SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2026
ORGANIZATION AND MANAGEMENT SERIES NO. 252

SOCIAL CAPITAL 4.0: RELATIONAL CHALLENGES IN THE DIGITALIZATION AND ARTIFICIAL INTELLIGENCE ERA

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Purpose: The aim of the article is to determine the role of social capital 4.0 as an economic resource in micro and small enterprises operating in conditions of growing geopolitical tensions, market asymmetries and accelerated development of digital technologies, in particular artificial intelligence.
Methodology: The findings derive from an ongoing multi-stage study on social capital in Poland (since 2023). The theoretical part is supported by a critical analysis of the relevant literature, while the empirical part is conducted using the CAWI method on a sample of 360 respondents in a group of micro and small enterprises.
Findings: In conditions of increasing asymmetries, the role of social capital is undergoing a significant redefinition. In this context, it is no longer merely a complementary soft resource of enterprises but is beginning to serve as a strategic catalyst for adaptation to a changing environment. Its importance is particularly evident in the ability of market entities to maintain continuity and stabilize economic processes in a turbulent environment. Research indicates that the conditions for shaping social capital are changing; it no longer arises solely offline, and increasingly, relationships established virtually can strengthen its foundations and expand networks. Therefore, the assumption is made that "social capital 4.0" is a hybrid of online and offline relationships, which implies new challenges and creates new opportunities, e.g. reducing the problem of inclusivity, but also threats, such as digital illiteracy, trust issues, and the credibility of relationships established in the virtual world.
Research limitations: The research conducted, due to the multi-threaded nature of the issues discussed, imposes limitations as to the level of detail of the presented problems, while at the same time opening the possibility of their deeper exploration in subsequent stages of the analyses.
Originality: The originality of this study lies in introducing a hybrid perspective on social capital 4.0 as a strategic intangible resource. Micro- and small enterprises increasingly use this resource to expand their networks of business partners and improve their access to new markets.
Keywords: digitalization, micro and small enterprises, relationships, resources, management processes.
Category of the paper: Research paper.

1. Introduction

Contemporary economic processes are being implemented under conditions of deepening global asymmetries, encompassing the political, technological, and economic spheres, which generates a state of permanent uncertainty in the functioning of market entities. Due to limited financial and organizational resources, micro and small enterprises are more often exposed than other entities to the uncertainty associated with their business activities. In such conditions, social capital can become a key mechanism supporting economic processes. Currently, social capital is undergoing a transformation from an offline relationship model to a hybrid model (the author's approach, social capital 4.0), which is built on the foundations of relationships established both in real-world interactions between entities and in the virtual world.

Social capital 4.0, considered a soft resource at the entrepreneur's disposal, is capital built on the foundations of trust, relationships, credibility, and mutual trust. What distinguishes it from previous definitions known from the literature is the space of established relationships, the creation, construction, and maintenance of which increasingly take place in the virtual world, and increasingly often remain there. Artificial Intelligence (AI) is playing an increasingly important role in building social capital 4.0. It can support processes that have traditionally been time-consuming and burdened by information asymmetry, for example, by supporting entrepreneurs in searching for information about potential business partners not only on a local scale but, above all, on a global scale. AI suggests various scenarios for establishing business relationships and implementing tools that can be used to build relationships (such as introducing real-time translations, which facilitate communication between entities representing cultural diversity). These defined AI functions in supporting relational processes among micro and small business entrepreneurs imply a number of benefits, including reduced transaction costs and increasing the reach of the smallest market entities. In this study, 39% of respondents confirmed the importance of AI in establishing relationships in the virtual world.

It should also be noted that the use of artificial intelligence may pose a certain threat to building social capital (e.g., by shifting the responsibility for initiating contacts to technology, which may lead to a gradual loss of relational skills among entrepreneurs). It is important to remember that AI does not replace relationships, does not build social capital, and cannot be treated as an entity on which entrepreneurs' decisions depend. Artificial intelligence should support the formation of social capital among the smallest market entities by strengthening entrepreneurs' relational skills. It should serve as a tool for establishing and expanding relational networks. However, maintaining long-term contacts should take place offline, based on a solid foundation of trust and credibility with relational partners who are aware of the role social capital plays in economic processes. Entrepreneurs should strive for the sustainability of social capital by collaborating with other entities and using it as a resource for their company to

achieve a competitive advantage. Based on the above premises, the main thesis of the article was formulated, according to which social capital 4.0 is of a hybrid nature, combining relationships established offline and online, and is one of the key economic resources of micro and small enterprises operating in conditions of growing geopolitical uncertainty and accelerated digital transformation, in particular related to the development of artificial intelligence.

Despite the growing number of studies on social capital and digital transformation, there is still a research gap regarding the measurement of Social Capital 4.0 at the enterprise level.

In particular, the literature lacks empirical studies examining how artificial intelligence affects the development of social capital, with a particular focus on bonding and bridging social capital. In this regard, the present study contributes to a fuller understanding of the role of AI in strengthening hybrid forms of social capital within the group of surveyed enterprises.

2. Methods

The aim of this article is to define the role of social capital 4.0 as an economic resource in micro and small enterprises operating in conditions of growing geopolitical tensions, market asymmetries and accelerated development of digital technologies, in particular artificial intelligence. The research is focused on social capital 4.0 essence, advantages, and limitations in contemporary economic processes, with particular emphasis on the group of micro and small enterprises for which social capital may prove to be one of the few opportunities, or the only chance, for market survival in an era of increasing political, technological, and economic asymmetries. Based on this, the following research question was formulated: How are contemporary business relationships established and what is the role of artificial intelligence in initiating them? The study was conducted as part of a broader research project on the role of social capital in micro- and small-scale enterprises in Poland, ongoing since 2023. The theoretical part of the study was based on a critical analysis of the relevant literature, while the empirical part was conducted using a quantitative approach. The study employed a diagnostic survey method, employing a questionnaire technique. Purposive sampling was employed. The research sample consisted of 360 respondents representing micro- and small enterprises operating in Poland. The surveyed enterprises represented diverse sectors, locations, and economic conditions. Empirical data were collected using CAWI (Computer-Assisted Web Interview) technique. The collected empirical data was statistically analyzed using SPSS software. The analysis included descriptive statistics and correlation analysis.

The adopted methodology allowed for the identification of the processes of social capital formation and an assessment of the role of artificial intelligence in supporting its development in micro- and small-scale enterprises.

3. The role of social capital in the era of digitalization and artificial intelligence- literature review

Social capital is not a new concept. Since the dawn of time, members of communities have instinctively sensed the need for collective action. Collaboration has enabled people to build communities and bond social structures, contributing over time to the multiplication of benefits, including economic and social ones.

In contemporary economies, characterized by increasingly severe market asymmetries, social capital is perceived by many authors as a resource that allows economic entities to overcome the limitations created by these asymmetries. (Bourdieu, 1986, p. 248; Coleman, 1998, p. 109; Fukuyama, 2001, pp. 7-10). Contemporary literature on the subject offers a wide range of definitional analyses that reduce social capital to a soft resource that an economic entity uses (as with other resources) to achieve a set of self-defined goals that would be difficult or even impossible to achieve in a situation of low or absent social capital. Therefore, social capital is "a set of resources that an actor can mobilize and derive benefits from his (the actor's) embeddedness in specific networks of relationships with other actors" (Esser, 2008, p. 23). Against this background, C. Trigilia's definition also seems justified. He states that: "Social capital can be understood as a set of social connections that an individual or collective entity can utilize at any time. Thanks to the availability of this capital, cognitive resources such as information and normative resources such as trust enable actors to achieve goals that would otherwise be impossible to achieve or would be achieved at greater cost" (Trigilia, 2001, p. 430).

Theoretically, social capital can imply a number of advantages for economic entities. It can strengthen competitive position by: reducing transaction costs, strengthening trust and credibility among business partners, developing collective problem-solving skills, and acting to achieve individual and group goals. At the same time, the literature on the subject emphasizes the negative effects of the formation of social capital, which can lead to exclusionary mechanisms, such as the closure of relational networks and limited access to resources from outside the group, the pursuit of particular individual interests, and the avoidance of the costs of reciprocity, which are an element of creating social capital (e.g., helping other entities) (Table 1).

Table 1.
Advantages and disadvantages of social capital in the traditional approach - an example of micro and small enterprises

Advantages	Disadvantages
•Reduces transaction costs and helps achieve individual and group goals •Strengthens human capital – individuals acquire new skills and experiences. •Provides access to resources belonging to business partners. •Contributes to mutual trust and reliability among contractors. •Facilitates the resolution of collective action dilemmas. •Promotes long-term investments. •Increases overall efficiency and market competitiveness.	•Enables individuals to pursue "unclear interests" under the banner of the common good. •Imposes conformism and limits objectivity, which leads to reduced individual autonomy and forces independent individuals to either accept group norms or leave the group. •The "freelancer" problem – entities are unwilling to share in the costs of creating the social capital they benefit from, hoping that someone else will bear these costs. •Contributes to the creation of negative social capital – for example, closed organizations focused on pursuing the interests of their own members benefit from internal social capital (the formation of interest groups). •Limits access to resources for entities outside the group. •Individual success can be perceived as a threat to group cohesion.

Source: own study based on: Grabowska-Powaga, 2019, pp. 168-172.

A fundamental element of building social capital is relationships, which, strengthened by mutual trust, mutual assistance, and the credibility of entities, create relational networks. Social capital is rooted in dense and enduring relational networks that enable the flow of information and access to resources, consolidate the framework for cooperation, and build mutual trust.

The contemporary conditions for establishing relationships, including in the virtual world, have prompted the need to redefine social capital. Currently, social capital is changing its face and the conditions for its creation, shifting from an offline model to a hybrid model. Social capital 4.0 is capital emerging in times of technological challenges related to the galloping development of automation, digitization, and the increasingly prevalent use of artificial intelligence in economic processes. This means that social capital 4.0 is no longer solely capital built among entities that engage in direct relational interaction, but is also built virtually.

Digital transformation encompasses not only the execution of final market transactions, which are transferred online, but also encompasses the process of shaping relationships between businesses, which determine their course and sustainability. The research shows that 67% of respondents establish business relationships hybridly, i.e., both in-person and online, 31% adhere to the traditional model of establishing contacts, and 2% of respondents exclusively online (Figure 1).

Like traditional social capital, its model formed online can take on both positive and negative dimensions (Smith, Smith, Shaw, 2017, pp. 18-34; Lee, Hallak, 2020, pp. 1-14).

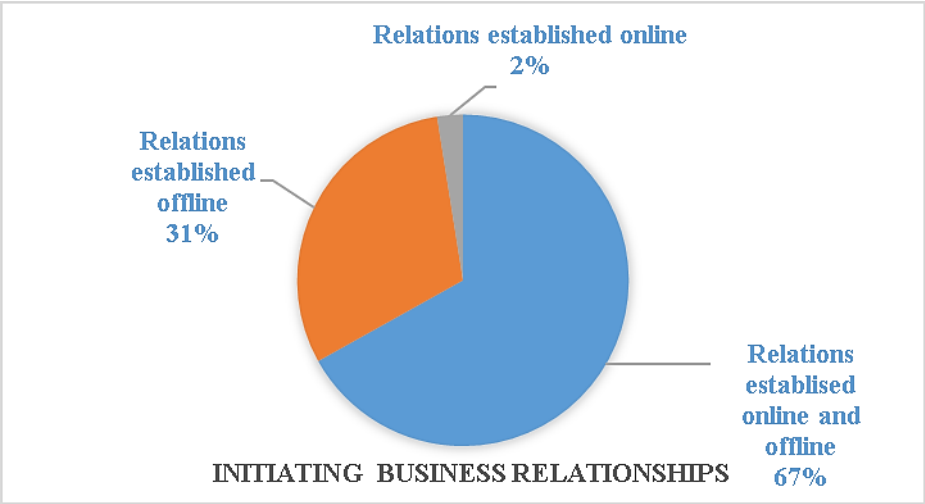

Figure 1. Ways to establish business relationships.

Source: own study.

The key advantages of social capital formed in the digital space include increased access to potential business partners and a broadened range of relationships, which leads to the reduction of temporal and spatial barriers. Social capital developed through online interactions also fosters greater inclusivity, creating opportunities for participation in relational networks for entities with limited resources and less potential for building relationships in traditional market conditions.

Social capital also fosters innovation in micro and small enterprises, enabling them to access diverse technological resources and knowledge through relationships with other economic entities (van Tran, van Ngoyen, Dinh, Huynh, van Ma, 2024, pp. 2-4).

Virtually established relationships, which form the foundation of online social capital, enable the crossing of closed networks and the establishment of contacts with market entities whose acquisition in traditional settings would require greater time, cost, and organizational effort. Network transparency, in turn, is an important advantage that strengthens social capital, especially in the context of bonding capital. By analyzing business profiles, it is possible to identify common areas of interest among entities, which will further strengthen the relational networks established between them. Digital infrastructure also facilitates monitoring competitors, accessing qualified capital, and increasing the credibility of relational parties.

At the same time, social capital built in the digital space can pose certain technological or ethical threats, such as data leakage or the persistence of information itself, whose digital footprint often becomes a business's trademark. Every online activity is subject to the assessment of followers, which can lead to negative opinions regarding the reliability of market entities. Mistakes made remain online and can cast doubt on the credibility of entities and the development of trust.

The disadvantages of online social capital also include the blurring of the boundaries between the professional and private spheres. As with offline social capital, a negative feature is the imposition of conformity and the limitation of objectivity on entities that enter into

asymmetric business relationships. Excessive involvement in online relationships can also pose a threat, which can lead to constant reassessment and failure to adhere to the company's specific strategic goals.

Another threat may be the disintegration of relationships built offline due to increased activity in establishing relationships in the virtual world. The model of social capital built in the digital environment particularly favors the strengthening of bridging social capital, while in the offline model, bonding capital remains the dominant form (Woolcock, 1998, p. 172). From the perspective of social capital developed online, the growing importance of bridging capital may come at the expense of the durability and cohesion of relationships characteristic of bonding capital (Table 2).

Table 2.
Advantages and disadvantages of online social capital – an example of micro and small enterprises

Advantages	Disadvantages
•Trust can be initiated online if there is consistent, repeatable, and transparent communication. •Digital relationships are often the only point of contact; are real, but not a substitute. •Online relationships foster inclusiveness and enable market entry for entities with significantly fewer resources (e.g., micro-enterprises from the periphery with limited capital or without PR departments). •Reducing time and space barriers by increasing the reach and effectiveness of established online relationships, faster communication, and increasing the availability of business partners. •Reducing communication barriers (diverse networks facilitate effective knowledge sharing). •Transforming the relational model from offline to hybrid. •Strengthening bridging capital supported by algorithms that suggest new contacts. •Network transparency, which can contribute to strengthening bonding capital (analysis of business profiles helps identify common areas of interest among interacting entities). •Accessibility (the ability to establish relationships in geographically distant locations). •Lack of preliminary assessment of the parties entering into relationships, which reduces anxiety and uncertainty regarding new relationships. •Ease of and convenience - establishing relationships online does not require relocation and does not imply time constraints, •Anonymity of relationship pages, •Support for innovation, and thus the company's adaptation to changing market conditions, •Tangible market benefits (access to qualified human capital, monitoring competitive activities), •Building legitimacy through professional digital profiles, increasing the credibility of relationship pages, •Increased efficiency in times of crisis.	•Technological and ethical threats related to data leaks, •The persistence of archived information that casts a shadow over the professionalism of entrepreneurs can hinder credibility and reliability, and thus the building of trust between the parties to the relationship, •Blurring the boundaries between the professional and private spheres during online relationships, •Imposing mental conformism or limiting objectivity (similar to offline social capital), •Excessive involvement in online relationships can lead to constant reassessment rather than adherence to the business goals defined in the company's strategy, •Risk of negative evaluation – every virtual activity is subject to evaluation and verification of reliability, accuracy, etc., •Lack of experience in confronting real relationships makes it difficult to build deep trust solely online, • Superficiality of online relationships, •Technological asymmetries (digital illiteracy), •The impermanence of online relationships that are not maintained interpersonally, •Limited credibility and trust in the relationship parties that are not subject to real verification, •Lack of certainty regarding the other party to the relationship, •The risk of fraud by the other party to the relationship and manipulation of information.

Source: own study based on: Smith, Smith, Shaw, 2017; Lee, Hallak, 2020, pp. 1-14; van Tran, van Ngoyenm, T. Pinh, 2024, pp. 2-4; Bylok, 2024, pp. 1580-1581; Annamalah et al., 2023, pp. 5-6.

As research shows, the hybrid nature of social capital 4.0 creates new opportunities for economic entities, but also presents numerous drawbacks. Another challenge currently faced by entities establishing relationships is the role of artificial intelligence in shaping relationships between entities and the role it can play in building social capital.

4. New relational challenges among entrepreneurs in the era of artificial intelligence on the basis of an example of micro and small enterprises- results and discussion

Research results indicate that 97% of entrepreneurs use artificial intelligence in their business operations. AI tools are most frequently used for searching for information (90.3%), user manuals (67%), and finding best practices to solve company business problems (57%) (Figure 2).

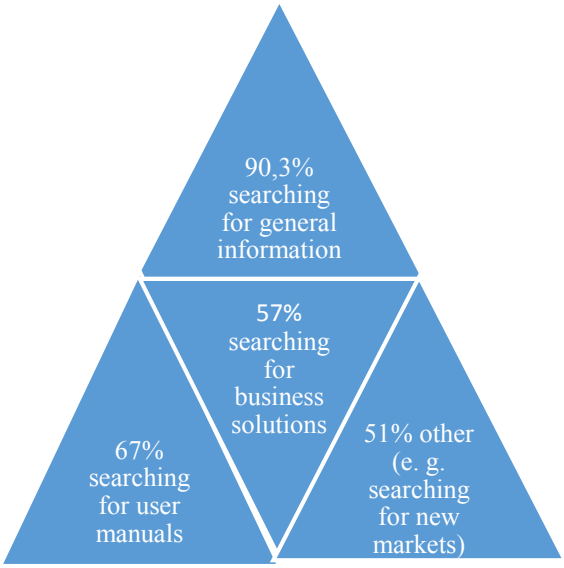

Figure 2. The goals of using artificial intelligence in business.

Source: own study.

According to research, 39% of entrepreneurs agree with the growing role of artificial intelligence in establishing new business relationships (Figure 3).

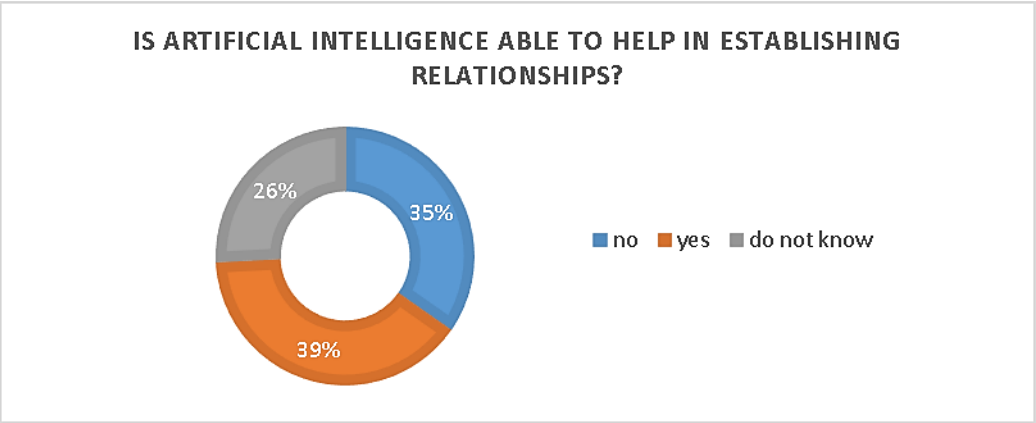

Figure 3. The impact of artificial intelligence on establishing relationships.

Source: own study.

According to respondents, the role of artificial intelligence is not limited solely to searching for new business partners (21% of responses), but AI can also simplify the establishment of relationships by, among other things, assisting in communication, e.g., language translation (71% of responses), preparing proposals for introducing a new model of cooperation between entities (37.1% of responses), or resolving conflict situations (25.8% of responses) (Figure 4).

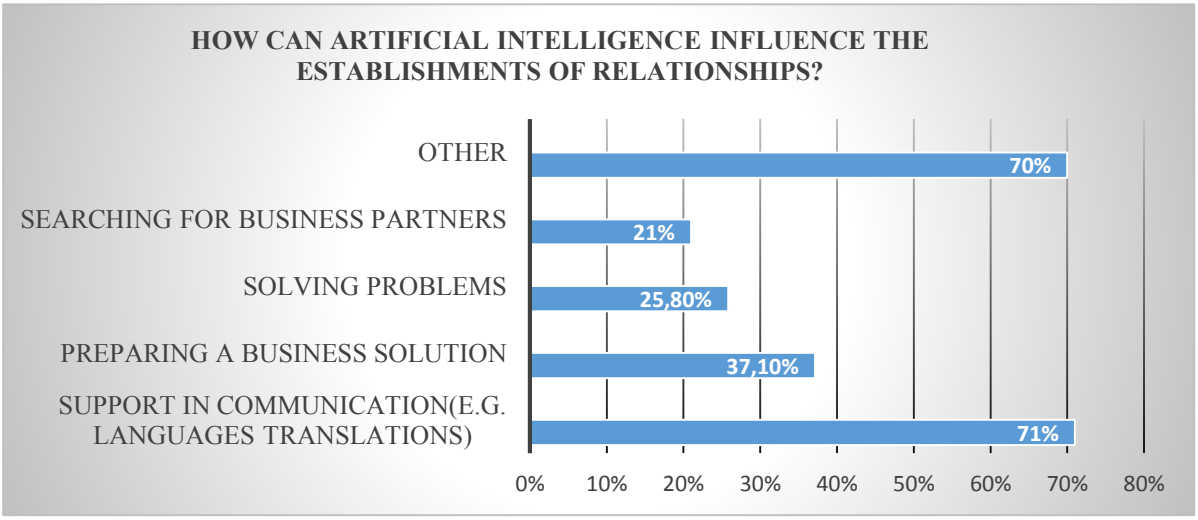

Figure 4. The role of artificial intelligence in establishing relationships.

Source: own study.

The application of artificial intelligence in relational processes and in building social capital is ambivalent, generating both new opportunities and specific risks of a social, organizational, and technological nature. Artificial intelligence does not replace relationships but can act as a relational catalyst. The use of artificial intelligence reduces transaction costs and supports the relational capabilities of entrepreneurs, especially in the smallest entities, where social capital is built by an individual (the business owner) rather than an entire team. There is also a significant, real risk, which is already materializing, that businesses will transfer relational activity from other market participants to artificial intelligence systems, which, thanks to their

availability, will become the preferred source of support in situations requiring rapid decision-making. This is tempting because it allows for time savings and decision optimization, in which entrepreneurs are often left alone. Analysis of the research results allows us to identify the paradoxes accompanying the implementation of artificial intelligence in the processes of building relationships and developing social capital 4.0. First, artificial intelligence, which was intended to strengthen the competitiveness of micro and small enterprises, may standardize them by introducing similar patterns of established business relationships. Second, delegating relationships to technology may lead to a long-term loss of empathy, negotiation skills, and relational intuition. Third, the risk of instrumentalizing relationships established schematically to optimize benefits may strip them of norms of reciprocity and obligation (Table 3).

Table 3.
Advantages and disadvantages of building relationships with the support of artificial intelligence

Advantages	Disadvantages
•Helps initiate relationships and reduce barriers to entry (reducing fear and tension before contact with an unknown business partner). •Strengthens relational competencies through negotiation and conflict resolution, particularly important for companies where social capital is closely linked to the owner. •Aids in relationship analysis and relational learning. •Reduces transaction costs and helps build social capital.	•The risk of transferring relationships to technology. •A weakening of affective trust based on personal experience; trust becomes an instrument rather than a value. •A weakening of entrepreneurs' relational competences. •Power asymmetry - entrepreneurs lose control over the selection of business partners. •Homogenization of business relationships; relationships lose authenticity or entrepreneurs' style disappears. •The risk of standardization of patterns for establishing business relationships.

Source: own study.

Artificial intelligence can therefore support the building of social capital among entrepreneurs, but only if it serves as a tool supporting relationships and provides infrastructural support. It cannot be treated as a substitute for relationships between entities. If entrepreneurs limit real relationships and stop investing independently in social networks, this may bring tangible results in the short term, translating into business efficiency (e.g., due to faster decision-making), but in the long term, their ability to collaborate and resilience to crisis situations will weaken. If entrepreneurs fail to independently cultivate relationships with business partners and focus on leveraging technology to optimize decisions, there is a risk of eroding relational capabilities, weakening the quality of relationships, diminishing trust, and deteriorating cooperation between entities. This could ultimately lead to a long-term loss of the ability to build social capital.

5. Summary

Social capital 4.0 is increasingly perceived by economic entities, faced with various constraints in times of increasing market asymmetries, as a resource that, through optimal management, can become an economic resource that allows them to survive crisis situations. It is increasingly rarely treated as solely the result of the intuition of entrepreneurs seeking to expand their relational networks and, through them, reach various markets. The greatest advantage of social capital 4.0 is the hybrid nature of relationships formed both online and offline. Therefore, relationships formed online do not replace its traditional role but rather expand its possibilities. It is worth noting that social capital 4.0, which arises through the initiation of online relationships, increasingly strengthens bridging capital, which is actually more difficult to establish than bonding capital. Online relationships can provide a real and economically significant foundation for building social capital, especially for the smallest businesses (micro and small enterprises), provided they are long-lasting, based on trust, and can be strengthened by digital technologies. Artificial intelligence can support the development of social capital in micro and small enterprises, but only if it serves as a tool supporting the formation of relationships, not as a substitute for them. AI can act as a relational catalyst or contribute to reducing the problem of inclusiveness among the smallest businesses. It helps companies that lack sufficient resources to expand their relational networks and thus reach distant markets by filtering databases of potential business partners, thereby reducing the transaction costs of establishing such relationships.

In summary, the obtained research results confirm the growing importance of social capital 4.0 in micro and small enterprises. Based on these results, it seems reasonable to conclude that social capital 4.0, combined with the use of artificial intelligence, allows this resource to be considered a significant adaptive mechanism for the smallest market entities in conditions of increasing political, technological, and market asymmetries. Based on the above premises, the thesis presented in the introduction has been proven and the aim of the article can be considered achieved.

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