

Article

Evolution of Social Competencies in Sustainable Supply Chains

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Abstract: In many sectors of the economy, the global changes brought about by COVID-19, the war in Ukraine and the ensuing economic crisis have challenged the hitherto used social competencies necessary to successfully manage companies in sustainable supply chains. The slogan of sustainability has now become a household word in the global economy. At the same time, the EU is moving from a 4.0 to a 5.0 economy, with increasing attention being paid to the soft competencies of future managers. This article aims to present the patterns of competencies in supply chains and to identify the relevance of specific social competencies for doing business in the face of the above challenges. The survey was conducted among selected experts from the healthcare industry, who were asked to identify the importance of social competencies. This choice was primarily motivated by certain characteristics of the industry. This work aims to determine which social competencies seem to be essential for future managers in sustainable supply chains and the transformation towards a 5.0 economy. The answer to this question is crucial for research and teaching centers aiming to educate future managers at the highest level of specific social competencies and skills in a business environment. Given the dynamic development of specific industries, it is reasonable to identify the needs in the areas of social skills.

Keywords: social competency; sustainable supply chain; Industry 5.0



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1. Introduction

The complexity of today's economic environment requires that entrepreneurs possess a variety of competencies to operate in a dynamically changing environment. Competencies and resources define the strategic differences between companies and shape the path to competitive advantage. The nature of competences and resources is extremely important from this point of view. In the scientific discussion, entrepreneurial competences most commonly fall into social, technical, or digital competences as well as managerial or cognitive ones. The subject matter of this article involves social competences and their importance for managers in a sustainable supply chain.

The research area of sustainable supply chains covers a range of topics that reflect the interdisciplinary nature of the issue [1], mainly focusing on social and environmental issues [2–4]. An analysis of sustainable practices in supply chains in view of achieving the goals set by the UN Global compact is also available [5].

Different definitions of social competencies are not presented in the same way while others occur in parallel depending on the field of social sciences [6,7]. A study of social competencies conducted on a group of managers is also interesting [8]. Social competencies can be viewed in static and dynamic terms. The first approach applies to the skills that involve social competencies such as behaviors that lead to establishing, maintaining, and ending interpersonal relationships. The second view describes competencies as purposeful behavior, adapted to a given situation, acquired, and monitored by the individual [9]. According to the established list of key competencies agreed by the European Union, social

competencies not only promote the success of organizations from a micro-social perspective but also contribute to fostering macroeconomic ties and globalization by building social capital and economic development [10]. The importance of social competencies can be considered in the context of the individual enterprise (the micro perspective), supply chains and networks (the meso-level perspective) and society as a whole (the macro perspective). If social competencies are considered crucial for the functioning of entrepreneurs in sustainable supply chains, a model of social competencies should be sought from the perspective of the management of these chains.

In an increasingly volatile economic environment, many economists nowadays question whether the existing pattern of social competencies in sustainable supply chains is still appropriate and adapted to the current economic situation. This article aims to present the pattern of social competencies in sustainable supply chains. The right pattern of social competencies requires the involvement of social capital. A well-developed social capital in the form of good recognition or interpersonal relationships helps entrepreneurs to access investor capital as well as establish good relationships with suppliers and customers. Improving social skills can contribute to the development of social resources in enterprises. These include [11] social perception, which is the ability to correctly perceive other people's emotions and intentions; impression management, i.e., the tactics of eliminating other people's emotions, traits, motives and intentions; persuasion and social influence involving the ability to change other people's attitudes and behavior; and the ability to adapt to social situations.

Social capital underpins the new economy entrepreneurship, behavioral economics as well as civil society. It fills the social space between people and is rooted in the relationships that support connections and networks on the solid foundation of interaction.

1.1. Transformation of the Economy from Industry 4.0 to Industry 5.0

While discussing sustainability requirements in supply chains, it is important to mention the role of the transformation of Industry 4.0 into Industry 5.0. The Industry 5.0 concept has its roots in Industry 4.0 which was presented in 2011 by the German federal government as one of the key strategic development initiatives in high-tech and industrialization. Originally, the concept of Industry 4.0 was conceived as part of a German high-tech strategy to be widely adopted by business, science and decision makers. By design, the concept focused not only on meeting the economic but also the special ecological requirements of 'green production', to achieve a 'green transformation' and a carbon-neutral, energy-efficient industry. While the first three industrial revolutions were the result of mechanization, electrification and computerization, the tenets of the fourth industrial revolution (as the concept of Industry 4.0 is referred to) are based on the creation of a globally networked industry in which machines, production systems and all elements of the logistics chain will be integrated, forming a cyber-physical system (Cyber-Physical System, or CPS0 for short [12]. In line with this approach, Industry 4.0 realizes the vision of an intelligent 'factory of the world', in which cyber-physical systems manage physical processes, create virtual (digital) replicas of the real world, and make decentralized decisions. Through an interconnected Internet of people (via social and business networks), things, services and data, these systems communicate and collaborate with each other as well as with people in real time. The term has had a huge impact on the international scene, making it used globally in many alternative ways by think tanks, international organizations, business leaders and decision makers. Industry 4.0, however, focuses mainly on digitization and AI-driven technologies to increase production efficiency and less on social justice and sustainability, which is the fundamental difference between Industry 4.0 and 5.0. The 5.0 concept emphasizes the importance of the role of research and innovation in supporting industry in its long-term service to humanity within the limits of our planet. Although the concept of Industry 4.0 is relatively new, it is already being gradually and steadily replaced by the 5.0 concept, which is expected to bring with it a new paradigm of ethical collaboration and interaction between

humans and machines. This fits in with the environmental, social and economic values of sustainable economics.

While presenting the origins of Industry 5.0, it is also important to mention the concept of Society 5.0, presented in 2016 by Keidanren, one of Japan's most important business federations. The concept was subsequently promoted by the Japanese government. Japan is essentially moving the dimensions of digitalization and transformation, mainly located at the level of individual organizations and parts of society, into a full national transformation strategy, policy and even philosophy. In Society 5.0, advanced information technologies, the Internet of Things, robots, artificial intelligence as well as augmented reality are being actively used in various fields such as everyday life, industry and healthcare [12]. However, unlike in previous generations of societies, these technologies are not used primarily for economic gain, but for the benefit and convenience of every citizen. The concepts of Industry 5.0 and Society 5.0 are interlinked as they refer to a fundamental shift in our society and economy towards a new paradigm [12]. However, criticism of the concept of Society 5.0 can be found in the literature. For example, as understood by G. McLaren [13], Society 5.0 is another fantasy created by simplistic misconceptions of the macro-paradigm, and its ultimate effect will be to enslave humanity and render us incapable of both resisting this enslavement and imagining any alternative thereto. Like Brave New World, it is a new model of the old tradition of imposing totalitarian control over humanity [14]. Some level of balance needs to be found in understanding the role of Society 5.0. Audrey and Paksi have put forward an interesting concept to address this problem. Their suggestion for the proper implementation of the Society 5.0 concept is to change the mindset. Society 5.0 is a very complex problem. To solve it, it is necessary to develop a mindset based on HOTS (High-Order Thinking Skill), which includes the ability to think critically and creatively to solve complex problems [14].

Industry 5.0 is characterized by an extended purposefulness that goes beyond the production of goods and the provision of services purely for profit. The three main elements of this broader purposefulness are [14]:

- (1) **Humanocentricity:** Rather than treating emerging technology as a starting point and exploring its potential to increase productivity, a humanocentric approach in the industry places basic human needs and rights (what technology can do for people, with values such as the right to privacy, autonomy and human dignity) at the center of the production process,
- (2) **Sustainability:** A new industrial policy based on a closed-loop economy is essential to achieve climate and environmental goals. A sustainable industry needs to develop closed-loop processes that reuse and recycle natural resources, reducing waste and environmental impact [15]. Sustainability means reducing energy consumption and greenhouse gas emissions in a way that avoids depletion and degradation of natural resources and meets the needs of today's generations without compromising the needs of future generations. Technologies such as artificial intelligence and additive manufacturing can play a huge role in this, optimizing resource efficiency and minimizing waste.
- (3) **Resilience:** To increase the resilience of industrial production and the supply chain, it is necessary to develop more resilient processes that are capable of counteracting disruptions and providing critical infrastructure in the event of crises. The COVID-19 pandemic exposed the weaknesses of current approaches to managing the global supply chain and industrial production. To increase resilience, these need to be balanced by developing sufficiently resilient supply chains, adaptive manufacturing capabilities and flexible business processes, especially where the value chains of these processes serve basic human needs such as healthcare or security [14].

Focusing solely on profits in the globalized world of today is increasingly unsustainable as it does not consider social and environmental costs and benefits. If industry is to contribute to true prosperity, its objectives must take into account social, environmental and societal issues [15]. This includes responsible innovation that aims to improve the

well-being of all stakeholders, i.e., investors, employees, consumers, society and the environment, and not just to increase cost efficiency or maximize profits [12]. In the context, advanced digital technologies and the combination of digitalization and human capital also play an important role [16].

These changes should be reflected in the following five trends [17]:

- Implementing innovation in the business of the future;
- The occurrence of shorter and more complex business cycles;
- An increase in the number of customers (individual and organizational) for various types of products, as well as an increase in their requirements/expectations;
- Wage increases, but also higher costs;
- Enterprise digital platforms will play a very important cross-functional role in terms of collaboration within companies, with partners, institutions and customers;
- The evolution of Big Data and related processes [17,18].

The transformation in line with Industry 5.0 will require the creation of modern, efficient and resilient supply chains that enable the flow of information and resources between smart companies. Supply chain management and sustainable supply chains constitute an important part of the overall implementation. In summary, the use of Industry 4.0 and 5.0 technologies, combining green practices, ethical and safety issues in supply chains, as well as the principles of a circular economy (including reducing the carbon footprint) are a key directions for research. Industry 4.0 and 5.0 are the foundation for further development that involves establishing and operating sustainable supply chains.

1.2. Social Competency in the Context of Sustainable Development

In July 2022, the report on the Sustainable Development Goals was published. This is a review of progress towards the previously set 17 UN Sustainable Development Goals 2030. The document describes how the constantly emerging crises, COVID-19, armed conflicts, and climate change affect health, education, eradication of poverty and hunger, nutrition and many others that are relevant to achieving the 2030 goals (UN Global Compact). To achieve the Sustainable Development Goals, guidelines have been developed by the International Organization for Standardization (ISO). ISO standards contain many topics (including processes and procedures) that correspond to the implementation of the individual Sustainable Development Goals. There are approximately 22,000 known standards and other documents recognized worldwide as a framework for implementing sustainability concepts. ISO standards define the requirement that companies need to successfully implement the Sustainable Development Goals. These standards set the framework for management, while the skills and social competencies of managers enable the practical implementation of these guidelines in the management of sustainable supply chains.

For example, the well-known 26,000 standard, which is mainly related to corporate social responsibility (CSR), covers issues that can be incorporated into an organization's systems, such as quality management (ISO 9001) [19], environmental management (ISO 14001) [20] as well as occupational health and safety management (OHSAS 18001/PN-N-18001) [21].

The ISO 26000 [22] standard is not mandatory, it is a kind of guide in the implementation of CSR with guidelines and recommendations on issues such as

- Public engagement and community development,
- Organizational governance,
- Human rights,
- Employee practices and environment,
- Fair operating practices, and
- Consumer issues [22].

The social responsibility in the new economy is an important aspect of social capital, which becomes a network of social ties between organizational participants and customers and is helpful in economic transactions. Such transactions are facilitated because of the

rapid access of participants in these ties to current organizational resources. These become available through the network of ties in which an individual or organizational unit is involved. Thus, the ability of entrepreneurs to exploit growth opportunities lies in social capital, including skillful collaboration with customers within the organization to pursue common interests. This ability to cluster is an important part of the social capital that generates much of the trust between participants in an organization, which represents an important and measurable economic value. This is why the role of social capital in facilitating the rapid building of effective connections and thus maximizing the use of resources by as many network participants as possible to undertake business activities is so important. In conclusion, it is essential to consider the links between social competence, social capital and sustainability. A proposal for these links is presented in Figure 1.

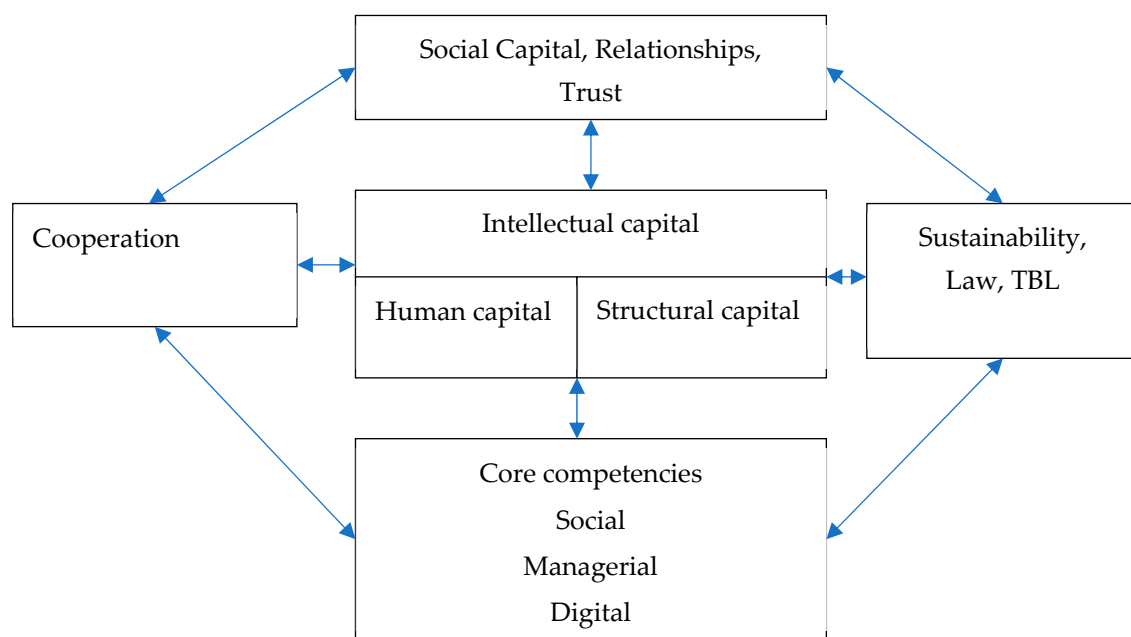


Figure 1. Relationship between social capital, sustainability and core competencies. Source: compiled from A. Łupicka 2022 [11].

The figure shows the feedback between the different categories, as all these expressions are dependent and equivalent to each other. The ties, relationships and trust that underpin social capital are built on a foundation of cooperation and shared commitment to sustainability and compliance with environmental regulations and standards. All this would not be possible without highly developed intellectual capital, with a particular focus on developing human capital and integration with trading partners in sustainable supply chains.

1.3. Characteristics of Social Competencies in Light of the Literature

Based on a review of the literature [16,23–37], the most commonly identified competencies relating to sustainable supply chains are listed. The shape of these competencies has been evolving. Most of the works dealt with supply chain competencies, without highlighting the role of sustainability economics. Many of the works were devoted to competencies concerning Industry 4.0 [30,32,36,38]. Six social competencies in Industry 4.0 were most frequently identified [38–40]. These included communication skills, leadership skills, the ability to be compromising and cooperative, to work in a team, to share one's knowledge, and the ability to accept change. After a deeper analysis of the literature, 21 social competencies have been identified [9,11,13,14,17,27,38,39] that are required by companies to create sustainable supply chains. They are listed and described one by one in the Table 1 below. Their relevance to the environmental, social and economic aspects as

pillars of sustainability is considered. Of course, this set of competencies can also be applied to traditional supply chains, but the authors believe that these 21 social competencies are particularly well suited to the requirements of sustainable supply chains.

Table 1. Social competencies in sustainable supply chains.

No.	Social Competence	Description
1	Conflict mitigation and resolution	Including mediating disputes and silencing. Conflict management and resolution require emotional maturity, self-control and empathy.
2	Intercultural skills	The ability to function in culturally diverse environments. Skills can be understood as resources used during intercultural dialogue (to use different forms of communication). Knowledge of multiple cultures allows for effective negotiation.
3	Foreign language skills	Language skills foster collaboration with foreign partners, increasing the company's opportunities for growth through internationalization.
4	Communication and communication skills	Listening to others without prejudice.
5	Leadership skills	Inspiring staff and teams, performing leadership roles.
6	Ability to compromise	Ability to solve problems while considering the other side of the conflict.
7	Teamwork ability	It manifests itself in the organization of the activities of all team members to achieve an agreed goal.
8	Knowledge sharing	Knowledge transfer enables colleagues to learn skills and benefit from each other's experiences. It is also the ability to sense the need for development in others and to develop capacity in employees.
9	Effective persuasion and social influence	Ability to change the attitudes and behavior of others in desired directions, e.g., in dealing with suppliers and customers, negotiating, obtaining funding,
10	Change initiation and change leadership	Initiating change leads to the search for the best solutions to increase organizational performance.
11	The ability to correctly perceive the emotions, characteristics, motives and intentions of others.	Understanding others involves becoming aware of other people's feelings and viewpoints.
12	Adaptability to social situations	Adaptability and confidence in a wide range of areas.
13	Self-awareness and knowledge of own preferences and skills	The awareness of one's skills makes it possible, among other things, to use them to lead a team competently.
14	Improving others	Involvement in the development of other employees.
15	Empathy	It is the foundation of effective management of interactions with the environment as well as understanding, shaping and using these interactions.
16	Transdisciplinarity	Understanding and using concepts from different disciplines to address contemporary complex issues, e.g., climate change.
17	Establishing credibility and trust in the team	Trust and reliability are determinants of positive relationships.
18	Showing professionalism to clients, colleagues, and team members	Demonstrating professionalism increases trust and willingness to cooperate.
19	Responding consistently in situations that require honesty and frankness	Honesty and sincerity inspire positive thoughts and a willingness to cooperate.
20	Avoiding conflicts between work and personal interests or activities	The ability to balance professional and personal matters.
21	Showing interest in learning and personal development	Seeking feedback from multiple sources on how to improve and develop; modifying behavior based on feedback or self-analysis of past mistakes.

Source: own elaboration based on [9,11,13,14,17,27,38,39].

Based on the proposed set of social competencies, a questionnaire was prepared to obtain information on the importance of each social competency and the possibility of building a template for social competencies in sustainable supply chains.

2. Materials and Methods

As part of the empirical research, the authors of this article decided to survey a purposively selected research group. The survey was conducted using the Discrete Choice Experiment (DCE) method. This group consisted of senior managers managing logistics and supply chains in manufacturing companies (directors of logistics and purchasing departments) and owners or presidents of manufacturing companies in the medical industry. This made it possible to reach respondents who, by virtue of their positions, should possess key managerial competencies, including social competencies. Such a choice of respondents meant that the survey was conducted on a smaller, non-random sample. Still, it allowed for obtaining objective results due to the respondents' extensive knowledge, professionalism and experience in managing teams of employees. A total of 34 respondents took part in the survey, 20 from the Polish market and 14 from the global one. A more extensive research sample exceeded the research capabilities of the article's authors since only senior executives were selected for this study. The companies participating in the survey were located in Europe, North America and East Asia and had diverse manufacturing operations in the medical devices manufacturing sector. The survey was conducted in June 2023. The survey used a three-point Likert scale, where 1 meant unimportance of a given competence, 2 hard to say and 3 importance of a given competence. Three-point scales communicate two pieces of information (neutrality and direction) [41].

It was distributed to the companies constituting the survey sample via webmail. The distribution of the questionnaire was preceded by a direct email or telephone contact to present the purpose and scope of the survey, the manner of its execution as well as its relevance to the research area. At the same time, a technical briefing was conducted. The respondents were assured anonymity. A CAWI (Computer-Assisted Web Interview) method was used to conduct the survey, in which the participant was provided with a questionnaire to be completed electronically. In the topic under discussion, the authors focused on answering research questions that have descriptive, exploratory or explicative value. This refers to research with a narrower scope and lower level of analysis. In the present study, it is a certain (intersubjective) state of scientific ignorance that inspires the research, so the research question was formulated and the introduction of assumptions and criteria about the reality under study, which are usually included in the hypotheses that form the basis of statistical tests, was omitted. Survey results were subjected to arithmetic mean to answer the research question: What set of social competencies are important to logistics and procurement managers in sustainable supply chains?

Characteristics of the Branch

The medical device market was selected for this study since it is characterized by a high degree of commitment to sustainability. This area includes the sale of medical products and related services such as servicing, rental, or training. The equipment is primarily aimed at patients, who make up most of its end users. In addition to the patients themselves, another group of users includes medical organizations such as hospitals, nursing homes, clinics or diagnostic practices. The medical products include medical devices used in the diagnostics, treatment, monitoring and prevention of disease. These may include, for example, diagnostic imaging equipment, dental equipment and supplies, operating tables, ophthalmic devices, anticoagulation bands, beds, lifts or medical baths. The medical devices market is specific because of the characteristics that distinguish it from other markets. A characteristic feature of this market is the high regulatory requirements, including environmental standards, that medical devices must meet to be approved for sale in each market. This often involves lengthy, costly, and demanding product certification procedures or obtaining several other product approvals for the market. Medical devices are primarily used to save the health and/or safety of the patient and therefore must have a sufficiently high level of quality and safety to be used by both patients and medical personnel (e.g., doctors and nurses). All this sets extremely high standards for the organizations to meet before they enter the market. The COVID-19 pandemic has led to changes in the demand

structure for medical devices. The purchase of equipment for acute care and hospitalization, such as ventilators, medical beds or antibacterial masks and gels has become a priority. The purchase of long-term care equipment has therefore been partially or completely postponed (for example, baths or medical lifts). Despite this change, the global market for medical devices continues to grow. In 2020 alone, it reached the value of USD 432 billion, and in 2021 it will already reach USD 455 billion, a change of +5.3% year-on-year. It is estimated that this trend will continue in the coming years, with the global medical device market reaching USD 660 billion by 2028. The largest value is generated by sales in the North American market, mainly in the US, but the European market, as well as Asia-Pacific, is expected to grow in value in the following years. The COVID-19 pandemic has also resulted in the acceleration of the digitalization of the medical sector, which, combined with sustainability policies, could have a significant impact on the future direction of the sector. The challenge in such an operational environment for companies in the sector has become the competence of managers, and their ability to deal with difficult situations on a daily basis.

In summary, the outlook for the global medical device market is currently extremely promising. At the same time, it should be noted that the further development of medical device markets is strongly dependent on several different factors, such as government regulations, further developments in technology, advances in research, private and public sector budgets for new investments, environmental requirements, transparency of production in terms of environmentally compliant materials used and also random factors, which may include, for example, the emergence of a new pandemic. Consequently, the pace of further development of the medical device market may change, depending on the strength of new, yet unexplored factors.

3. Results

Based on a comparative analysis of competencies in the Polish and foreign markets, slight differences in respondents' answers are apparent. The results are shown in Table 2. For the most part, however, managers were unanimous in their responses. The respondents considered empathy (mean 2.30 Polish market, 2.31 foreign market) improving others (2.10;2.23), transdisciplinarity (2.20;2.15) and demonstrating interest in personal learning and development (2.20;2.23) to be the least important. In the case of economic crises resulting in supply chain disruptions, personal needs came second. In the turbulent economic environment, transdisciplinarity is being displaced by specialization. At the same time, economic, environmental and social demands are forcing a focus on competencies that directly affect the sustainability of supply chains.

Table 2. Social competencies in sustainable supply chains-survey results.

Social Competencies	Arithmetic Means—Polish Market	Standard Deviation—Polish Market	Arithmetic Means—Foreign Market	Standard Deviation—Foreign Market
Conflict mitigation and resolution	3.00	11.55	2.46	4.16
Intercultural skills	2.65	8.14	2.54	5.13
Foreign language skills	3.00	11.55	2.77	5.77
Communication and communication skills	3.00	11.55	2.69	5.85
Leadership skills	2.40	5.70	2.69	5.85
Ability to compromise	2.45	6.70	2.62	4.93
Ability to work in a team	2.70	9.00	2.85	6.65
Knowledge transfer and sharing	2.60	7.23	2.69	4.93
Applying the methods of effective persuasion and social influence	2.45	6.65	2.31	3.51
Initiating and directing change	2.75	8.96	2.62	4.93

Table 2. *Cont.*

Social Competencies	Arithmetic Means—Polish Market	Standard Deviation—Polish Market	Arithmetic Means—Foreign Market	Standard Deviation—Foreign Market
Ability to correctly perceive the emotions. traits. motives and intentions of others	2.50	7.63	2.38	4.50
Adaptability to different situations in the environment	2.35	6.02	2.62	4.93
Self-awareness and knowledge of one's preferences and abilities	2.35	6.02	2.31	3.51
Improvement of others	2.10	4.16	2.23	2.51
Empathy	2.30	3.78	2.31	3.51
Transdisciplinarity	2.20	4.50	2.15	3.05
Establishing relationships and credibility with colleagues	3.00	11.54	2.62	4.93
Demonstrating professionalism to clients. colleagues and team members	2.65	7.23	2.69	5.85
Responding consistently in situations that require honesty and frankness	2.85	9.81	2.77	5.77
Avoiding conflicts between work and personal interests or activities	2.45	4.72	2.23	2.51
Demonstrating interest in personal learning and development	2.20	3.05	2.23	4.04

Source: own elaboration.

Significant differences can be seen in the case of the competencies of conflict mitigation and conflict resolution. In the Polish market, respondents considered this competence very important (3.00), while their foreign colleagues did not view it as particularly important (2.46). In the context of sustainable supply chains, this is probably due to the insufficient maturity of the Polish market with regard to sustainability. Poland is still struggling to meet basic environmental and often social aspects. There is also quite a big difference in the case of establishing relationships and credibility with colleagues. Again, in the Polish market, this is a significant competence (3.00), mainly due to the ongoing development of cooperation and partnerships. For foreign employees, it is quite obvious (2.62) that cooperation is needed and they are used to this competence. Effective cooperation in a team largely depends on how conflicts are resolved. In this case, respondents from both markets were unanimous (2.70;2.85). Managers also unanimously identified the following competencies as very important: foreign language skills (3.00;2.77), communication and communication skills (3.00;2.69) and responding consistently in situations that require honesty and frankness (2.85;2.77). The latter competence is particularly important with regard to sustainable supply chains, which must be characterized by transparency in social aspects such as fair wages, non-exploitation of workers or guaranteed working conditions in accordance with the employment contract. Concerning the economic aspect, what counts is the so-called 'open book' principle and full transparency of supply chain finances. As regards the environmental aspect, honesty towards buyers throughout the entire production process, taking into account production following the principles of environmental governance. Showing openly whether the company generates a carbon footprint, for example, or introduces upgrades to offset negative environmental impacts. The responses differed slightly on the ability to compromise, which clearly shows the cultural differences and the way of approaching the business partner. Regarding the ability to adapt to different situations in the environment, Polish managers did not attach as much importance to it (2.40) as their foreign counterparts (2.62). This may also be due to the lower development dynamics of the Polish economy concerning the aspects of sustainable

development and the implementation of related requirements. Considering the different degrees of development of the economies, this is quite obvious. In Poland, the development of democracy and free trade has been going on for more than two decades. However, the time is too short for Polish managers to gain confidence in a constantly changing economic environment. Looking at Figure 2, it is clear that there are common points in the assessment of social competencies by Polish and foreign respondents. Yet, there are quite a few differences as well.

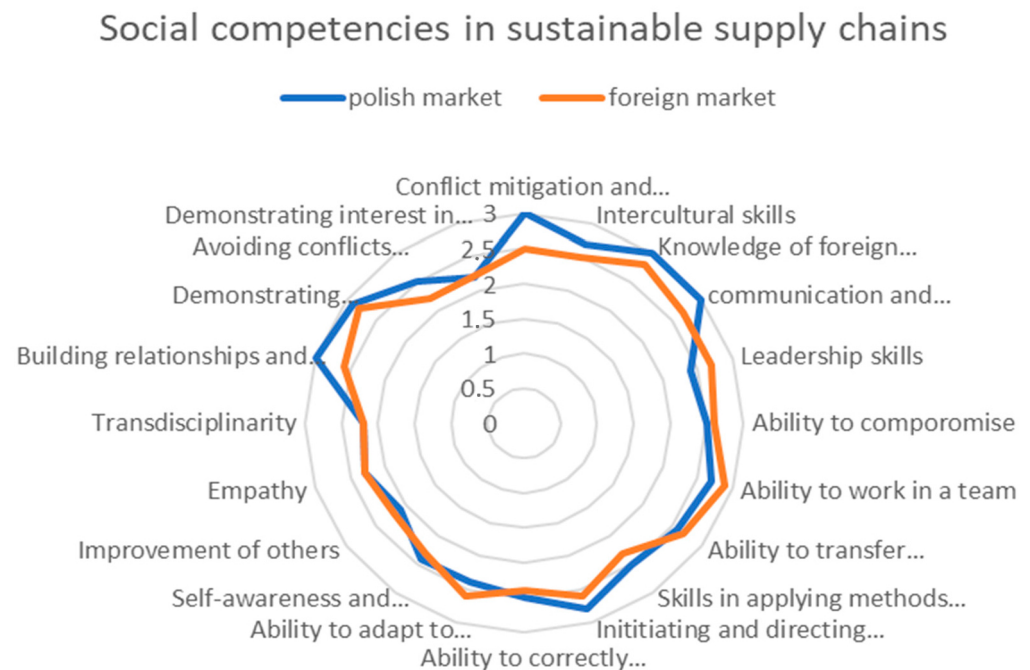


Figure 2. Social competencies in sustainable supply chains. Source: own elaboration.

Analyzing the results of the standard deviation shows slight differences between the distribution of responses in the Polish and foreign markets. The standard deviation (SD) measures the extent of scattering in a set of values, typically compared to the mean value of the set [42]. Intuitively speaking, the standard deviation tells how widely the values of some quantity are scattered around its mean. The smaller the value of the deviation, the more the observations are clustered around the mean. Due to the different number of participants in the survey in the Polish and foreign markets, the standard deviation results fall into different values. Nevertheless, it can be noted that the highest values for both markets are characteristic of three social competencies: foreign language skills, communication and communication skills and responding consistently in situations that require honesty and frankness. The consensus of respondents on the relevance of these competencies is reflected in the indication of mostly this particular category on the Likert scale. On the other hand, the most averaged responses where respondents did not have a common opinion in both the Polish and foreign markets refer to competencies such as improvement of others and avoiding conflicts between work and personal interests or activities. Encouraging are the results of indications confirmed by the measure of standard deviation concerning leadership skills. In the case of the foreign market, as many as 11 respondents out of 14 taking part indicated that this was an important competence. In the Polish market, there was no unanimous answer, with 5 managers considering this competence as unimportant, 2 difficult to say and 13 as important. The remaining standard deviation distributions are similar in both markets.

4. Discussion

Literature research has shown that the competency approach to human resource management is not new. The competency structure is used by organizations in various practices

such as recruitment and selection, training and development, human resource management, career development, and compensation to improve organizational and employee performance. Competency-based management approaches focus on enhancing the potential of the employee to gain a competitive advantage over other organizations [43]. Resource dependency theory seeks to explain how knowledge and competency management affect the sustainable performance of the organization and supply chains. Prahalad and Hamel note [44] that a core competency becomes a differentiating competency when not only is it something the organization does very well (core competency), but it does it better than anyone else in the industry (differentiating core competency). This competence then becomes a competitive resource; and if there are barriers that limit other organizations' access to this resource, it becomes a long-term source of economic rents [45]. The same is true regarding social competencies that are designed to meet the challenges of sustainable supply chains. The development of social competencies towards sustainability will enable companies and entire supply chains to overcome economic crises and adapt to changing socio-environmental conditions. Competencies are the common link of most human resource subsystems [46]. By linking human resource processes with desired competencies, organizations can shape the capabilities of their employees and achieve better results [47]. Draganidis [48] proposed a competency-based model consisting of several steps:

- Competence identification—the process of discovering what competencies are necessary for exemplary or fully successful work.
- Competency model—a narrative description of the competencies to be possessed by a target employee.
- Competency estimation—a comparative analysis with an established competency benchmark compared to the individual competencies of the employee concerned.
- Competency-based management—the application of a set of competencies to the management of human resources in such a way that the results are relevant to the organization's performance.
- Competency standard—defines the core skills and knowledge that employees must possess and defines the performance levels they must achieve to demonstrate competence in a specific work segment or function.
- Competency profile—a document describing a set of individual competencies for a given job/job group/functional community.

Referring to the above competence model, in order to prioritize individual social competencies, it is important to identify the most important social competencies required in today's sustainable supply chains. The goal of supply chain sustainability is to create, protect and develop long-term environmental, social and economic value in the provision of products and services to the market [3]. Environmental values include compliance with the regulations related to the environmental aspects of running a business. Within the supply chain, the amount of greenhouse gases emitted, energy efficiency or the recyclability of materials can be measured. Social values emphasized in sustainable supply chains include but are not limited to fair labor practices, fair remuneration of workers, compliance with labor and human rights laws, respect for gender equality, safety and security in the workplace, non-use of child labor, non-use of labor slavery and practices geared to working with local communities. Economic values include but are not limited to fair contractual terms, paying receivables on time, not taking economic advantage of supply chain partners, building relationships based on trust, applying fair trade principles, and properly allocating risk and responsibility in the supply chain.

Based on the research conducted, it can be assumed that the most important social competencies concerning sustainable supply chains in the medical device industry include foreign language skills, communication skills and responding consistently in situations that require honesty and frankness.

Each of the competencies mentioned is significant in building sustainable supply chains in the medical device industry. Foreign language skills seem to be a rather trivial competence, but in light of compliance with international environmental regulations,

fluency in languages simplifies the way you communicate. You do not need to hire translators because you are yourself competent in interpreting regulations in a foreign language. Communication skills and responding consistently in situations that require honesty and frankness are important for building relationships based on trust or applying fair trade.

5. Conclusions

Social competencies are of particular importance as part of the development of social capital. Social competencies are strongly correlated with sustainability, including establishing new relationships and creating various networks that are so vital in the contemporary economic environment. The implications from the empirical and literature studies conducted indicate the important role of social competencies in building sustainable supply chains. Regarding the medical device industry under discussion, five social competencies are identified that the authors believe are key in terms of supply chain sustainability requirements. The authors are aware of the limitations regarding the research conducted, which can serve mainly as an exploratory one. However, they point out several implications for further research in this yet unexplored area. In particular, it is worth extending this research to other industries, both related and with completely different characteristics, e.g., service industries. Further implications may include

1. The impact of social competencies on the finances of sustainable supply chains,
2. The development of social competencies based on informal connections that result in a willingness to share experience and acquired knowledge,
3. The impact of social competency development on knowledge conversion in sustainable supply chains.

The above considerations and implications for further research will advance our understanding of the role that social competencies play in sustainable supply chains.

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References

1. Tajbakhsh, A.; Hassini, E. Performance Measurement of Sustainable Supply Chains: A Review and Research Questions. *Int. J. Product. Perform. Manag.* **2015**, *64*, 744–783. [\[CrossRef\]](#)
2. Arora, A.; Walia, M. Sustainable Supply Chain. *Int. Multidiscip. Res. J.* **2015**, *5*, 126–137.
3. Adams, F.G.; Gabler, C.B.; Landers, V.M. The Hierarchical Resource Nature of Green Logistics Competency. *J. Bus. Ind. Mark.* **2021**, *36*, 1474–1485. [\[CrossRef\]](#)
4. Singh, A.; Trivedi, A. Sustainable Green Supply Chain Management: Trends and Current Practices. *Compet. Rev.* **2016**, *26*, 265–288. [\[CrossRef\]](#)
5. Da Silva, B.M.; Ferreira, D.H.L.; Georges, M.R.R. Sustainable Practices in the Supply Chain under the UN Global Compact Perspective. *Int. J. Innov. Educ. Res.* **2019**, *7*, 135–153. [\[CrossRef\]](#)
6. de Janasz, S.; Schneider, B.; Dowd, K.O. *Interpersonal Skills in Organizations*; McGraw-Hill Education: New York, NY, USA, 2014.
7. Wright, B. *Interpersonal Skills*; Caring for Skills Series; M & K Update: Keswick, UK, 2007.
8. Park, H.H.; Faerman, S. Becoming a Manager: Learning the Importance of Emotional and Social Competence in Managerial Transitions. *Am. Rev. Public Adm.* **2019**, *49*, 98–115. [\[CrossRef\]](#)

9. Spitzberg, B.H. Interpersonal Skills. In *Handbook of Interpersonal Communication*; Sage Publications: Thousand Oaks, CA, USA, 2002.
10. Recommendation of the European Parliament and of the Council of 18 December 2006 on Key Competences for Lifelong Learning (2006/962/EC). Official Journal of the European Union L 394/10. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006H0962> (accessed on 17 December 2023).
11. Baron, R.; Markman, G. Beyond Social Capital: The Role of Social Skills in Entrepreneurs' Success. *Acad. Manag. Perspect.* **2000**, *14*, 106–116. [\[CrossRef\]](#)
12. European Commission; Directorate-General for Research and Innovation; Breque, M.; De Nul, L.; Petridis, A. *Industry 5.0—Towards a Sustainable, Human-Centric and Resilient European Industry*; Publications Office of the European Union: Luxembourg, 2021. [\[CrossRef\]](#)
13. McLaren, G. Why the Future Needs Ecological Civilization and Not Society 5.0. *Cosm. Hist. J. Nat. Soc. Philos.* **2021**, *17*, 567–598.
14. Audrey, A.A.; Paksi, A.K. The Challenges of The Japanese Government to Implement Society 5.0. In Proceedings of the International Conference on Public Organization (ICONPO 2021), Yogyakarta, Indonesia, 13–14 August 2021. Advances in Economics, Business and Management Research.
15. Dwivedi, A.; Agrawal, D.; Jha, A.; Mathiyazhagan, K. Studying the Interactions among Industry 5.0 and Circular Supply Chain: Towards Attaining Sustainable Development. *Comput. Ind. Eng.* **2023**, *176*, 108927. [\[CrossRef\]](#)
16. Song, S.; Shi, X.; Song, G.; Huq, F.A. Linking Digitalization and Human Capital to Shape Supply Chain Integration in Omni-Channel Retailing. *Ind. Manag. Data Syst.* **2021**, *121*, 2298–2317. [\[CrossRef\]](#)
17. Knut, A.; Balaji, I. *Next Generation Supply Chain: Supply Chain 2020*; McKinsey & Company: Chicago, IL, USA, 2013.
18. Annesley, G. Gartner Supply Chain Conference: Trends 2019. The Digital Supply Chain Network. Available online: <https://supplychainbeyond.com/gartner-supply-chain-conference-trends-2019/> (accessed on 17 December 2023).
19. ISO 9001; Quality Management Systems—Requirements. Geneva, Switzerland, 2015. Available online: <https://www.qal-iran.ir/WebsiteImages/iso/6.PDF> (accessed on 20 December 2023).
20. ISO 14000; Environmental Management Systems. Geneva, Switzerland. Available online: <https://www.qal-iran.ir/WebsiteImages/iso/22.PDF> (accessed on 20 December 2023).
21. OHSAS, 18001/PN-N-18001; Occupational Health and Safety Management Systems—Requirements. Geneva, Switzerland. Available online: <http://www.aims.org.pk/wp-content/uploads/2014/08/OHSAS-18001-2007-Standards.pdf> (accessed on 20 December 2023).
22. ISO 26000; Guidance on Responsibility. Geneva, Switzerland, 2010. Available online: https://iso26000.info/wp-content/uploads/2017/06/ISO-26000_2010_E_OBPpages.pdf (accessed on 20 December 2023).
23. Sapiński, A.; Małodobry, Z.; Sito, R. Digitisation AsA Tool For Developing Social Capital. *Sci. J. Bielsk. Biała Sch. Financ. Law* **2021**, *25*, 50–55. [\[CrossRef\]](#)
24. Mukherjee, A.A.; Raj, A.; Aggarwal, S. Identification of Barriers and Their Mitigation Strategies for Industry 5.0 Implementation in Emerging Economies. *Int. J. Prod. Econ.* **2023**, *257*, 108770. [\[CrossRef\]](#)
25. Digital Supply Chain Skills Learn Nine Skills That Fuel Digital Supply Chain Planning; Gartner. Available online: <https://www.gartner.com/en/supply-chain/trends/digital-supply-chain-talent> (accessed on 17 December 2023).
26. Supply Chain Manager Competency Model; APICS The Association for Operations Management. 2014. Available online: <https://www.apics.org/docs/default-source/careers-competency-models/supply-chain-manager-competency-model.pdf> (accessed on 17 December 2023).
27. Hoffman, J.; Hoelscher, M.; Sherif, K. Social Capital, Knowledge Management, and Sustained Superior Performance. *J. Knowl. Manag.* **2005**, *9*, 93–100. [\[CrossRef\]](#)
28. Relich, M. Identifying Relationships Between Eco-Innovation and Product Success. In *Technology Management for Sustainable Production and Logistics*; Golińska, P., Kawa, A., Eds.; EcoProduction; Springer: Berlin/Heidelberg, Germany, 2015; pp. 173–192. [\[CrossRef\]](#)
29. Joerres, J.; McAuliffe, J. *The Future of Jobs—Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution*; World Economic Forum: Geneva, Switzerland, 2016.
30. Winter, J.; Heindl, A. *Kompetenzentwicklungsstudie Industrie 4.0*; Deutsche Akademie der Technikwissenschaften: Dortmund, Germany, 2016.
31. Davis, A.; Fiedler, D.; Gorbis, M. *Future Work Skills 2020*; Institute for the Future for the University of Phoenix Research Institut: Palo Alto, CA, USA, 2011.
32. Bauer, H.; Baur, C.; Camplone, G.; George, K. *Industry 4.0—How to Navigate Digitization of the Manufacturing Sector*; McKinsey Digital; Bauer: Exeter, NH, USA, 2015.
33. Störmer, E.; Patscha, C.; Prendergast, J.; Daheim, C.; Rhisiart, M.; Glover, P.; Beck, H. *The Future of Work: Jobs and Skills in 2030*; UK Commission for Employment and Skills (UKCES): Wath-upon-Deane, UK, 2014.
34. Pompa, C. *Jobs for the Future*; London. 2015. Available online: <https://cdn.odi.org/media/documents/9578.pdf> (accessed on 20 December 2023).
35. Morgan, J. *The Future of Work: Attract New Talent, Build Better Leaders, and Create a Competitive Organization*; John Wiley & Sons: Hoboken, NJ, USA, 2014.

36. Sitek, P.; Wikarek, J. A Hybrid Programming Framework for Modeling and Solving Constraint Satisfaction and Optimization Problems. *Sci. Program.* **2016**, *2016*, 5102616. [[CrossRef](#)]
37. Grzybowska, K.; Gajdzik, B. SECI model and facilitation on change management in metallurgical enterprise. *Metalurgija* **2013**, *52*, 275–278.
38. Łupicka, A.; Grzybowska, K. Future Competencies in the Automotive Industry—Practitioners’ Opinions. W K. Soliman (Red.), *Vision 2020: Sustainable Economic Development, Innovation Management, and Global Growth* (s. 5199–5208). 2017. Available online: <https://ibima.org/accepted-paper/future-competencies-in-the-automotive-industry-practitioners-opinions/> (accessed on 20 December 2023).
39. Łupicka, A. Social Competences in Average Times. *J. Posit. Manag.* **2023**, *13*, 111–122.
40. Łupicka, A. Kompetencje Przyszłości w Dobie Kryzysu Gospodarczego. In *Ku Nowej Normalności po COVID 19-Perspektywa Gospodarki po Transformacji*; Jankowska, B., Mińska-Struzik, E., Eds.; PUEB: Poznań, Poland, 2021.
41. Shannon, C.E.; Weaver, W. *The Mathematical Theory of Communication*, 16th ed.; The University of Illinois Press: Champaign, IL, USA, 1971.
42. Whitley, E.; Ball, J. Statistics Review 1: Presenting and Summarising Data. *Crit. Care* **2002**, *6*, 66. [[CrossRef](#)] [[PubMed](#)]
43. Tripathi, K.; Agarwal, M. Competency Based Management In Organizational Context: A Literature Review. *Global J. Financ. Manag.* **2014**, *6*, 349–356.
44. Prahalad, C.K.; Hamel, G. *The Core Competence of Corporation*; Harvard Business School Reprint: Boston, MA, USA, 1990.
45. Wernerfelt, B. A Resource-based View of the Firm. *Strateg. Manag. J.* **1984**, *5*, 171–180. [[CrossRef](#)]
46. Byham, W. Developing Dimension-/Competency-Based Human Resource Systems; DDI Competitive Advantage Realised. 2006. Available online: <https://www.yumpu.com/en/document/view/7920280/developing-dimension-competency-based-human-resource-systems> (accessed on 17 December 2023).
47. Donzelli, P.; Alfaro, N.; Walsch, F.; Vandermissen, S. *Introducing Competency Management at ESA*; ESTEC Human Resources Division, Directorate of Resources Management, ESTEC: Noordwijk, The Netherlands, 2008; Available online: https://www.esa.int/esapub/bulletin/bulletin126/bul126k_donzelli.pdf (accessed on 17 December 2023).
48. Draganidis, F.; Mentzas, G. Competency Based Management: A Review of Systems and Approaches. *Inf. Manag. Comput. Secur.* **2006**, *14*, 51–64. [[CrossRef](#)]

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