,7%
Adaptability	Mentioned	N	3	4	15	17	39
		%	0,4%	1,0%	3,1%	0,6%	0,9%
Openess	Mentioned	N	78	57	41	96	272
		%	10,6%	14,1%	8,5%	3,3%	6,0%
Ethics	Mentioned	N	25	23	18	49	115
		%	3,4%	5,7%	3,7%	1,7%	2,5%
Teamwork	Mentioned	N	77	84	160	1436	1757
		%	10,5%	20,8%	33,2%	49,3%	38,8%
Communication	Mentioned	N	207	183	253	332	975
		%	28,2%	45,3%	52,5%	11,4%	21,5%
Effectiveness	Mentioned	N	19	33	85	223	360
		%	2,6%	8,2%	17,6%	7,7%	7,9%
Law	Mentioned	N	34	13	53	36	136
		%	4,6%	3,2%	11,0%	1,2%	3,0%

Source: Own study.

Based on the table mentioned above it is possible to state that pre-green competences are much more popular in job advertisements in comparison with green competences.

Analysing soft/ behavioural pre-green competencies it is important to state that Teamwork is the most popular in job offers with 38.8% in total and almost 50% for IT industry. Communication is second with 21.5% in total and close to 50% in creative and moderating business industries. Other competencies are rarely mentioned. Creativity in 5.7% of job offers, with the most mentions in the creative industry (43.3%). Adaptability in 0.9% in total with the majority in the modern business industry (3.1%). Openness is demanded in 6% of job positions with the majority in the creative industry (14.1%). Ethics goes with 2.5% in total and similar distribution among the industries, maximal in creative industry (5.7%).

Considering hard/ functional competences, the most demanded, effectiveness scores 7.9% in total, with the majority in business (17.6%). Knowledge of law is needed in 3% of the total and mostly in business (11%). Segregation (considering waste) and health and safety competence were not mentioned at all, most probably because segregation is considered rather home/private life competence and health and safety is a mandatory training in Poland.

4. Discussion

The discussion will be structured by the research objectives. The above-mentioned research results are showing very interesting situation of both green competences and the way to analyse them. The first task of the research procedure was to identify job offers and create a vast research sample. The scraping procedure was very effective, but it is important to note that there are no filters or categories that might be supportive while searching for green competencies or sustainable job positions. It may be explained by the low availability of the sustainable positions/ green competence demand of a labour market which was presented in the research part.

Creating the list of competencies required in the analysed industries by using key words such as: green, environment, waste, raw, and energy. In order to make the analysis possible, introductory words were prepared. There were seven general forms introduced in order to generally assess the importance of sustainable topic within those industries. The maximum number of mentions was 47 out of 4534 job offers, making that 1.04% of the total job offers. It is important to state that although sustainable development is an important topic in science, the labour market does not pay much attention to this case. Within the business industry, it is popular to provide extended information and declarations about undertaken actions, but even those actions do not have a significant place in the labour market offers. Most of the connected offers were about the concept and job positions dedicated to ESG reporting. Green compounds are not yet visible within the non-esg related positions. Analysing of Green itself brought interesting results. The analysis based on the list created by Górniak was not possible due to the lack of demand strictly connected with ecology, sustainability, and environment. There is still a huge gap between the still growing theoretical approach and is utilisation in the labour market practice. There is a time needed to implement green practices into every job position in the companies. Some organisations are still thinking of the ESG concept as a greenwashing possibility. Another reason might be related to the job advertising itself. Many of the offers are being created as a generalised template without some important information in them.

The comparison of green products across the selected industries was impossible due to the lack of mentions. That is why the authors decided to propose the pre-green competences as a tool for analysing the labour market. That is the concept based on generalising (as the job offers are very general) the competences into its basic forms. That is why instead of communicating environmental knowledge, communication was assessed and in a similar way openness instead of openness to acquiring environmental knowledge. Having a base competence, it would be easier to acquire the green version of it. This approach allowed authors to prepare a comparison of four industries. The summed score of all industries (by summing %) is equal to 86.3/800. Medical industry was not on top of any pre-green competence need and

scored 52.1 which is 34 lower than the average sum score. Within those job offers, a very detailed description of medical skills and knowledge as well as soft skills was presented. This industry is focused on saving lives, rather than whole environmental issues. The second-place industry is IT, with 76.8 points. This industry scored a lot in teamwork (49.3 points), but other competences were scored very low. This industry is also focused not on the environment but on technology, which causes low interest in the topic of green competence. This industry is also focused not on the environment but on technology, which causes low interest in the topic of green competence. The business sector scored 134.2 points with high scores in communication, teamwork, and effectiveness. As the modern business companies are aware of regulations end are mostly the ones which support other industries in all the ESG reporting needs, this shows that modern business services are an industry with a potential to be the leader in implementing the green competences due to the utilitarian approach. The industry that scored the most is a creative industry with a score of 141.9 points. The main factor is a score from the communication, creativity, and teamwork competence. It is also crucial to maintain an open mind for the changes that will become more and more popular.

4.1. Limitations and future research

The research is due to some limitations. First of all, it allowed for comparison only 4 industries. The industries were chosen based on their attractiveness in national intelligent specialisations, but do not show the whole picture of a labour market. All the data was scrapped from the pracuj.pl portal, which is mostly the source of job offers for specialist and middle management form business related industries. The last limitation worth mentioning is that the research is based on a quantitative approach. Some of the data might be missed without a deeper understanding of the contemporary situation on both the labour market and the perspective of employers/ hr specialists. While the presented study offers insight into the demand for both green and pre-green competences in selected industries, future research might be conducted in order to enhance the scope of data collection as well as to prepare an in-depth analysis of the framework.

The first step suggested is connected with future research, to develop a standardised green competence framework with unified names and understanding of competences. That will allow future research to be based on similar, up-to-date theories and will enable the replication of presented results.

The second important focus is on the methodological approach, especially the type of data collection methods. The presented method was focused on quantitative data, while the qualitative approach such as in-depth interviews might uncover a new way of understanding the terminology and demand. It is also a good idea to incorporate various sources, not just focus on one job portal.

The last path to follow relates to time. Conducting longitudinal studies will allow tracking the demand for green competences and will make it easily visible to all interest groups.

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