

Intellectual Capital and its Importance for an Entrepreneurial IT Company in the Period to Come

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Abstract

The main forces today that initiate changes are globalization, the consequences of the health crisis caused by the Covid-19 pandemic, energy crisis, economic crisis, new technologies, increased competition, changes in consumer demands, etc. All these factors force entrepreneurial IT companies to adapt better, to respond faster to business challenges and proactively to shape the activities in which they operate.

Additionally, in the last few decades, there are large differences between the market and accounting values of the companies in general. Many authors believe that this difference is due to the value of the intangible assets of the companies i.e. their intellectual capital. Therefore, it is needed more detailed analysis of the impact of IT company's intellectual capital on its business performance because IT companies that use intellectual capital in their operations and at the same time practice an entrepreneurial way of managing processes (innovation, creativity, taking risks) are in a better position to maintain their current competitiveness as well as to develop a new one.

Hence, this paper aims to analyze the importance of intellectual capital for entrepreneurial IT companies in the period to come especially when the future seems more uncertain and unpredictable than ever before.

Keywords: intellectual capital, entrepreneurship, IT company, knowledge, competitiveness.

Introduction

The change, in general, has been a central theme for centuries. The ancient Greek philosopher Thales of Miletus argued that change is ubiquitous and inevitable and that it is one of the fundamental characteristics of the world. There is no other constant reality, except the reality of change (Latin: "Panta Rei"). Hence, success is achieved by one who changes faster and smarter. Today, knowledge is increasing at a tremendous rate and theoretically, people should perceive and understand things better and faster. But the exact opposite is happening. New knowledge leads to faster economic, social and political changes, and to understand what is happening, people accelerate the accumulation of knowledge, which, in turn, leads to faster and greater changes. This, above all, is mostly due to the digital revolution and the massive application of new information and communication technologies (ICT) in all spheres of social life. Robotics, Artificial Intelligence (AI), Nanotechnology, Biotechnology, Blockchain Technology, Internet of Things, Quantum Computers, 3D printing, 5G, Virtual Reality, Augmented Reality, Big Data etc. are all part of this revolution. In the period to come by 2030, it is expected that more than 500 billion devices (smartphones, drones, autonomous cars, home appliances, sensors, wearables) will be connected on Internet as a result of the concept "Internet of Things (IoT) [1]. As a consequence, people are less and less able to understand the present or to predict the future. For example, in 1023 it was relatively easy to predict how Europe would look like in 1050. Indeed, royal dynasties might change, unknown invaders might invade, and natural disasters might occur, yet it was clear that in 1050 Europe would still be ruled by kings and priests, that society would be agricultural, that most of the inhabitants will be fortified peasants who will suffer greatly from famine, diseases and wars. In contrast, in 2023, it is not known exactly what Europe will look like in 2050. Nobody knows what political systems there will be, how labor markets will be structured, what medicine will be like, or what health, economic, environmental, or energy crises will exist. Therefore, a more detailed analysis of intellectual capital and entrepreneurship is needed as concepts

that would help individuals, companies and societies to deal more easily with the large number of challenges in the coming period.

The relationship between intellectual capital and entrepreneurs

Uber, Airbnb, Oculus VR, WhatsApp, Tesla Motors are some of the startups that have managed to acquire a multi-billion dollar market value in just a few years (although it should be mentioned here that up to 90% of newly established startups fail over the long run) [2]. The speed of wealth acquisition for this new type of company is something without precedent in the business world. These companies rely on fast-growing and functionally sustainable exponential assets such as the large amount of data (Big Data), access to and seeking opinion from the “Community” or fast-growing technologies (Accelerating Technologies). Unlike linear growth, which is the result of adding a constant (arithmetic progression) and which applies to traditional companies, exponential growth is multiplication by a constant (geometric progression) and mostly applies to these exponential companies that operate in the IT sector. For example, imagine that you have to walk along a road with steps of one meter in length. As soon as you take 6 steps, you have progressed six meters (1, 2, 3, 4, 5, 6). After 24 steps you are already 30 meters from where you started. It's easy to predict where an extra 30 steps will take you. This is linear growth. However, let's imagine that, after each step is taken, we can double the length of our step. In this way, after taking 6 steps, we will actually advance 32 meters (1, 2, 4, 8, 16, 32), which is significantly more than the 6 meters we would have covered with an equal step length. Unbelievable, but after step number 30, doubling our step, it will take us further than a billion meters from where we started ($2^{30} = 1073741824$ meters). This is actually the surprising power of accelerated exponential growth. Today, the future is not unfolding linearly, but exponentially, which makes the process of predicting the future of technological trends and business models significantly difficult. Hence, the need for a more detailed analysis of the intellectual capital of IT companies is imposed. But what is intellectual capital? The intellectual capital of an IT company represents its intangible assets as an important part of its total assets. This capital has a specific power creatively to turn the various types of knowledge, abilities, experiences, skills, technologies, etc. within an IT company into products that have real value. The essence of intellectual capital can be presented by its contribution to value creation and knowledge-based competitive advantage for an IT company. Mathematically, the simplest way to calculate a company’s intellectual capital value is:

$$Company's\ intellectual\ capital\ value = Company's\ market\ value - Company's\ accounting\ value.$$

Moreover, the basic elements of intellectual capital are the human capital, the structural capital and the relational capital. Each of these components of intellectual capital contributes significantly to the success of an entrepreneurial IT company.

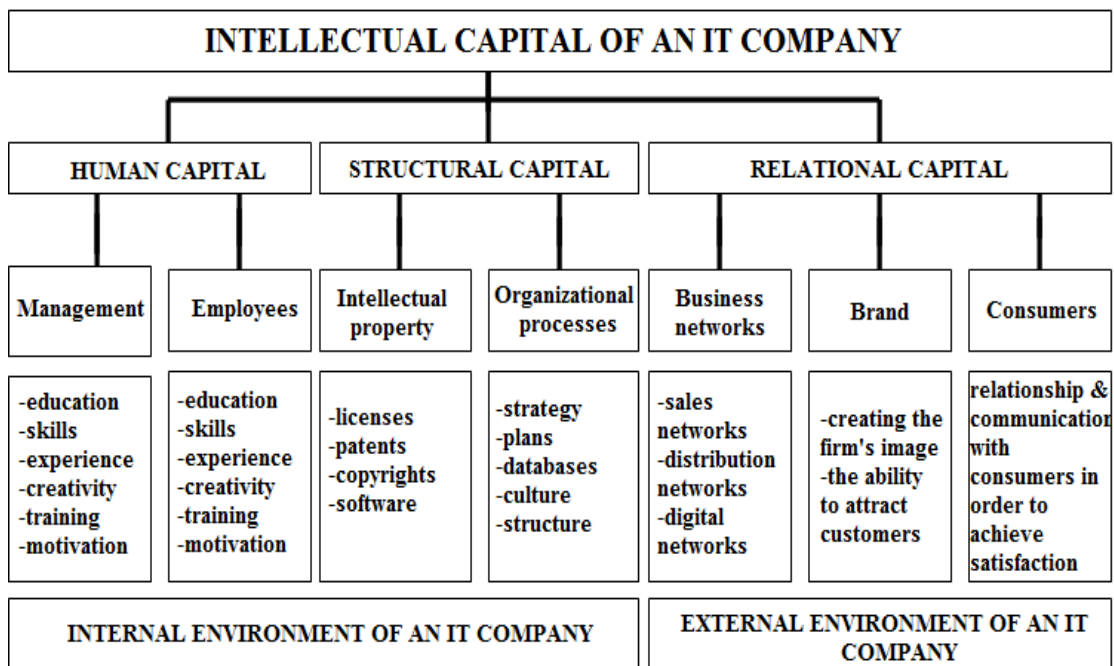


Figure 1. The intellectual capital structure of an IT company [3]

On the other hand, entrepreneurs are individuals who allocate economic resources from a level of lower productivity to a level of higher productivity. So for example, the human capital of the entrepreneur (education, business experience, skills, training, level of motivation), structural capital (the capacity of the company to adapt quickly to changes, organizational structure, organizational culture, the ability to implement successful organizational strategies) and of relational capital (development of productive business networks, quick access to key external stakeholders of the company, etc.) are important intangible resources that are related to the achievement of positive business performances. This shows the interrelation and mutual influence between entrepreneurs and the intellectual capital in their companies as well as their contribution to the success of the entrepreneurial IT company. In this context, a simple metaphor that can be used to explain the connection between entrepreneurs and intellectual capital is the one according to which the entrepreneur can be considered as a sort of "juggler", who juggles different parts of intellectual capital: experience, training, skills, education, networks, organizational structure, organizational culture. Such a metaphor implies interesting aspects. For example, a juggler, just like an entrepreneur, must have the necessary skills and abilities. The more skills he has, the more things he can juggle. Likewise, if an entrepreneur can "juggle" more aspects (parts) of intellectual capital, then he will be more successful than other entrepreneurs who know how to "juggle" fewer parts of intellectual capital [4].

Determinants of a successful entrepreneurial IT company in terms of its intellectual capital

Entrepreneurship is not exclusively bound to small or newly founded companies and the private sector, but it is also found in large companies, as well as in the public and non-governmental sectors. At the same time, it should be emphasized that, regardless of the size or the sector in which it operates, an entrepreneurial company is usually characterized by the ability to innovate, initiate changes and quickly respond to changes in the environment in a flexible manner.

There are three phases that an entrepreneurial company goes through:

(1) the ex-ante period, (2) the gestation period, and (3) the consolidation period. All this also applies to an entrepreneurial IT company [5].

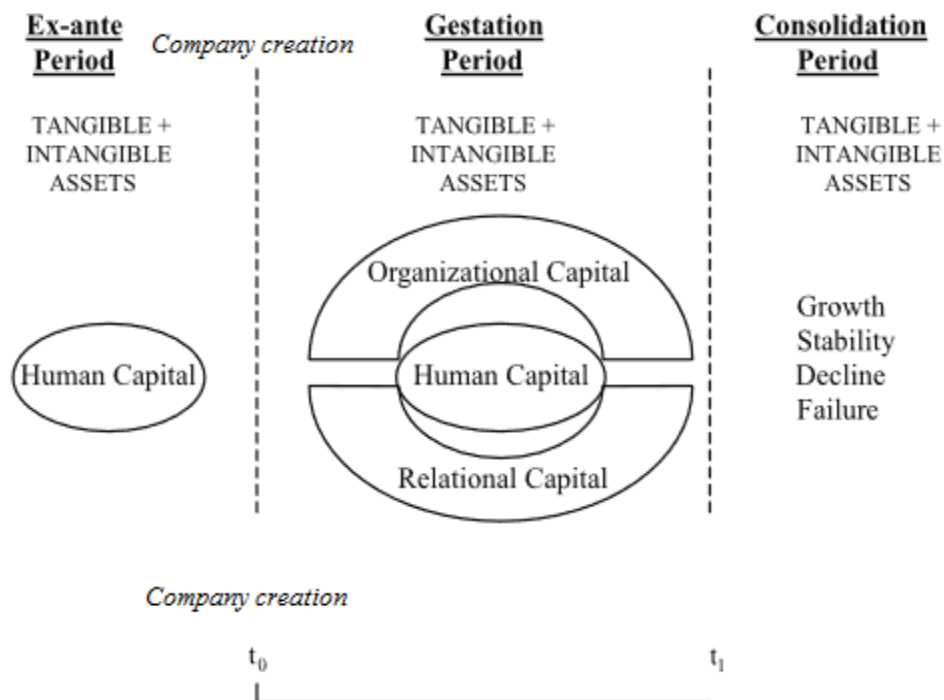


Figure 2. The three stages that an entrepreneurial company goes through [5]

During the first phase, the entrepreneur has a business idea and decides to establish a company. At this stage, only exists the entrepreneur's human capital because the company has not yet been established. The entrepreneur's human capital in this phase may initially have been acquired through formal education, training, previous work experience, different life experiences and so on.

The gestation period begins with the founding of the company. During this phase, which extends from period t_0 to period t_1 (Figure 2), the entrepreneur has to make a great effort to adapt the newly founded company to the market conditions and to turn it into a successful business organization. In doing so, structural and relational capital emerges. Structural capital includes procedures, processes, plans, business strategies, organizational culture, databases, patents, copyrights, software, etc. Relational capital includes all the resources that are related to the relations that the company has with external factors. Human capital, structural capital and relational capital are interrelated and each of these three elements of intellectual capital contributes to the development of the other two elements. Here, the interaction between the three constituent elements of intellectual capital is unique and unlike common material goods where "1+1 equals 2", the nature of intellectual capital is that "1+1 can yield 3, 4 or more". In other words, intellectual capital is characterized by the synergetic effect. In the company's gestation period, the entrepreneur decides how much time and how many resources to invest in each of the components of intellectual capital to develop and strengthen the key competencies of his company.

The company's consolidation phase is a consequence (result) of the company's gestation period. After several years of managing the company and continuous learning, the entrepreneur can assess (predict) the future of his business. The consolidation period can be in the form of: (1) growth, when the company advances and increases its intellectual capital, (2) stability, when the company did not progress as expected of it and the intellectual capital remained at the same level as it was at the beginning, (3) decline, when the entrepreneur's expectations are not met, but the company continues to operate and achieve poor business results and (4) failure, when the entrepreneur decides to close the company.

Which of these four outcomes will occur depends on the utility that the elements of intellectual capital have for the company and the value that is accumulated in them. If the result of the consolidation phase is the growth of the company, the entrepreneur will have to change over time and adapt to new situations. The qualities and skills that he possessed at the beginning change over time. Also, organizational structure and organizational culture, as elements of structural capital, are changing. At the same time, the management should become more formal, but not bureaucratic.

Negative intellectual capital and loss of intellectual capital in an entrepreneurial IT company

The failure rate is significantly high in many research projects and new products. Many of the new drugs are ineffective, many of the new consumer products are of poor quality, and many of the new artistic achievements are not good. Investments in intangible assets have a much higher level of risk and uncertainty than investments in tangible assets. So, for example, if a software project fails, the costs of its development are lost forever, unless the knowledge gained during its development is used for a new entrepreneurial attempt. On the other hand, if an entrepreneur invests in real estate and that property loses value, the investor will be able to recover at least part of his investment. Hence, it should be kept in mind that there is negative human capital, negative structural capital and negative relational capital. In that context, it should be pointed out that not everything people know is useful. Such is the case with the intellectual human capital possessed by a criminal or the entrepreneur who wishes to undertake a criminal enterprise. It is knowledge just as flying an airplane or programming is knowledge. An example of negative structural intellectual capital at the company level is a situation where there is strict adherence to old organizational methods in which organizational hierarchy is rigidly respected and which prevents employees from achieving their work potential. An example of negative relational intellectual capital at the company level might be the situation in a company's marketing, where there is a product focus rather than a consumer focus.

A loss of intellectual capital can occur as a result of wars, environmental disasters, health crises, or economic crises when there is a loss of human lives or displacement of people, destruction of infrastructure and production facilities, the collapse of businesses, etc. (for example, the irreversible loss of intellectual capital in Ukraine today). Also, loss of intellectual capital can occur when an employee who has specific, relevant knowledge for the company, leaves the company for various reasons such as retirement, dismissal, transfer to another company or death. Moreover, this situation will not be recorded in accounting because when an employee with expertise leaves the company, no financial-accounting report will register it. Simply, the modern accounting system measures and provides information only about the visible (material) assets (there are no accounting positions that indicate the invisible assets (intellectual capital)). In this context should be mentioned the forgetting curve of the German psychologist Hermann Ebbinghaus as well. This curve can partially explain the loss of intellectual capital due to forgetting and resistance to acquiring new knowledge, which, ultimately leads to knowledge obsolescence. This is especially important for IT companies that, due to the constant development of ICT, are very susceptible to the risk of obsolescence of the knowledge

they have. Namely, this author discovered as early as 1885 that people forget about 75% of everything they learn in a very short time: in the first 24 hours more than half, and in less than a week they forget about 75% of all information that they received¹.

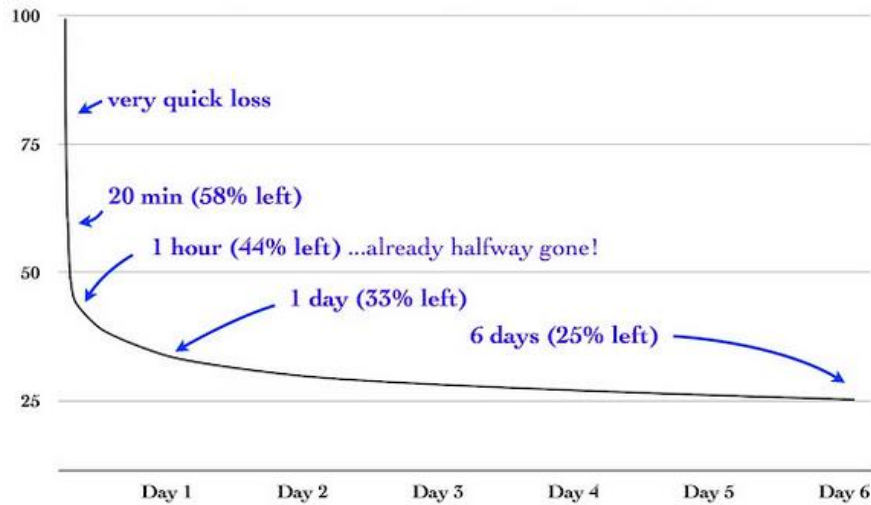


Figure 3. Ebbinghaus' Forgetting Curve [6]

With the penetration of digital transformation into the daily operations of IT companies, in addition to the mentioned scenarios that endanger intellectual capital, business processes are constantly exposed to the danger of its loss. The possibility of cyber attacks that could lead to outages with catastrophic consequences precisely in the area of intellectual capital (encryption and deletion of data, damage to data structures and so on), are one of the main reasons why modern companies in their business operations pay special attention to the protection of intellectual capital through protective plans and procedures for maintaining business continuity in the firm (Business Continuity and Disaster Recovery - BCDR). These plans and procedures are aimed at maintaining business continuity through the protection, repair, and recover of the infrastructures on which the information systems are placed, as well as the data and information as carriers of the intellectual capital. Considering that modern information systems are data-centric in their operation and functioning, the protection of intellectual capital is key to minimize losses from system outages within firms (Cost of Downtime-CoD). According to the Ponemon Institute's newest report, for the year 2022 average total cost of a data breach is 4.35 million dollars, a value that is constantly increasing from year to year [7].

IT entrepreneurship in the period to come

Economic development revolves around the human mind and its ability to transform material resources and intangible ideas into valuable goods and services. The animal world also reorganizes material resources, often with incredible precision (for example, birds make nests and bees make hives). But unlike the animal world, humans create wealth and prosperity through their ability to dream, fantasize, invent, experiment, think, and take risks. A market economy creates wealth and prosperity, not only because of private property, the free market, and the profit motive, but also because of people's willingness to invent and develop new ideas. Human flexibility and ability to distort facts in reality through dreaming, fantasizing, inventing, experimenting, thinking, etc., make homo sapiens the dominant species on Earth. Humans are the only creatures that can experiment inside their minds, which is their specific evolutionary advantage. In that context, it should be emphasized that the social environment such as the family, the educational system, cultural norms and customs, the value system, religious communities, social networks, etc., have a great influence on the formation of entrepreneurs. Biological predispositions are not a decisive factor in whether someone will be a successful entrepreneur or not [8]. Also, entrepreneurship is an economic-social and psychological phenomenon that does not choose space, time, religion, gender, age, level of education, nationality, income, or

¹ The opposite of the forgetting curve can be considered the experience curve, which describes the empirically verified phenomenon that by repeating things, they are performed faster and more efficiently as a result of accumulated experience. This is an extension of the concept of the "learning curve" which describes the reduction of the time required to produce certain products based on increased sophistication and experience.

sexual orientation and which aims to satisfy human desires, needs and demands. Entrepreneurship always and everywhere seeks the latest combination of opportunities and risk. It is a creative response, an innovative solution to new challenges, and a new initiative to create new markets, products and processes. The less favorable, riskier and more unpredictable the circumstances, the more challenging it is for true entrepreneurs. In the context of IT entrepreneurship, it should be noted that some of the most successful IT companies today emerged in times of crisis. Google, eBay, and LinkedIn emerged after the dot.com bubble in 2000. Uber, Airbnb, Instagram, and WhatsApp appeared after the economic-financial crisis in 2007. Zoom Video Communications, the company that provided the most used video conferencing application during the Covid-19 pandemic, in September 2021 reached a market value of \$82.19 billion and 4,422 employees. This company had started to operate only ten years earlier, in 2011, with one founder and 40 engineers [9]. This only confirms the fact that there are great business opportunities for IT entrepreneurs even in conditions of great crises when many new human desires, needs and demands are expected to appear. The global pandemic with Covid-19 or the war in Ukraine have posed challenges to all humanity in the search for quick, global and unique solutions because for the first time in human history, a health, military, economic and energy crisis affects everyone equally: rich and poor, developed and undeveloped, successful and unsuccessful. In this new business and cultural environment, in which the only certain thing is that nothing is certain, it is necessary to redesign the phenomenon of IT entrepreneurship and the conditions and ways of its further development. Such redesigning should go in the direction of creating initial strategies, goals, missions and visions in which IT entrepreneurs will incorporate values that should ensure the sustainability of their IT businesses in the long run. Also, their basic motives such as self-interest and profit, should be complemented by environmental ethics, concern for employees and concern for the wider social community.

Conclusion

Today, the future seems more uncertain and unpredictable than ever before. The fact is that the modern business environment is turbulent, unpredictable and risky, which certainly makes it difficult for IT companies to operate. On the other hand, acting in conditions of increased risk and uncertainty is a main characteristic of enterprising people with divergent (creative) thinking.

Additionally, the development of new technologies has contributed to modern economies being largely based on intangible resources. In that context, it should be mentioned that intellectual capital has a strong influence on achieving business success in an entrepreneurial IT company because it contributes to the creation of value and competitive advantage based on knowledge.

Finally, it should be emphasized that all this comes into force even more in the context of health crises, energy crises and economic crises when discontinuity occurs in the business environment and when the need for knowledge exchange has been increased. Hence, future entrepreneurs should take advantage of the experiences of such crises and develop IT businesses whose main goal will not be only to make a profit but also to achieve broader social goals.

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