

A successful path of growth and development amid changing competitive conditions is built on intellectual capital

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ABSTRACT: The hectic and increasingly unpredictable changes of our time are forcing both nations and companies to rethink their development paths. This is compounded by resource depletion and the need to increase the efficiency of their use. Quantitative growth targets are also being superseded by the need to shift toward a systems-based approach to development, as well as by the new opportunities this shift offers.

The importance of intellectual content, organizational, and leadership capabilities—already recognized and referred to by various names—comes to the fore in improving competitiveness, successfully adapting to change, and generally ensuring preparedness for the future.

The article outlines the main professional arguments regarding the role of intellectual assets in competitiveness. Then, based on the data, it demonstrates that investments in intellectual assets contribute to improved socio-economic performance and competitiveness at both the national and corporate levels. The article clarifies concepts related to intellectual content and also addresses measurement issues.

KEYWORDS: Intellectual investment, intellectual assets, development path, future readiness, competitiveness

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Introduction

Amid rapid changes, growing uncertainty, and intensifying market competition, both nations and companies realize that there is no turning back; the conditions for past success are no longer applicable; change is necessary, and new paths of development must be sought along which one can prepare for changes more securely, avoid their harmful effects more easily, and better capitalize on the opportunities presented.

We need development paths that place strong emphasis on constant renewal, continuous learning, innovation, and the protection and efficient, future-oriented utilization of environmental and human resources. In other words, knowledge and creativity take center stage. One of the central themes of the Davos Conference² held in January 2025 was the “brain economy,” which examined people’s knowledge, creativity, and analytical and social skills as the most important assets, concluding that these are now more important for both countries and companies than physical assets, machinery, equipment, and buildings. Another frequently used term was the “age of intelligence,” in which rapid innovation drives productivity gains, thereby contributing to overall development.

A development model based on intellectual values is more successful because it creates advantages that others cannot easily replicate or purchase on the market. For example, if a country follows a development path centered on attracting foreign capital through the highest possible non-repayable subsidies, other countries can easily follow suit by increasing their state subsidies. The same applies to various tax incentives; other countries can offer those as well. For a company, acquiring state-of-the-art machinery and technology is only a temporary advantage, as it is merely a matter of money for other companies to obtain the same technology. Similarly, competing on price does not provide a long-term advantage, because competitors can also lower their prices. The literature refers to these strategies as a “race to the bottom.” However, when significant innovations, new solutions, new organizational systems, and new knowledge assets are created, they are not easy to copy, nor can they be purchased. However, what do we mean by knowledge assets, and what kinds of intellectual property fall into this category? English-language literature uses the term “intangible” to refer to investments and the assets they generate that cannot be physically grasped. In the case of investments, these include, for example, research and development, software procurement, continuing education, and organizational and institutional development. The assets created, in turn, include, for example, patents, trademarks, brand names, and royalties, as well as the established organizational culture, good relationships with customers and suppliers, state-of-the-art IT and management systems, and the company’s market image.

2 The 55th World Economic Forum conference, held January 20–24, 2025, in Davos, Switzerland.

The key point, therefore, is that these assets generally have no direct “tangible” form. Intellectual content can also be interpreted at the national level. This includes, for example, the knowledge assets created through educational expenditures, or the social capital shaped by national values and cooperative systems—which also describes the level of trust—and which has a significant impact on competitiveness, just as, for example, the “image” or reputation of the country, that is, its renown. At the national level, reputation is often described as “soft power.”

Numerous studies demonstrate that it is precisely the elements falling under this broader definition that most significantly enhance opportunities to improve competitiveness, as these are “assets” that cannot be purchased on the market or easily replicated and thus represent a distinctive competitive advantage. Indeed, they cannot even be sold.

One study highlights the importance of these assets in that they have a significant impact on productivity, competitiveness, and, consequently, future growth. It also points out that investments in these areas are risky, as the resulting assets are often not marketable, meaning the invested value cannot be recouped. Basic research is one such example. Investments often require physical capital, equipment, instruments, machinery, and training so that costs can multiply. Physical investments, however, can be sold if necessary. On the other hand, value-adding and spillover effects may also occur; for example, the knowledge and experience gained may be applicable in other areas. (EC 2017)

Daum (2003) points out that at the national economic level, intellectual capital—or, as the author puts it, conceptual value creation—plays an increasingly significant role in GDP generation, alongside physical and financial resources. At both the national and corporate levels, creativity, innovation, knowledge, and continuous learning create significant added value. However, at both levels, “perception” and reputation—that is, what partners think of the country or the company—are important. We could also put it this way: it matters less and less what “you have, what you own.” What is far more important is “what you know,” what unique abilities you possess. This is true, by the way, for both a country and a company. That is why expanding intellectual capital is important, and this requires investment. There is a close connection between intangible, intellectual investments, the value (wealth) they generate, and innovative capabilities. After all, innovation requires creative people (human capital), a supportive environment (organizational capital), and collaborative partners (social capital). Within a company, an important management task is to create an environment that meets these conditions. What does this require?

- ▶ recruiting and retaining the right people
- ▶ ensuring their continuous development
- ▶ providing the necessary resources
- ▶ operating a management model in which the leader is not the “all-knowing boss” but acts as a conductor: setting the pace, ensuring harmony, and creating the conditions for cooperation.

However, this system cannot function within a traditional organizational structure. What is needed is a more flexible organizational system consisting of a multitude of horizontal relationships—one that is open to the outside world and to partners.

There is no truly good Hungarian translation for the word “intangible.” There is, however, some confusion, as some people equate the “intangible”—that which cannot be grasped—with the Hungarian term “immateriális javak” (intangible assets), which is a mistake. “Immateriális javak” is a concept known from Hungarian accounting practice. These are non-physical assets that directly serve the operation of the business and are marketable, such as “know-how,” trademarks, software, and patents. RSM Hungary Tax Advisory and Financial Services Ltd., for example, defines intangible assets as follows: “Intangible assets include those assets that do not have a physical form but represent conceptual and market value, which directly serve business activities for a period longer than one year during their expected useful life. The term “intangible” means non-material and independent of physical substance; thus, within the scope of fixed assets, intangible assets are non-physical assets that are nevertheless marketable, i.e., they represent economic value.” (RSM, 2025).

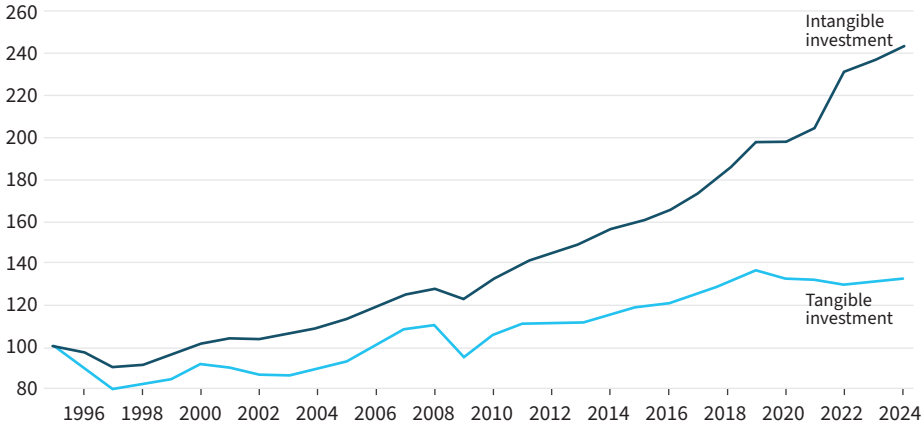
“Intangible” is thus a corporate accounting term, while “intangible” is a general economic term that encompasses many values that go beyond the “intangible assets” measured in accounting. However, intangible assets are included among “intangible” values. At the corporate level, most intangible assets do not yield a return within a year; therefore, they can be recorded as assets, appear on the balance sheet under fixed assets, and, in some cases, be depreciated. In the remainder of this article, we will generally use the terms “intellectual investments,” knowledge investments, knowledge assets, and knowledge wealth, depending on the context. In some cases, when referring to a specific article, the terms knowledge capital and intellectual capital may also be used. We will analyze this topic from two perspectives: investments and results (or impacts).

Some recent data

According to a study, since 2008, the value of intellectual capital investments in the global economy has grown much faster than that of physical investments, despite increasing economic uncertainty. However, more than 60 percent of intellectual investments do not appear in official statistics (WIPO-Luiss Business School, 2025).

Figure 1 shows trends in intellectual and physical investments from 1996 to 2024 across 26 selected countries.

Figure 1: Trends in intellectual and physical investments in 26 countries (1996–2024; 1995=100)

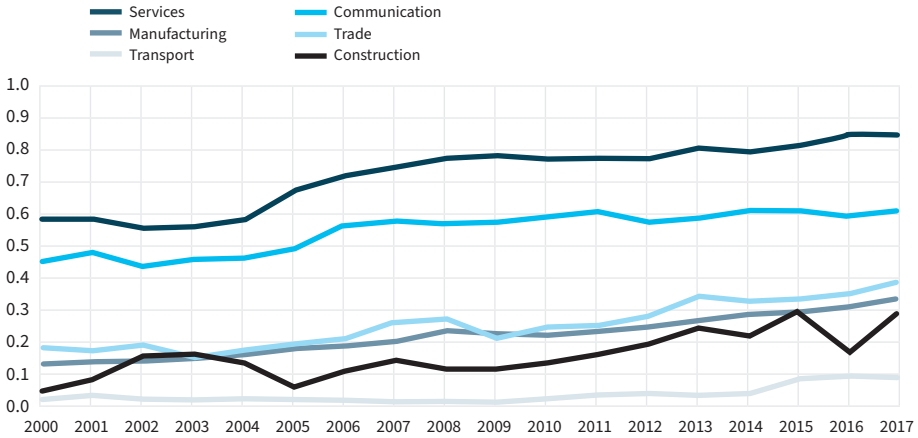


Note: The figure shows aggregate data for Brazil, India, the United Kingdom, the United States, and 22 EU countries measured at 2020 purchasing power parity.

Source: WIPO-Luiss Business School (2025)

The figure shows that by 2024, the share of intellectual investments in the countries examined had more than doubled, while that of physical investments had increased by only 32 percent. The growth in the value of intellectual capital investments accelerated around 2008. Between 2008 and 2024, the annual average growth rate was 4.1 percent, while for physical investments it was only 1.1 percent. The growth rate accelerated particularly from 2023 to 2024 in countries such as France, the United Kingdom, Spain, and Denmark. Another key finding of the study is the trend in intellectual investment as a percentage of GDP in 2024. According to this, Sweden leads the countries examined with 16, followed by the U.S. in second place, France in third, and Finland in fourth. The figure for Hungary is around 9 percent. Among intellectual investments, it is unsurprising that investments related to software, databases, and data centers have been growing the fastest in recent years, primarily due to the spread of artificial intelligence. An analysis of Eurozone companies indicates that investments in intellectual assets increase productivity. This is particularly evident when broken down by sector. Figure 2 shows the share of intellectual investments in total investments across six sectors in Eurozone countries. It should be noted that these data include only investment values that appear on the balance sheet. The authors refer to the share of intellectual investments within total investment value as “intellectual investment intensity.”

Figure 2: Intellectual investment intensity in the Eurozone (2000–2017)



Source: ECB, 2018

Figure 2 shows that the share of intellectual investments is highest in the service sector, with the communications sector performing particularly well within this group. The manufacturing sector, which is showing slow improvement, ranks fourth. The lowest value is found in the transportation sector.

Based on their studies of U.S. companies, McAfee and Brynjolfsson (2012) found that the successful adoption of new machines and technologies required additional investments – primarily in changing business models and organizational systems, as well as in employee training. According to Brynjolfsson et al. (2017), artificial intelligence (AI), the new technology of the future, will only contribute to a significant increase in productivity if it is accompanied by investments in intellectual capital, such as knowledge and skill enhancement, as well as organizational development. Goodridge et al. (2016) and Corrado et al. (2017) note that the size of intellectual capital influences the potential to increase productivity. Roth–Tsakanikas (2021), in an analysis of a sample comprising 10 European countries, found that approximately 40 percent of productivity growth is attributable to investments in knowledge. Elnasri and Fox (2017) caution that investments in intellectual capital also have spillover effects, but these are difficult to measure using standard accounting methods. Coyle (2025) also highlights these measurement challenges. According to him, approximately 80 percent of real economic activities today cannot be valued using traditional methods. This is because companies find opportunities for value creation not in manufacturing, but in the operation of networks and platforms – in so-called intangible activities made possible by digitalization. “Intellectual value chains” – data centers and customer service networks – are on the rise, moving massive amounts of data around the world, and it is currently impossible to precisely measure where and how much real value is being created. In general, the value creation of digital

service providers is difficult to track. This is also true of the performance of companies providing cloud-based services.

The rapidly changing environment, growing competition, and the difficulties companies and countries face in adapting have drawn attention to the importance of intellectual investments and assets. However, many have been researching this topic for a very long time, searching for the key to true success and effectiveness: why does one country or company perform better than another?

Let us now examine the conclusions of the most interesting previous publications.

Where we started: a look back at the literature

An important precursor to the “intangible” – that elusive concept and term – was the definition of “tacit” knowledge featured in the 1995 book by Nonaka and Takeuchi, which referred to the knowledge inherent in a person without them being aware of it, caring about it, or consciously wanting to pass it on to others. This type of knowledge was primarily interpreted in the context of companies and referred to experiences and insights accumulated over time, as well as forms of collaboration that were not recorded in corporate databases or reports, nor accounted for as assets in financial statements. It referred to a set of knowledge and skills that had “become ingrained in the fabric of the company.” (Nonaka-Takeuchi, 1995)

Competitive advantage – whether at the macroeconomic or corporate level – is influenced by both external and internal factors. In the case of companies, we typically refer to Porter’s “Five Forces” model, which posits that a company’s competitiveness is determined by the combined impact of competitors, customers, suppliers, new entrants, and substitute products. (Porter, 1979). In contrast, proponents of the resource-based view argue that competitive advantage stems from internal capabilities and unique knowledge, especially when competitors lack them. Rumelt (1984), for example, writes about the importance of unique, special resources. Teece (2009) also raises the importance of constantly updating and revitalizing resources. One of the most important observations regarding the ability of internal resources to create a competitive advantage was made by Barney, who argued that a company’s resources constitute a sustainable competitive advantage only if they are valuable, rare, and difficult to imitate. He considered the company’s value system and organizational culture to be such resources. (Barney, 1991). Among internal resources, authors generally distinguish three main groups: physical, human, and organizational resources. Organizational culture is one of the most important resources, representing high value, being unique (rare), difficult to imitate, and impossible to purchase.

Physical resources can generally be purchased, and human resources can be partially acquired by hiring new employees. At the same time, trained,

committed employees who have been with the company for a long time can also be classified as unique (rare) resources.

Theories emphasizing the importance of intangible resources can also be classified among resource-based theories of competitiveness. In this context, Roos (2006) also asks to what extent these can be considered an advantage, and to what degree they are unique and cannot be copied. After all, if they provide a competitive advantage only for a short time and others can quickly copy them, then they do not constitute a sustainable competitive advantage. In this context, one might ask whether the early adoption of artificial intelligence could provide companies with a lasting competitive advantage. We will return to this question later. According to Roos, intangible, knowledge- and skill-based resources are easy to distinguish from tangible resources. Any resource that can be physically perceived, either directly or indirectly, or touched, and has a physical form, falls into the category of tangible resources. Those that do not appear in physical form and cannot be touched are intangible resources. Roos illustrated these differences in Table 1 (2006).

Table 1: Holistic classification of resources

	Traditional (economic)		Intellectual (knowledge, skills)		
	Assets				
	Financial	Physical	Human	Organizational	Relational
Tangible	Cash Investments, Loans, Liabilities, Awarded grants	Assets: Factory buildings, Machinery, Equipment, Inventories	Documented knowledge, Know-how	Systems, Processes, Patents, Trademarks	Contracts (customers, suppliers)
Intangible	Credit rating, Borrowing capacity (the company's financial standing)	Quality of the company as a whole and its equipment, Assessment of the modernity of the inventory	Quality, experience, and problem-solving ability of senior management, Undocumented corporate knowledge, Employee loyalty, Employee skills	Informal processes, Productivity, Organizational culture, Business ethics	Customer commitment, Collaborations, Reputation, Acceptance

Source: Compiled by the author based on Roos (2006)

Two influential books on intellectual capital were published in 1997. Using practical corporate examples, Edvinsson and Malone identified two types of capital as factors determining a company's market value: financial capital and intellectual capital. They further divided the latter into two categories: human capital and structural capital. They further subdivided structural capital into

customer and organizational capital, and the latter into innovation and process capital. In the book, they used the example of Skandia to demonstrate that a company's market value is determined by the quantity and quality of its intellectual capital. (Edvinsson-Malone, 1997). Stewart discusses the growing significance of knowledge, emphasizing human capital, organizational capital, corporate networks, and information. (Stewart, 1997). Thus, Stewart already highlights social capital and collaboration as competitive advantages. Many authors mention the importance of organizational and management systems. Cunningham, for example, warns that management must always be evaluated within its broader social context. This means that the quality and effectiveness of management are interrelated with the prevailing systems and organizational cultures; in other words, these systems shape one another. (Cunningham, 2010). The importance of these relationships can also be linked to open innovation. The essence of open innovation is that innovation is not necessarily an internal company activity. It can be far more successful if, for example, the company collaborates with its suppliers and customers to develop new solutions. However, trust is a crucial element in this process, and trust itself can be regarded as an intangible asset (or capital). The most renowned researcher in open innovation is Chesbrough, an American. (Chesbrough, 2006; Chesbrough-Vanhaverbeke-West, 2006).

The concept of “intangible capital” – knowledge capital and intellectual capital – has increasingly come into focus since the late 1990s and early 2000s. In the UK, Haskel and Westlake have written two highly influential books on the “intangible economy” (Haskel-Westlake, 2018, 2022). In their first book, they demonstrate that value creation and competitiveness in our time are no longer merely a matter of money (capital)–indeed, they are not primarily a matter of money. The most important factor is how much a country or company allocates to local knowledge creation (not knowledge import!), and how effectively it converts these expenditures into knowledge assets. However, they argue that there are no well-established and generally accepted methods for measuring this efficiency. The title of their second book, published in 2022, is *Restarting the Future: How to Fix the Intangible Economy*.

The book was published in Hungarian under the title “Restarting the Future: How to Give Momentum to the Intangible Economy”⁽³⁾, highlighting the domestic “confusion” in interpreting the strictly corporate category (intangible assets) and the economic category of intellectual and knowledge assets. Incidentally, the original English book is about the latter. In the book, the authors point out that knowledge creation has raced ahead in our time, while the institutional system – including government economic policies – has fallen behind. For a country to successfully transition to knowledge-based development, well-chosen and effective investments in knowledge are essential, as are the “good

3 MCC Press. E-book

governance” that enables them, an efficiently functioning system of public institutions, and a shift from a quantitative to a qualitative approach.

The literature review shows that the examination of competitiveness factors – which are difficult to quantify but all the more important – has a long history. With increasing environmental uncertainty and unpredictability, attention is increasingly focused on creating unique, hard-to-copy values – whether at the country or company level – that provide a competitive advantage. However, measuring these remains a challenge. Csath (2023) warns that the theory of intellectual capital investments and assets remains underdeveloped, and professional debates continue over measurement methods. Practical research, however, demonstrates that locally generated and continuously expanding knowledge is becoming increasingly significant in our time. Therefore, the importance of investing in it is also growing. Of course, as with any other investment, efficiency and return on investment are key criteria for intellectual capital investments as well; however, measuring these is even more difficult when dealing with long time horizons, widespread effects, and synergy benefits.

Intellectual Assets and Productivity

According to an analysis comparing the development models of South Korea and Brazil (Neves et al., 2020), both countries had nearly identical per capita GDP figures in the 1970s. The development models of the two countries also started the same way, relying on as much foreign direct investment as possible to increase GDP per capita. However, after a shorter learning period, South Korea shifted course and, relying on a deliberate development strategy, began to build its own strong companies and their collaborative networks (chaebols). It supported this with significant investments in development and education, which enhanced local knowledge-creation capabilities. Today, South Korea spends 4.5–5 percent of its GDP on research and development, and its GDP per capita is around \$36,000–\$37,000. In contrast, Brazil continued an economic policy based on attracting foreign capital, through which it continued to import knowledge rather than create it locally. It did not increase its R&D expenditure as a percentage of GDP, which currently stands at around 1.2 percent. In Brazil, GDP per capita is around \$10,000, which is less than 30% of South Korea’s figure. Based on the latest data, South Korea’s domestically generated exports are approximately three times those of Brazil.

Canuto (2020) points out that South Korea’s rapid development occurred because, in addition to modern technology, significant investments in knowledge served as a foundation for increasing local value-added capabilities. This was supported by environmental changes that encouraged innovation, such as reduced government bureaucracy. The results were reflected in a significant improvement in total factor productivity. By significantly altering its development path, South Korea avoided the risk of falling into a development trap – Canuto emphasizes.

An OECD study reached a similar conclusion. It demonstrated that investments in intellectual capital lead to long-term productivity growth (OECD, 2019). Productivity indicators measure the efficiency with which various factors of production are used. Productivity can be measured at the macroeconomic, sectoral, and firm levels alike. The smarter and more skillfully a given system uses its resources, the easier it is to improve its competitiveness. This also serves as a reminder that it is not enough to invest resources simply; they must be utilized effectively. Therefore, it is not sufficient, for example, to evaluate the size of expenditures relative to GDP on its own. What is truly important is the goals the organization aims to achieve—the proper selection of these goals is often referred to as effectiveness—and how frugally resources are utilized. The latter is measured by productivity (efficiency). It is therefore unprofessional to boast about how much money the government is allocating to a given issue—such as school renovations, road construction, or the purchase of hospital equipment. Instead, one should take pride in how well a given goal can be achieved through resource management, that is, at the lowest possible cost.

Let us briefly return to total factor productivity. This productivity indicator examines not only the value created per unit of labor input (person-hours), but also how the level of technology and knowledge, organizational structure, and the quality of management influence this value creation. It follows that intellectual investments, as well as the intellectual assets they create, have a significant impact on total factor productivity. The Hungarian Central Statistical Office (KSH) defines it as follows: total factor productivity (TFP)⁴ is the residual component of economic growth that quantitative increases in the labor force or capital stock cannot directly explain. Its growth points to technological progress, a more skilled workforce, innovation, and better organization. The MNB Productivity Report (MNB 2024) analyzes Hungarian productivity data in detail from many perspectives, but does not provide complete total factor productivity data. It notes, however, that intellectual capital investments—which it refers to as “smart capital”—accounted for only 3.6 percent of Hungary’s GDP between 2013 and 2019, while the EU average was 4.7 percent. The study then concludes that there is still “growth potential” in increasing the share of smart investments within total investment. During the period in question, this share was highest in Denmark and Sweden (6.5–7 percent), but the Czech figure was also better, at around 5 percent.⁵ Measuring total factor productivity is not easy. There is still no generally accepted methodology for accounting for qualitative factors (e.g., organizational efficiency) to determine actual productivity outcomes. Accurate measurement is further complicated by the fact that services—particularly digital services—can appear at any point in the production process, and their impact can be not only direct but also indirect and far-reaching.

4 <https://www.google.com/search?client=firefox-b-e&q=ksh+total+factor+productivity>

5 MNB 2024, page 54, Figure 3-15.

It is, however, clear that intellectual investments and the intellectual assets they generate have a significant impact on value creation – and thus on productivity – which can lead not only to growth but also to improved competitiveness.

Finally, it must be noted that the most important prerequisite for the successful application of digitalization and artificial intelligence is precisely the existence of intellectual assets: software, knowledge, and appropriate organizational systems and culture. These elements have a significant, though currently unmeasurable, impact on productivity. Smith, for example, points out that AI is a new technology – or, if you will, “hardware.” Its successful application can only be expected if it is supported by intangible resources, knowledge, and suitable organizational structures and systems, including management systems. It is therefore important for companies to conduct ROI analyses that measure the effectiveness of AI implementation by comparing all necessary expenditures with the expected new value created. (Smith 2025).

Measurement challenges

We have already mentioned on several occasions that the effects of intellectual investments and existing intellectual assets on productivity, competitiveness, and growth are difficult to measure. However, there is a great need for such measurement, as it would help companies make informed investment decisions. In the case of companies, the situation can be interpreted as follows: companies have resources they own and those they do not, and they generate new value by effectively utilizing all resources. Companies own the majority of tangible and intangible assets. However, this is not clear-cut when it comes to intangible resources. Physical and financial resources appear on the balance sheet, but most intangible resources do not. The most important intangible resource is human capital; however, its skills, knowledge, and intellectual assets are not the company’s property. The company pays for its “use” by providing wages and other benefits. At the same time, the company’s success and competitiveness depend primarily on this resource and its effective utilization. Organizational capital represents another important group of intangible resources. This includes the company’s organizational and management systems and processes, the aggregate of external perceptions of the company, and the company’s internal organizational culture. Other important elements are the company’s owned intellectual assets (brands, patents, copyrights, design protection, etc.). However, as mentioned earlier, these assets appear only to a small extent on the balance sheet, even though they also significantly help the company differentiate itself from its competitors—that is, gain a distinctive competitive advantage. It is important to emphasize that while physical capital – such as machinery and technology – is easy to acquire and can be purchased on the market, an excellent organizational culture and well-functioning management systems – such as those at – cannot be bought. Although these can be developed with the help of

professional consultants, their development usually takes longer, so results can only be expected in the long term, making them difficult to measure. Finally, social capital, insofar as it has a physical form, may be owned by the company and appear on the balance sheet. Still, the majority of it is also not the company's own property. At the same time, it also significantly impacts companies' success. Another important characteristic is that, like organizational capital, its development requires significant time and purposeful effort, yet it can be easily destroyed. An important element of relational capital is the network of relationships established with customers and suppliers, as well as with the media, which the company may operate itself. (Company newsletters, newspapers, etc.) The company may also own the latter. It is clear from the above that management itself and management systems are significant intangible but value-creating assets. Therefore, it would be important to measure their operational efficiency – that is, their return on investment. We could also put it this way: is it efficient to ask what the leaders of a given organization—be it a company or a country – cost? We could also ask whether they are worth the money they cost. The authors of an interesting analysis warn that it is difficult to measure or compare the short- and long-term effects of leaders' decisions. Short-term damage control may seem useful, but if it comes at the expense of ignoring the longer-term perspective, it can cause significant harm later. However, these effects are not easy to measure. Assessing the value of, for example, leaders avoiding potential crises and thereby preserving the company's or the country's assets presents a similar challenge. On the other hand, it would also be important to measure the changes they bring about, the new solutions they introduce, and the useful connections they create for the organization they lead, since the results – or failures—are not immediately apparent. The authors suggest that, despite the difficulties, it is worthwhile to measure leaders' performance, as they have a significant impact on the functioning and success of organizations. It is advisable to use a return on investment (ROI) metric, with the numerator representing the total benefit managers bring to the organization and the denominator their total cost. Time-related discrepancies can be adjusted through discounting in the calculations. To quantify known and estimated future results, the authors recommend using expert estimates. The idea may seem surprising, but its validity is undeniable. However, a truly effective method has yet to be developed. (Seymann-Kleinhanzi, 2009). A recent MIT article warns that an increasingly important leadership skill is the ability to gain employee acceptance of the benefits of AI implementation and to elevate employees' digital competencies. An important tool for this is making a culture of learning the norm. (Hill et al., 2026).

So far, we have noted that measuring intellectual assets is very important. Still, at the corporate level, only a small portion of these so-called intangible assets is included in the accounting system. We could also say that currently, accounting measures what is easy to measure, rather than what is important to measure. This is because traditional accounting is based on financial transactions. Therefore, there is a need to apply alternative accounting methods,

but a professional consensus on such methods has not yet been reached. (Adams - Oleksak, 2010). At the same time, in the case of businesses, the market and the stock exchange are paying increasing attention to what kind of intangible—and at the same time difficult-to-replicate—assets—primarily knowledge and intellectual capabilities—a business can accumulate. Knowledge of this value is also essential in the event of a company sale. Errors in measuring a company's intellectual assets can lead to its value being underestimated. Low levels of investment in intellectual assets, in turn, hinder a company's development, impair its competitiveness, and thereby reduce its chances of market growth. Even at the national level, there are only preliminary attempts to measure intellectual assets. On the expenditure side, research and development, education, and training costs are typically compared with one another; on the asset side, intellectual property, functioning innovation systems, and human capital (knowledge, skills, health) are typically compared with one another.

Early measurement attempts: the Tobin approach

James Tobin received the Nobel Prize in Economics in 1981 for his analysis of financial markets. He is known for the “Tobin tax,” which was designed to curb short-term financial speculation. From the perspective of our topic, however, his ideas on measuring intellectual assets are of particular interest. According to the “Q ratio” theory, investment decisions are greatly influenced by a company's intellectual assets, which can be measured by subtracting the current market value of all available measurable assets from the company's market value. If the difference (Q) is greater than one ($Q > 1$), then the company possesses values not measured in accounting—its intellectual assets. (Tobin, 1969). The idea is related to Fama's market efficiency theories. It is based on the premise that, in the long run, a company's equilibrium market value must equal the replacement cost of its assets, provided that the value of “Q” is close to “1.” However, if $Q > 1$, then there are “hidden” excess values within the firm. In the longer term, the firm's true value is also reflected in the price of its shares. (Fama 1970). The approximation is a good idea, but it does not make measurement any easier. For example, it is not simple to determine the present value that would allow for the full replacement of existing physical assets. It has also been suggested that the value of unmeasurable intellectual assets could be estimated by treating them as if they were separable from the portion of revenues attributable to physical assets. To do this, one would need to start with current return-on-investment data specific to the industry and derived from physical assets; for a company, a potentially higher return-on-investment could then be considered the “return” on intellectual assets. There are many other proposals, but no universally accepted method exists yet. One reason for this is that there is still no agreement on which of the non-measurable factors—those that must be taken into account for competitiveness, productivity, and growth – should be considered most significant. Incidentally, countless

organizations offer such assessments on a market basis. These analyses are often based on interviews and questionnaire surveys. Let us say a few more words about national-level assessments. At the national level as well, intellectual assets and the investments in intellectual capital that enhance them contribute most significantly to improvements in productivity and national competitiveness in our time. In their research, Brynjolfsson and Collis primarily sought to estimate the unmeasurable but important outcomes of digitalization, such as the value of the digital resources created and made freely available. (Brynjolfsson – Collis 2019). Brynjolfsson later, together with several colleagues, set out to measure the digital “well-being” of nations – that is, the value-adding, but traditionally unmeasurable, benefits of digitalization – at the national economic level. (Brynjolfsson et al 2023).

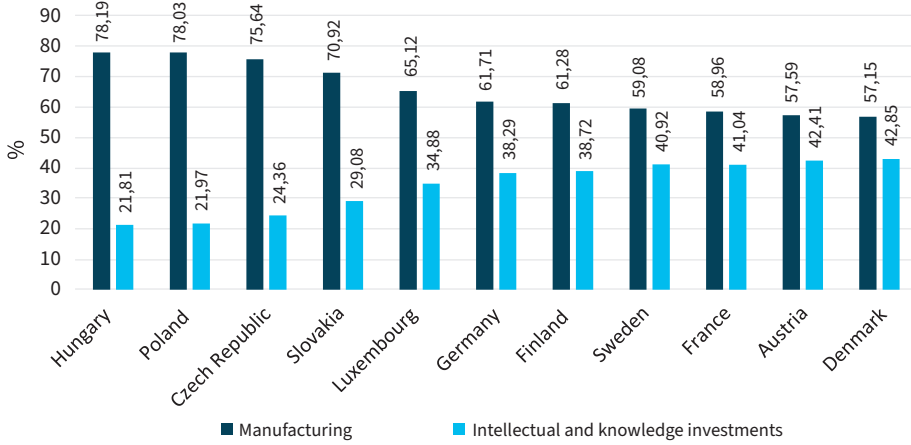
In summary, although there is still no universally accepted methodology at the national or corporate level for measuring intellectual assets or for describing how intellectual investments increase competitiveness and productivity by creating intellectual assets, this is no reason to abandon measurement entirely. The following example is a very simple approximation of the relationship that might exist, for instance, in Hungary between corporate intellectual capital investments and the country’s position in terms of national competitiveness.

Intellectual Capital Investment and Competitiveness: Some Correlations

According to a study by the European Investment Bank (EIB, 2020/2021), in Hungary in 2021, as shown in Figure 3, only 21.81 percent of total corporate investments were in intellectual capital.⁶ In Austria, for example, this figure is 42.41 percent. The authors classified investments in machinery, equipment, and infrastructure as physical investments. They defined knowledge investments as expenditures on research and development, software, data, and web-related operations, as well as on employee training and organizational and management innovations.

⁶ The database of results is based on a corporate questionnaire survey.

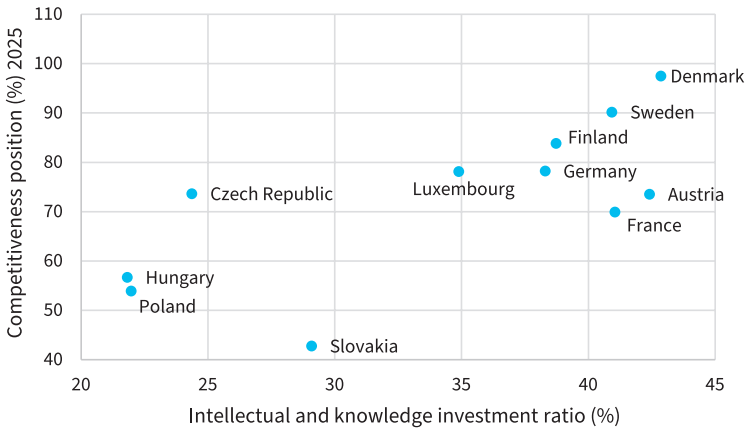
Figure 3: Breakdown of investments (% , 2021)



Source: EIB (2020/2021)

Figure 3 clearly shows that, within the investment activities of more developed, competitive countries, investments related to knowledge and local value creation account for a much larger share than in the V4 countries. Let us examine whether there is a discernible correlation between intellectual, knowledge-based investments and competitiveness.

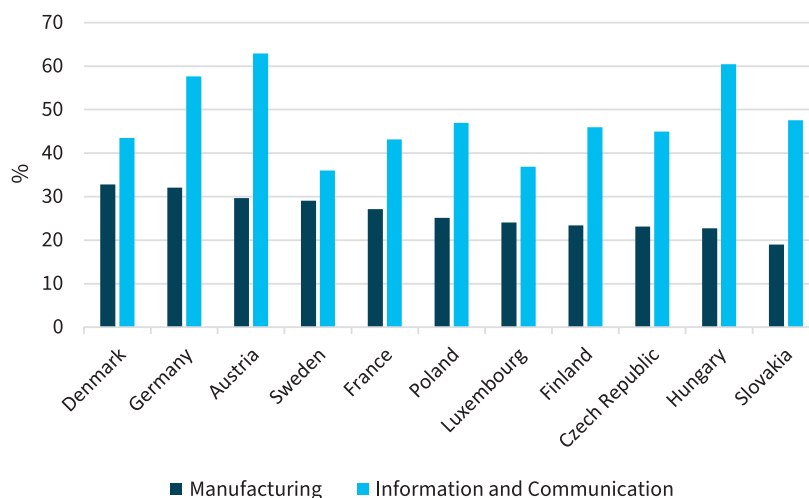
Figure 4: The relationship between competitiveness and the ratio of intellectual/knowledge-based investment



Source: IMD 2025, EIB (2020/2021)

Regarding Figure 4, it should be noted that the IMD analyzes competitiveness using a total of 262 criteria, including not only measurable factors but also non-measurable characteristics. Among the latter are many indicators related to intellectual investment and wealth, whose values are determined through a questionnaire survey. The best score is 100. It should also be noted that the investment data is from 2021, while the competitiveness data is from 2025. This time lag reflects the fact that investment results are generally not expected in the year of the investment. Of course, when results can be expected depends on several factors, such as the type of investment. Figure 4 shows a clear correlation between intellectual and knowledge investments and competitiveness. The relationship appears particularly clear in the case of the Scandinavian countries. Intellectual and knowledge investments create value locally, that is, they increase the share of newly created value produced locally within total output. This data is available in Eurostat by sector and for the period 2021–2023. Figure 5 shows the share of locally generated value added within total output for the manufacturing sector—which plays the largest role among productive activities—and for the information and communications sector, a typically knowledge-based sector, for the 11 countries featured in the previous figures.

Figure 5: Share of locally generated value added in total output in manufacturing and information and communication (2023)



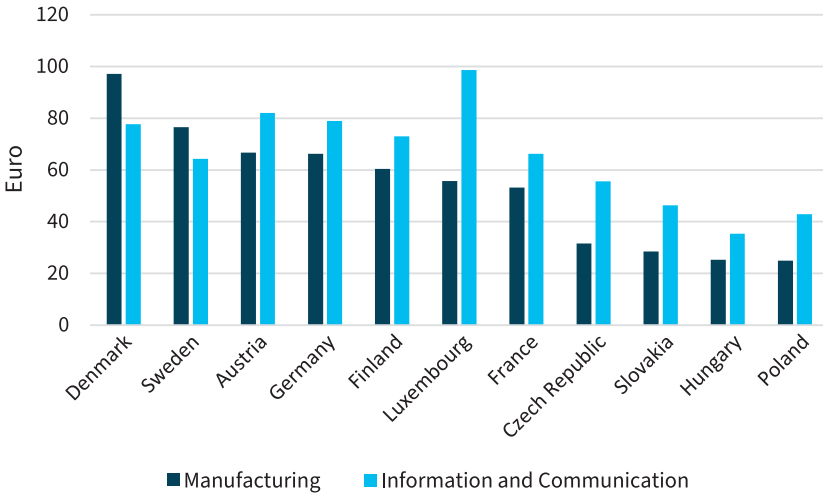
Source: Eurostat, December 8, 2025

Several conclusions can be drawn from Figure 5. On the one hand, we observe a correlation between the investment ratios shown in Figure 3 and the locally created value. On the other hand, in the manufacturing industry, the low figures for Hungary and Slovakia indicate a predominance of assembly activities. The

share of new value added locally in the information and communications sector is high in every country. The Hungarian and Austrian figures are particularly notable. The exact reasons for this could be determined by digging deeper and analyzing the sector’s activities in greater detail. This sector, in fact, encompasses a wide range of areas, from software development and radio and television broadcasting to book publishing. It should be noted, however, that at the national level in Hungary, the manufacturing sector has a more significant impact on the results than the information and communications sector, given that in 2023, the share of manufacturing value added in GDP was 17.1%, while that of the information and communications sector is only 4.5 percent (Eurostat, January 30, 2026). Based on the data examined, we can conclude that intellectual investments generate greater local value added through local knowledge creation, which also improves competitiveness.

Finally, let us examine one more productivity indicator, as the cited literature suggests that intellectual knowledge investments and the wealth they generate also significantly influence productivity levels. In Figure 6, we examine productivity for the previous 11 countries and the two selected sectors. The indicator used is the value added per hour worked by employees, measured by Eurostat in euros. The most recent available data is from 2023.

Figure 6: Value added per hour worked by employees (Euro, 2023)



Source: Eurostat 12/08/2025

We can draw two important conclusions from Figure 6. First, productivity figures are significantly higher in developed economies in both sectors. Second, the correlation between knowledge investments—which we examined earlier—and productivity is also evident in both sectors across individual countries.

Regarding the data analysis, it should be noted that the strength of these correlations will need to be further explored in future research. The results of these studies would also be reinforced by comprehensive modeling conducted over a longer time horizon and involving more countries.

Summary and Conclusions

This article aimed to highlight the growing importance of so-called intangible investments and assets in today's rapidly changing, increasingly uncertain environment. Drawing on international analyses and calculations, it argued for the close link between intangible investments and assets, on the one hand, and productivity, competitiveness, and economic growth, on the other. He pointed out that in Hungary, there is still a problem with the general awareness of the topic, and even its interpretation, as the broader subject under examination is conflated with the accounting term "intangible." Since there is no suitable Hungarian equivalent for the word "intangible" (⁷), the article generally used the terms "intellectual capital," "intellectual assets," and, in some cases, "knowledge capital" and "knowledge assets." The article noted that the concept can be interpreted at both the macroeconomic and corporate levels. At the national level, however, such analyses are even less common than at the corporate level, and such considerations are absent from concrete economic policy decision-making. At the same time, statistical data show that Hungary is in a poor position in terms of both intellectual investments and the intellectual assets they generate, as evidenced by low local value added and weak productivity. At the corporate level, intellectual assets – particularly those acquired through purchase – are recorded in the accounting system, but local knowledge creation – such as employee training – is treated as an expense even though it increases the company's knowledge assets.

Many important factors (organizational development, reputation building, market networks) are not quantified, even though they can significantly contribute to a company's market value. The article presented the measurement results and highlighted the challenges, emphasizing that it is in companies' best interest to be aware of what other assets they possess beyond their physical assets. For example, according to international data, Facebook's market value was \$320 billion in 2024, of which physical assets accounted for just \$44.2 billion.

Our era is also characterized by resource depletion, which is why it is crucial to achieve the best possible utilization of all factors of production. This is particularly true for the most important factor, human capital, whose characteristics – knowledge, skills, motivation, and health – constitute part

7 Perhaps the term "knowledge capital" used in MNB studies is the best known, but even this does not perfectly capture the essence of the English term "intangible."

of intellectual capital; therefore, it is important that we, on the one hand, utilize it effectively and, on the other hand, continuously develop it and invest in education and healthcare. Aware that, for example, the human factor is an important element of intellectual capital, decision-makers must obviously consider whether to utilize this asset in assembly work or in creative, value-generating work. The article also touched on artificial intelligence. In this context, it is important to emphasize that the digital economy relies heavily on intellectual property, software, and marketing databases. Still, it cannot succeed without appropriate internal systems, effective process management, and a strong organizational culture. Therefore, the quality of institutional and management systems influences the effectiveness of AI applications at least as much as physical resources do.

In this context, we must emphasize that even in the case of these elements – which are difficult or impossible to measure – we should attempt to measure them for the sake of analysis, since an approximate measurement is better than no measurement at all. Examples include leadership quality, leadership values, leadership goals, and leadership methods. Effective leadership, for instance, can create an excellent organizational culture. In contrast, poor leadership can destroy it, and, in doing so, undermine another intangible resource group, human capital, by causing even the most outstanding professionals to leave the company due to problems with the organizational culture. Taking this idea further, in this regard, the “top” leader plays a primary role, but the “ensemble” of leaders, their work style, and the invisible relationships among them also leave their mark on the organizational culture and the image of the company, and can thus have a significant impact on the company’s social reputation and, consequently, its social capital. Overall, we can say that intellectual values and resources have a greater and longer-term impact on the competitiveness of companies – and indeed, of a country – than physical resources.

Investments in intellectual capital represent investments in the future, even if most of them initially appear as costs and – in the short term – may even hurt productivity. Changes will likely be needed in how both national and corporate performance are measured to properly demonstrate the long-term effects of these important investments, as well as the value-creating capacity and productivity-enhancing effects of the resulting assets. This would also be aided by prioritizing the use of total factor productivity indicators in productivity measurement and by standardizing and refining measurement methods. In addition to highlighting the importance of intellectual investments and assets, this article also aims to contribute to the debates, concepts, and ideas surrounding measurement methods. ■

References

1. Adams, M. - Oleksak, M. (2010): *Intangible Capital: Putting knowledge to work in the 21st Century Organization*. Praeger, 2010. May 5, 2010.
2. Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*. 1991. Vol. 17. No. 1.
3. Brynjolfsson, E. - Collis, A. (2019): How should we measure the digital economy? *Harvard Business Review*. November-December 2019.
4. Brynjolfsson, E. - Rock, D. - Syverson, C. (2017): Artificial intelligence and the modern productivity paradox: A clash of expectations and statistics. NBER Working Paper No. 24001.
5. Brynjolfsson, E. et al. (2023). *The Digital Welfare of Nations: new measures of welfare gains and inequality*. National Bureau of Economic Research. Cambridge, MA. Sept. 2023.
6. Canuto, O. (2020). *Brazil, South Korea, and a Tale of Two Countries*. International Intelligence Unit. Center for Macroeconomics & Development. Aug. 17, 2020.
7. Chesbrough, H. (2006). *Open Business Models: How to Thrive in the New Innovation Landscape*. Harvard Business Press, 2006.
8. Chesbrough, H. - Vanhaverbeke, W. - West, J. (2006): *Open Innovation: Researching a New Paradigm*. Oxford University Press, 2006.
9. Corrado, C. - Haskel, J. - Jona-Lasinio, C. (2017): Knowledge Spillovers, ICT and Productivity Growth. *Oxford Bulletin of Economics and Statistics*. 79(4): 592–618.
10. Coyle, D. (2025). *The Measure of Progress: Counting what really matters*. Princeton University Press. 2025.
11. Csath, M. (2023). The Role of Intangible Capital Investment and Intangible Assets in Improving Competitiveness. *Financial and Economic Review*, Vol. 22, Issue 2, June 2023.
12. Csath, M. (2023). *Hitelintézeti Szemle*, Vol. 22, No. 2, June 2023.
13. Cunningham, I. (2010). Leadership development in crisis: Leadership development has not made much difference to organizations. *Development and Learning in Organizations*. Vol. 24, No. 5, 2010. Emerald Group Publishing.
14. Daum, J. (2003). *Intangible Assets and Value Creation*. John Wiley & Sons Ltd, England.
15. EC (2017): *Unlocking Investment in Intangible Assets*. Discussion Paper 047. May 2017. (A. Thum-Thyssen et al.). European Union, 2017.
16. ECB (2018): *Update on economic and monetary developments*. Economic Bulletin Issue 7, 2018. European Central Bank.
17. Edvinsson, L. – Malone, M. (1997): *Intellectual Capital*. Harper Collins Publishers, Inc.
18. EIB (2020/2021): *EIB Investment Report 2020/2021*.
19. Elnasri, A. – Fox, K. J. (2017): The contribution of research and innovation to productivity. *Journal of Productivity Analysis*. 47.

20. Eurostat December 8, 2025: Value added in output value, percentage. Enterprise statistics by size class and NACE Rev. 2 Activity. Online data code: sbs_sc_ovw
21. Eurostat January 30, 2026. Gross Value Added and Income by main industry (NACE Rev. 2). Online data code: nama_10_a10
22. Eurostat, December 8, 2025: Value added per hour worked by employees, in euros. Enterprise statistics by size class and NACE Rev. 2 activity. Online data code: sbs_sc_ovw
23. Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*. 25.
24. Goodridge, P. – Haskel, J. – Wallis, G. (2016): Spillovers from R&D and Other Intangible Investments: Evidence from UK Industries. *Review of Income and Wealth*, 63(s1).
25. Haskel, J. – Westlake, S. (2018): *Capitalism without Capital: The Rise of the Intangible Economy*. Princeton University Press, Princeton & Oxford 2018.
26. Haskel, J. – Westlake, S. (2022): *Restarting the Future: How to fix the Intangible Economy*. Princeton University Press, Princeton & Oxford. 2023.
27. Hill et al. (2026). Why Digital Dexterity is Key to Transformation, MIT Sloan Management Review. February 17, 2026.
28. IMD (2025): *IMD World Competitiveness Yearbook*. Lausanne, Switzerland.
29. McAfee, A. – Brynjolfsson, E. (2012): *Race Against the Machine*. Digital Frontiers Press, Cambridge, MA.
30. MNB (2024): *Productivity Report 2024*. Budapest.
31. Neves, L. P. et al. (2020). *Economic Development and Global Value Chain Insertion: A View from Brazilian and South Korean Lenses*. Korea Foundation. July 2020.
32. Nonaka, I. – Takeuchi, H. (1995): *The Knowledge-Creating Company*. Oxford University Press.
33. OECD (2019): *Productivity growth and finance: the Role of Intangible Assets at Sector Level*. Economic Department. Working Papers No. 1547. 2019.
34. Porter, M. E. (1979). How Competitive Forces Shape Strategy. *Harvard Business Review*. May 1979. (Vol. 57, No. 2).
35. Roos, G. (2006). *Intellectual Capital and Strategy: A Primer for Today's Manager*. Handbook of Business Strategy. Emerald Group Publishing Ltd. UK.
36. Roth, F. – Tsakanikas, A. (2021): *Policies for Enhancing Growth from Intangibles at the Aggregate and Sectoral Levels*. European Policy Brief, GLOBALINTO, November 17. https://globalinto.eu/wp-content/uploads/2021/11/GLOBALINTO-European_Policy_Brief-Macrounderpinnings
37. RSM (2025): *Report on Intangible Assets*. May 12, 2025. RSM Hungary Zrt. (rsm.hu/kisokos/immaterialis-javak#)
38. Rumelt, R. (1984). *Towards a strategic theory of the firm*. In: Lamb, R.: *Competitive Strategic Management*. Prentice Hall. 1984
39. Seymann, M. - Kleinhanzi, B. (2004): *Maximizing return on directors: return*

- on investment in the boardroom. Handbook of Business Strategy. Vol. 5, No. 1. Emerald Group Publishing.
40. Smith, A. (2025). Supply Chain Strategy, AI set to transform manufacturing in 2026. Industry Week, Dec. 16, 2025 (<https://www.industryweek.com>)
 41. Stewart, T. (1997). Intellectual Capital: The New Wealth of Organizations. Nicholas Brealey Publishing, London.
 42. Teece, D. F. (2009). Dynamic Capabilities and Strategic Management. Oxford University Press. 2009.
 43. Tobin, J. A. (1969). A general equilibrium approach to monetary theory—Journal of Money, Credit and Banking.
 44. WIPO-Luiss Business School (2025). World Intangible Investment Highlights 2025. July 2025. Geneva, WIPO.