

ORIGINAL PAPER



DOI: 10.26794/2304-022X-2023-13-1-54-70

UDC 331.1:338.2;65.01(045)

JEL J24, M12, O15

The Ontogenesis of Human Capital of an Enterprise

D.A. Zhdanov

Central Economics and Mathematics Institute, Russian Academy of Sciences, Moscow, Russia

ABSTRACT

The management of the company traditionally faces the task of increasing the effectiveness of human capital (HC), its timely transformation, and the early accumulation of the necessary human resources. In this regard, the purpose of this work was to establish a rational set of transformations that HC goes through from its inception to the end of its existence. The human capital of an enterprise in the work is understood as a combination of the corporate human capital of the organization and the individual human capital of its employees. The methodological basis of the study was the four-component system economic theory, the evolutionary theory of the firm, in particular, the features of the life cycles of organizations (LCO) and, finally, the theory of human capital. The involvement of these scientific approaches made it possible to demonstrate that the evolution of human capital in the correct version (during the transition from one stage of the life cycle to another) occurs synchronously with the change in the management tasks of the enterprise that arise at each stage of the life cycle of the organization. They determine the priority requests to the elements of the human capital, leading to the rotation of the latter and the selection of the most demanded among them for the corresponding stage of the life cycle. From a scientific point of view, the main result of the work was the identification of unified key stages that make up a consistent cycle of development of the human capital of an enterprise (determining its evolution), as well as the establishment of the positions of corporate and individual human capital, the most focused on solving the problems of the corresponding stage. Verification of the results obtained was carried out on the example of the evolution of the basic elements of the enterprise's human capital – corporate culture and management style. The conclusions drawn are intended to help the management of companies to determine the components of human capital, which are mainly in demand at the corresponding stages of the life of the organization, and to choose in a timely manner the ways to increase the potential and efficiency of personnel.

Keywords: systemic economic theory; life cycle of the organization (LCO); company management; human resources; corporate culture; leadership

For citation: Zhdanov D.A. The ontogenesis of human capital of an enterprise. *Management sciences*. 2023;13(1):54-70. DOI: 10.26794/2304-022X-2023-13-1-54-70

Praemonitus, praemunitus

(from Latin — forewarned is forearmed)

INTRODUCTION

The effectiveness of any enterprise depends to a large extent on its workforce, the skills, knowledge, activity of its employees and the efficient use of human resources. Therefore, management usually pays so much attention to personnel development and improvement. In this regard, it would be useful to predict the demand for certain components of human capital (HC), to understand what competencies and abilities will be relevant,

what requirements to employees are urgent at different stages of the company's existence, what the management should pay attention to when selecting and training their employees.

This study seeks to answer these questions. The author aimed to establish the sequence of appropriate transformations that a company's human capital undergoes from inception to the end of existence, i.e., its ontogenesis. The object of the study is HC of organizations engaged in productive activities. Let us note that the period of its existence, obviously, is similar to the period of life of the corresponding enterprise.

In order to achieve and implement this objective, the following tasks are to be carried out:

a) identify the trends of changes in HC, the reasons for the transformations and the demand for the individual elements of capital during the “life” of the company;

b) assess the degree of universality of such transformations in relation to different enterprises;

c) if a commonality of changes is found, to identify the key phases of change and demonstrate the main features of each phase.

Given the multidimensional nature of the questions posed, the article uses a number of theoretical approaches to help justify the proposed solutions, namely four-component systems economic theory, evolutionary theory of the firm, in particular the concept of the organisational life cycle (LCO) and human capital theory.

In economic research, the relatively recent debate on HC is linked to the desire to explain the role of intangible and inseparable human assets in the creation of social product. The concept of HC is primarily associated with the Nobel laureates Th. Schultz and G. Becker. The latter, in particular, moved the discussion of HC from the individual sphere to the enterprise level. His works gave rise to a justification for investing in people — in their health, education and well-being. Today, there is a well-established view that human capital is one of the main resources for increasing a company’s competitiveness and efficiency [1–3].

Another topic to which scholars, including the proponents of the evolutionary theory of the firm, frequently refer is the concept of the life cycle. It is used when analysing the developmental phenomena of various social entities, such as individuals or individual organisations. The metaphors and analogies used in this approach help simplify the

representation of complex social phenomena and create comprehensible patterns and images in scientific thinking. The application of this theory to the solution of practical problems is often criticized [4], but its basic postulates are accepted by most economists.

One of the challenges of this study has been to bring together different perspectives on the issue under study. In this regard, the following research logic is used (*Fig. 1*). First, taking into account the positions of the systemic economic theory, the functional complexes that implement the basic tasks of the enterprise are identified. Then, based on the views on the ontogenesis of the enterprise as the passage of typical stages in the process of life cycle,¹ the tasks of each phase are detailed and the management tools (functional complexes) that ensure their solution are determined. After that, the elements that make up the corporate HC of an enterprise and the individual HC of its employees are highlighted, and the positions of human capital that are most in demand when solving the tasks of the noted complexes are identified. This allowed us to compare the problems of the individual stages of LCO, the tools (functional complexes) that implement them, and the HC elements that provide their solution, and thus record the changes that the HC of the enterprise undergoes during its “life”, the key features of each of the evolutionary stages, as well as the factors that determine them.

THE ENTERPRISE IN THE SYSTEMS ECONOMIC THEORY

Let us begin by detailing the main production and economic objectives of the enterprise, for which we will use the provisions of systems economic theory. In its framework,

¹ We will use the term ‘life cycle’ (LCO) to refer to the period of an organisation’s existence.

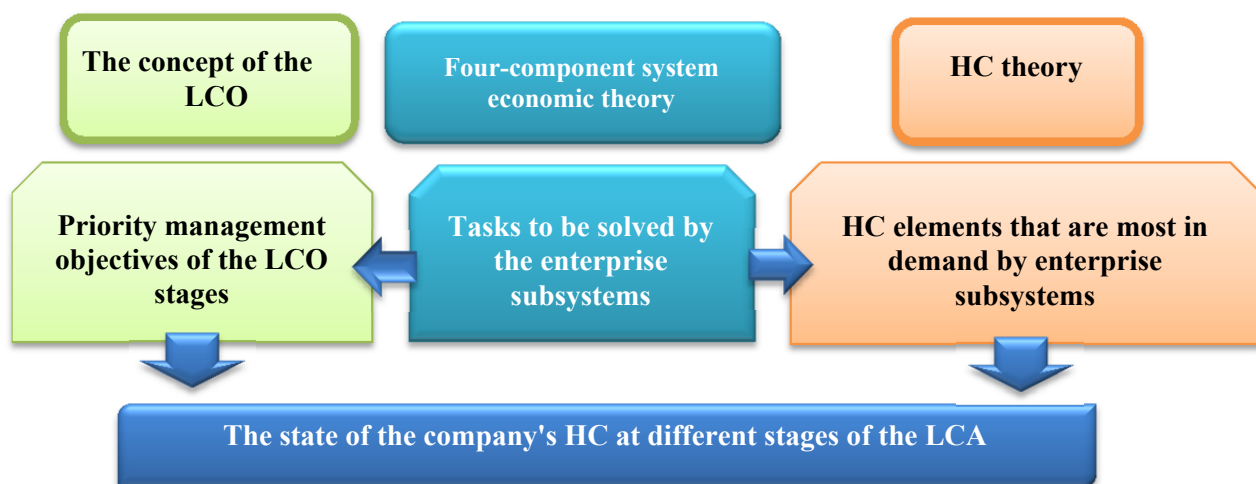


Fig. 1. Research algorithm

Source: compiled by the author.

the activity of economic actors (including the enterprise) is seen as the operation of a universal underlying structure consisting of four elements (systems) that differ from each other by the presence of boundaries in space and/or time.

The typology of economic systems at the upper level of the classification includes the following 4 basic categories, which differ in their spatial and temporal characteristics [5]. The enterprise can be perceived as a whole:

- *an object system* operating in a limited space within an unbounded time frame;
- *an environmental system* operating in an unbounded time span and without intrinsic spatial boundaries;
- *a process system* consisting of individual processes operating within a limited time span across the entire available space;
- *a project system* consisting of individual projects, each of which operates within a limited timeframe in a limited space.

A prerequisite for the sustainable operation of the company is a balanced internal structure, as well as balanced systems of all the above types that ensure its sustainability and reproduction cycle [6] and endowed with sufficient resources for its proper functioning.

In line with the concept under consideration, the basic system structure of an enterprise is a configuration that includes the following four elements: entrepreneurial, social, administrative and technical-economic spheres. The first refers to the domain of the entrepreneur who directs the development and position of the company in the surrounding world. The second includes the behaviour and evolution of employees and the relations between them. The third includes the processes, rituals and tools of production and business management. The latter includes intra-company projects necessary for the implementation of production and business processes [6].

The solution of the set of tasks of each of the mentioned spheres is carried out primarily by the profile functional complexes, which include: business model (BMC), social and labour (SLC), institutional and organisational (IOC) and property and technology (PTC). BMC covers the sphere of interactions of the enterprise with the outside world. SLC looks at the behaviour and evolution of employees, the relationship between them as well as the managers and owners. IOC includes intra-company institutions, organisational

Table 1

Tasks of the functional complexes of the enterprise

The system aspect of the enterprise	The scope of the company's activities	Functional complex	Tasks to be solved
The object system	Entrepreneurial (development, ensuring long-term competitiveness)	Business Model (BMC)	Preparation and implementation of enterprise development projects, entry into new markets, rationalisation of relationships with partners, other investment and innovation solutions
The environmental system	Social (employee interaction)	Social and Labour (SLC)	Ensuring the functioning of the workforce, establishing social relations in the units, maintaining an adequate corporate culture, establishing a psychological climate in the team, etc.
The process system	Administrative (business management)	Institutional and organisational (IOC)	Management of company activities, administrative and managerial interaction between departments and employees, formation of regulations and norms for employees' actions, etc.
The project system	Technical and economic (production and economic activities)	Property and Technology (PTC)	Enterprise asset management, implementation of production, distribution and exchange processes on the basis of available equipment

Source: compiled by the author.

structures that ensure the implementation of production and business processes. PTC allows the implementation of production projects on the basis of existing equipment using mastered technologies.

Let us compare the marked positions with each other and with the tasks solved within the framework of the functional complexes within the framework of *Table 1*. At the same time, other subsystems are involved in solving the problems of each sphere, in addition to those noted, but the dominant role remains with those given in *Table 1*.

SYSTEMS ECONOMIC THEORY AND THE BUSINESS LIFE CYCLE

Every business strives to be efficient and effective in the short term as well as the long term, and to do so it needs the four basic systems to work together smoothly. But the company's priorities change significantly as it develops, and its managerial, commercial and

other traits change over time. This leads to the fact that as its scope of activity, hierarchy and age change, the rational interaction of these systems, their correlation and relevance are transformed.

Many aspects of growth are common to different organisations, which allows us to identify typical stages of their evolution and use the life cycle metaphor to explain the changes in their development. In management theory the view of enterprise ontogenesis (as the passage of life stages) was formed in the 70s of the previous century and is associated with such names as A. Downs, L. Greiner, K. Cameron, P. Quinn, I. Adizes and others. The main idea of this approach, supported by the majority of scientists, is that any company in its development passes through a number of common stages, one following the other: they are characterized by their own problems, organizational characteristics and

management methods [4, 7]. The validity of this theory has been confirmed by numerous empirical studies [8].

Summarising the views on LCO stages, we identify the four most characteristic ones: *Formation, Development, Maturity, Aging*. At the end of this list *Resurgence* is sometimes added, which is linked to the possibility of making decisions that prevent the company from disappearing, such as spinning off new organisations, and returning to one of the initial stages. This sequence is inherent in most approaches, although there are other views both on the definition of the stages of enterprise evolution (L. Greiner, I. Adizes, B. Z. Milner, which is reflected in detail in [4]) and on the classification of features that characterise the presence of a company at a particular stage [9] or on the mechanisms of its transition from one to another [10]. It should also be noted that all authors emphasise the difficulty of fixing the duration of the stages noted — they can take a very significant period of the life of the organisation.

Thus, the increase in the volume of activities, levels of management hierarchy, and age of the company leads to traditional management development problems. Their solution requires changes in relevant competencies, activation of marked profile subsystems, otherwise business disintegration occurs. For example, at the initial stage of development *the Object System* determining initial requirements to the company is the key one; with the growth of business the attention is shifted to the administrative sphere and it is replaced by *the Process System*.

A company cannot make significant progress unless it has the necessary maturity and balance in its systems, which is why it is so important to anticipate necessary changes and respond to them in a timely and appropriate manner.

CHANGING OBJECTIVES OF THE ENTERPRISE AS IT EVOLVES

Each of the above-mentioned stages of the LCO has its own operational, managerial and other tasks that define the organisation's current agenda. Let us briefly note the key ones.

Formation. At this stage, the initial commercial ideas are turned into a product. The main task is to produce a niche product and sell it, which would allow the organisation to earn the initial money needed to survive. The management dominants are to establish production, increase sales, and occupy a local niche. The enterprise tries to ensure short-term efficiency, it is flexible and adaptive. Its development is based on creativity.

Development. As production is established, output is expanded, loyal customers are found and revenues stabilise, market niche growth and the search for the new directions and customers comes to the fore. The number of employees increases, processes are developed and modernised, and internal integration and adaptation to the environment takes place. The expansion of activities leads to more complex management and the need to regulate relationships, budgeting, and control, which necessitates the normalisation of administrative work, the formation of rules and regulations and the institutionalisation of relations. The focus shifts from generating new ideas and products to organising the effective operation of what has already been created. The dominant focus is on streamlining management, increasing sales, expanding the market niche, and improving operational efficiency.

Maturity. As long as the company's sales and profits are stable, it does not take active decisions to change course. The main objective is multi-faceted growth, centralisation of management with autonomy of individual business areas. The dominant goal is to

increase sales, expand the market, consolidate, and generate profits. The strengthening of the administrative and regulatory components leads to a situation where the entrepreneurial spirit is at odds with the administrative one. To remedy the situation, it is necessary to reorient the motivation system towards the development of creativity, use new work styles and culture, retrain personnel, carry out decentralisation, and launch new projects.

Aging. At the beginning of this stage the enterprise is successful and viable, its obligations and ambitions are fulfilled, there is an opportunity to pay attention to social issues, corporate values, and culture. But gradually, due to shrinking traditional markets, changing needs and the arrival of competitors, familiar areas are shrinking, and profits are falling. At the same time, the company is no longer ready for new positions, active and risky entrepreneurial actions, and the search for fresh behavioural guidelines and values which it has already become unaccustomed to. Decisions are becoming increasingly conservative, processes are rigidly regulated, the company loses flexibility and has no time to adapt. *The how* becomes more important than *the what*. The dominant goal — is return on investment, maintaining the status quo, regulation, balance of interests.

Resurgence. To prevent the effects noted and to move towards renewal at this stage, various means are used, in one way or another associated with the activation of the entrepreneurial component. It is necessary to return to finding a place in the market, redefining strategy, launching in-demand products, reorganising the business, renewing technology and the management team. It is important to reduce overregulation in management, give entrepreneurial and managerial freedom, and change the corporate culture. The dominant goal of management is to introduce new products to the market and rejuvenating the management team.

More details on the contents of the mentioned stages can be found in [4, 7, 11].

Thus, it can be concluded that each LCO stage has its own unique tasks, set of management tools and priority solutions. The latter are implemented primarily within the relevant functional complex (profile subsystem), as reflected in *Table 2*.

Simultaneously with the dominant tasks at each of the LCO stages, there is a wide range of current problems, in the solution of which other enterprise complexes, noted in *Table 2*, are also involved, such as social and labour complex (SLC): the more actively the environment component (*environment subsystem*) is present at all the stages of company development, the more sustainable and productive business will be, and the later the *Ageing* stage will come. With the help of this subsystem the company activates its “secret weapon” — the interconnection and integration of employees, which enables the latter to become aware of the semantic component of their activity, to define behavioral guidelines and values; it unites employees in achieving a goal, which is perhaps even more important than making a profit, shifts attention from what they do to what they are.

SYSTEMS ECONOMIC THEORY AND THE HUMAN CAPITAL OF THE ENTERPRISE

We have identified and grouped together the main problems faced by the company within each of the four basic subsystems and for which the profile functional complexes (business model, social and labour, institutional and organisational, and property and technology) are responsible for solving. Now we will consider which components of enterprise HC are most task-oriented within these complexes, as their implementation is primarily driven by the core components of individual and corporate HC.

Table 2

Priority management tasks of individual stages of the LCO

LCO stage	Dominant tasks	Responsible Complex
Formation	Establishing production and sales	Property and Technology (PTC)
Development	Launching new projects, entering markets, increasing the number of partners, implementing other organisational and commercial innovations	Business model (BMC)
	Setting up the administrative management of the company, the management interaction of departments and employees, the establishment of work rules and regulations	Institutional and organisational (IOC)
Maturity	The company's innovative development is intensified, new projects are launched, and new markets are entered. In contrast to the Development stage, these actions are not personalised, but institutionalised, embedded in the organisational structure and culture of the company	Business model (BMC)
Ageing	Attention to employee behaviour, social relations in divisions, maintaining the corporate culture and psychological climate	Social and Labour (SLC)
Resurgence	Finding a new market place, launching new products in demand, updating technology and management staff, reorganising the business	Business model (BMC)

Source: compiled by the author.

In this regard, let us comment on the attributes of human capital of the enterprise used in this paper. To date, there is no consensus on which characteristics can be rightly attributed to HC: whether it is only knowledge, skills and competencies used by a person in production processes, or also a set of social, psychological, attitudinal (ideological) and cultural properties of a person? Is it possible to consider as human capital the whole combination of acquired and natural attributes and abilities or only those that are able to produce returns? In this study, HC is seen as a set of personal qualities, social competencies, and values that can influence the performance of productive activities. This position is most closely reflected by the following definition: "Human capital is the knowledge, competencies and attributes embodied in individuals that contribute to personal, social and economic well-being". [12, p. 18].

In turn, the term "corporate human capital" is used in this article to refer to the total HC of a company's employees used to achieve its goals, bringing return. Moreover, corporate HC is not just the sum of employees' HC (their knowledge, experience, behaviour, attitude towards the company and colleagues), but also a manifestation of synergy (as well as dyssynergy) of sharing their individual abilities, additional rules and values that ensure the functioning and development of the company, such as corporate culture, intellectual property, relationships with partners. Their bearer is the collective HC of the firm.² Corporate HC, on the other hand, affects the individual employee capital, reinforcing its existing components

² It should be made clear that the HC of an enterprise does not exist outside the individual HC of the employees. It is an accumulated resource, inalienable from its bearers (people). Functioning in the system of institutions of the enterprise, it produces the effects of interpersonal interactions leading to a change in the productivity of workers. The company is entitled to these effects but not to the HC of the employees.

Table 3

The components of the enterprises' HC that are most in demand within the framework of functional complexes

Complex	Types of corporate HC	Types of individual HC
Property and Technology (PTC)	Production capital; Relationship capital (market capital, partnership capital)	Education capital; health capital; vocational capital
Institutional and organisational (IOC)	Structural (organisational) capital	Organisational capital
Business model (BMC)	Innovative and intellectual capital	Entrepreneurial capital; intellectual and creative capital
Social and Labour (SLC)	Social capital	Social and psychological capital; cultural and moral capital

Source: compiled by the author using [13].

and putting in place the missing components. Thus, by acquiring new equipment and fulfilling production tasks, employees improve their skills, acquire professional competences, and expand their social and intellectual capabilities.

According to the grouping given in [13, p. 28, 30], let us distinguish the following components within *individual HC*: educational capital; health capital; socio-psychological capital; cultural and moral capital; professional capital; intellectual and creative capital; organisational capital; entrepreneurial capital.

In turn, corporate HC will include: organisational (structural) capital; social capital; production capital; intellectual capital (knowledge accumulated by the company as a non-physical resource for creating added value [14, pp. 103–115; 15, pp. 313–321; 16–18]), innovation capital; relationship capital (market, partnership).

Looking at the HC of an enterprise as a whole, let us consider its three defining components:

- individual employee activity;
- the behaviour of the manager (as the leader who determines the company's actions);
- group (team) activities of employees.

Taking into account the introduced gradation, let us compare the elements of corporate and individual HC and the tasks solved with their help within each of the previously mentioned functional complexes, which will make it possible to assess the demand for individual components of human capital (Table 3). It is worth noting that the enterprise, of course, uses other HC components as well, but the priority impact is on those that are directly focused on a specific range of tasks.

THE EVOLUTION OF A COMPANY'S HUMAN CAPITAL

It can therefore be stated that the requirements to a company's HC are constantly changing, which generally leads to a reassessment of the weight and sometimes even the composition of its individual parts, as well as its overall growth.³ In particular, as a company grows, it usually

³ When we talk about the growth of a company's HC over time, we are referring to its normal progressive development. But even then, changes in the individual elements of HC can have their own dynamics. For example, shifts in technology lead to a depreciation of obsolete manufacturing knowledge and an increase in in-demand knowledge, or market share expansion increases competition, which can have a negative effect on relationship capital.

Table 4

The components of the HC of an enterprise, that are the most in demand at certain stages of the LCO*

LCO stage	Types of corporate HC	Types of individual HC
Formation	Production capital: a set of problem-solving methods, knowledge, skills and abilities of employees used to carry out production activities; Relationship capital (market, partnership capital): a system of mutually beneficial and trustful relationships with partners (customers, suppliers, competitors, authorities, etc.), business reputation, external conflict resolution practices	Professional capital: qualifications, general and special skills, experience; Education capital: an amalgamation of knowledge, skills; Health capital: analysis and support for health
Development	Innovation and intellectual capital: knowledge and competencies required for entrepreneurial success, intellectual assets, patents, know-how, licences	Entrepreneurial capital: the ability to set goals, to think outside the box, to be innovative, to seek innovative approaches, to take reasonable risks; Intellectual and creative capital: creativity, research and development, invention, rationalisation, problem-solving
	Structural (organisational) capital: the organisational capacity of a company in the form of its management system and technology, organisational structure, the aggregate mindset of its staff and its intra-company relationships	Organisational capital: capacity for creative work, motivation for economic activity, ability to achieve results, responsibility, initiative
Maturity	Innovation and intellectual capital: knowledge and competencies required for entrepreneurial success, intellectual assets, patents, know-how, licences	Entrepreneurial capital: the ability to set goals, to think outside the box, to be innovative, to seek innovative approaches, to take reasonable risks; Intellectual and creative capital: creativity, research and development, invention, rationalisation, problem-solving
Ageing	Social capital: interpersonal interactions in an organisation, expressed in social ties, shared values, norms, trust and responsibility, corporate culture	Socio-psychological capital: psychological stability, volitional and willpower qualities, the ability to establish relationships with other people and social institutions, and to engage in socially useful activities; Cultural and moral capital: mentality, upbringing, ethics, empathy
Resurgence	Innovation and intellectual capital: the knowledge and competencies required for entrepreneurial success, intellectual assets, patents, know-how, licences	Entrepreneurial capital: the ability to set goals, to think outside the box, to be innovative, to seek innovative approaches, to take reasonable risks; Intellectual and creative capital: creativity, research and development, invention, rationalisation, problem-solving

Source: compiled by the author.

Note: * – Table 4 uses data from Tables 2 and 3.

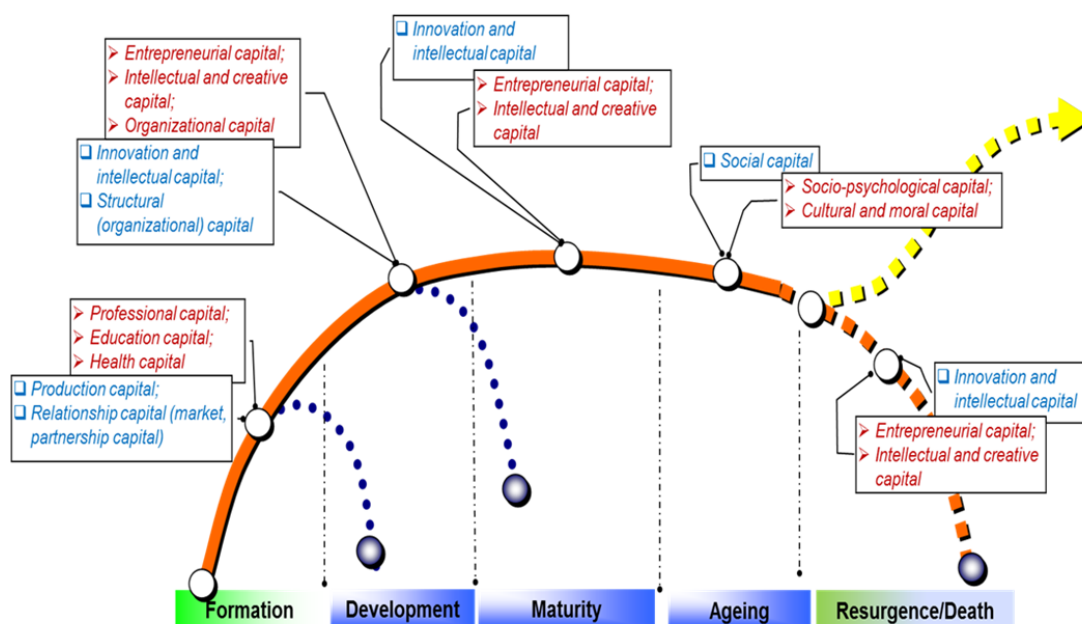


Fig. 2. Stages of evolution of the enterprise's HC

Source: developed by the author using [11].

invests in the training of its employees, the improvement of work quality and conditions and the prevention of health problems [19, 20]. Over time, its experience and knowledge, managerial traditions grow, its circle of partners is formed, all of this leads to the growth of corporate HC [21].

At the same time, in response to changing demands, human capital undergoes a certain sequence of transformations, its actual content is changing with the growth of the enterprise, with the increasing composition and nature of the tasks to be solved. And this series of changes is common to all companies because it is shaped by the challenges they face in their respective stages of the life cycle.

Table 4 provides a list of the enterprise HC components which are primarily engaged in solving the management tasks of the respective stages of business development.⁴ The types of corporate and individual HC that

are in demand may reoccur at different stages, but their substantive content will depend on the composition of the relevant tasks of the particular stage.

As a result of considering the evolution of the enterprise as a sequence of transformations, where at each stage there is a different composition of key tasks which require certain HC elements and competencies, the following conclusion can be made — the change of HC must correlate with the stages of LCO; as the demand for relevant components of human capital increases, their importance and requirements for the personnel possessing the required competencies increase. Hence (taking into account the determining importance of the task composition of the enterprise at certain stages of its life), it follows that HC in its development passes through stages: *Formation*, *Development*, *Maturity*, *Ageing*, *Resurgence*, the duration of which coincides with the duration of the LCO stages, since it is the problems of the individual LCO stages that determine the requirements for HC.

⁴ In detailing the HC elements that make up the individual types of corporate and individual HC, the material is based on [13].

Let us illustrate the sequence of human capital evolution in *Table 4* and the composition of corporate and individual HC elements that are most in demand at certain stages of development (*Fig. 2*). The steps of HC formation are combined in the figure with a graph showing the dynamics of the company's revenue (*Y axis*) with the change of time (*X axis*), the LCO stages are also plotted on the *X axis*.

If the change of HC does not keep pace with the evolution of the company's objectives, the lack of necessary knowledge and competencies is manifested, which becomes the cause of various management problems that hinder business development. Such situations are illustrated, in particular, by L. Greiner [22], I. Adizes [11] and B.Z. Milner [16]. In its turn, timely formation of the above-mentioned human resources allows to overcome the mentioned development difficulties faster: forewarned is forearmed.

TRANSFORMATION OF INDIVIDUAL ELEMENTS OF ENTERPRISE HUMAN CAPITAL AND MANAGEMENT DOMINANTS

Having identified the main changes inherent in the basic types of HC, let us consider the dynamics of its separate positions, in particular, corporate culture (included in the social component of corporate HC), and managerial style (formed taking into account individual HC), as well as the features of management of these elements. The key factors that determine the behaviour of the mentioned positions are outlined point by point in keywords, their detailed description can be found in the mentioned sources.

CORPORATE CULTURE

The dynamics of corporate (organisational) culture⁵ (CC) is a major component of a

⁵ Corporate culture is understood in this paper as analogous to organisational culture, since both terms speak of the culture of the organisation.

company's social capital. This example can also be used to trace the formation of other elements of corporate HC.

CC defines norms of behaviour and morality, standards of interaction in the enterprise; it accumulates successful practices of the firm (but can also manage them), is related to the accepted management style, characterises the involvement of employees in the organisation's activities. With this in mind, we will understand CC as "a model of behavioural norms shared by all, ... recognised as correct and transmitted to the members of the organisation as a correct way of perception, presentation, and attitude" [23, p. 231]. The source of behavioural norms is the experience and knowledge of the organisation, that are formed: a) in the social interaction of workforce members and b) in adapting to changes in the external environment.

CC usually evolves with the enterprise. It transforms from the individual experience and knowledge of employees through group to corporate behaviour, as noted in [24]. In this regard, the role of CC, as well as the entire socio-labor complex (SLC), increases at the stages of *Maturity* and especially *Ageing*.

A rational variant of CC evolution can be considered when each LCO stage corresponds to its own, most appropriate type (*Table 5*).

Let us use [9, 23, 24] materials and note briefly the procedures that help to generate relevant CC at individual stages of LCO, bearing in mind that the main mechanism of CC formation and management is the transformation of formalised and informalised knowledge, the extension of individual employees' personal perceptions to other team members and their "embedding" into the shared knowledge system of the enterprise.

Formation stage. The main problem at this stage is incoherence between the workers and the lack of a CC framework. Mechanisms of knowledge externalisation

Table 5

Changing the corporate culture at various stages of the LCO

LCO stage	Features of corporate culture
Formation	If we follow E. Schein [23], CC is absent at this stage. But there are individual value systems, perceptions and skills that came with the workers. Socialisation ^a of informal knowledge dominates, experience is being accumulated
Development	Own CC, group perceptions and values are formed. Experiences of successes and failures are accumulated at the individual, group, and corporate levels. The externalisation ^b and combination ^c of knowledge moves from the individual level to the group and corporate level: individual workers' values are transformed into group values, intra-corporate communication rules are developed, as well as the relationships with the external environment
Maturity	There is an awareness of existing experience, an internalisation ^d of knowledge acquired and processed by the company. These are expressed in proclaimed values and are individually understood. As the experience of integration and interaction has proven successful, it forms the basis of the CC framework
Ageing	The dogmatic nature of inherited CC leads to a contradiction between real and proclaimed values. CC exists but reflects past perceptions, while real understanding is present at an informalised level. New knowledge and experiences are not embedded in the existing system of beliefs, and the underlying assumptions and values do not reflect real events

Source: compiled by the author using [9].

Note: a – socialization – the transition of informalized knowledge into formalized knowledge through the transfer of experience from one worker to another [23]; b – externalisation – transition of informalized knowledge into formalized knowledge by formalizing and verbalizing it in the form of analogies, concepts, provisions; c – combination – transformation of informalized knowledge into formalized knowledge by incorporating externalized ideas into the existing knowledge system; d – internalisation – the dissemination of formalized knowledge and its processing at the level of the individual worker.

and accumulation are used to form it. As the leaders of the company have a special influence on CC during this period, it is important to pay attention to the content of the cultural paradigms being implemented in the company.

Development. This is the phase of building the foundation of CC, so it is necessary for the leader and the subordinates to cross-enrich ideas and establish teamwork. To develop the company in a versatile and fast way, it is necessary to pay special attention to the combination and internalisation of knowledge already at the enterprise level to ensure the distribution of CC elements among the staff.

Maturity. The perception of knowledge acquired and processed by the company requires its distribution and exchange, its translation into proclaimed values, baseline statements and individual attitudes. Since

there is already a successful experience of interaction at this stage, it is necessary to reinforce it with appropriate artefacts (symbols, rules, language).

Ageing. At this stage, the role of CC is particularly significant; the main task becomes the elimination of existing contradictions in CC, the adoption of new cultural paradigms, ensuring coherent group perceptions of the surrounding reality, the restoration of mechanisms of externalising knowledge and its subsequent internalisation.

EVOLUTION OF LEADERSHIP SKILLS AND SOCIO- PSYCHOLOGICAL REQUIREMENTS FOR COMPANY MANAGEMENT

Let us further consider the transformation of individual HC. As an example of such dynamics, let us take the change in the

Table 6

**Dominant requirements for individual capital and psychological characteristics
of the top managers at different stages of the organization life cycle**

LCO stage	Priority management tasks *	Demanded elements of individual HC	Demanded psychological qualities
Formation	Generating relevant business ideas	– Entrepreneurial capital; – Intellectual and creative capital	Combination of creativity and willingness to take risks, ability to transform ideas into achievable results, creativity
	Establishing production and sales	– Professional capital; – Educational capital	Determination, focus on success, willingness to see the task accomplished
Development	Launching new projects, entering new markets, implementing innovative solutions	– Entrepreneurial capital; – Intellectual and creative capital	Combination of creativity and willingness to take risks, ability to transform ideas into achievable results, creativity
	Establishing administrative management, norms and regulations	– Organisational capital	Aiming to streamline and control the situation
Maturity	Enhancing innovative development, launching new projects, and institutionalising them.	– Entrepreneurial capital; – Intellectual and creative capital	Combination of creativity and willingness to take risks, ability to transform ideas into achievable results, creativity
	Building employee integration, creating a team environment	– Social and psychological capital; – Cultural and moral capital	Perseverance, empathy, attention to relationships between people, desire to be a team player
Ageing	Ensuring production and sales	– Professional capital; – Educational capital	Determination, focus on success, willingness to see the task accomplished
	Finding a new market place, launching in-demand products, management renewal, reorganisation	– Entrepreneurial capital; – Intellectual and creative capital	Combination of creativity and willingness to take risks, ability to transform ideas into achievable results, creativity

Source: compiled by the author.

Note: * – the control tasks are given with regard to the data in Table 2.

managerial style⁶ of the manager [25, 26], which to a significant extent determines the success of the enterprise. As the latter moves through the stages of the LCO, both a transformation in leadership style and the ability to move the organisation from one stage to the next one, from one level of consciousness to another, are usually

required. However, individuals typically have a predisposition to a particular style, so running a business can be likened to a relay race: one manager runs his stride as long as he can cope with the tasks at hand, then passes it on to the next, who moves on (solving problems in a changed environment).

A company in the *Formation* stage needs leaders who are both entrepreneurs with relevant ideas and good producers who are able to create a relevant product. The same

⁶ When considering types of leadership style, we will base our discussion on [25; 26].

Table 7

The Evolution of Key Performance Indicators for the Executives

Stage	Dominants of control	Objects of control /	KPI
Formation	Operational efficiency, product development and launching	Sales, market share	Remuneration on sales volumes
Development	Efficiency of operations, costs, regulations, functional plans, innovation, cost centres	Organisational processes, current plans, compliance with standards and norms	Remuneration from functional outcomes
Maturity	Market expansion, strategy, reports, profit centres and investment centres	Organisational processes, strategic plans, innovation	Remuneration from product results
Ageing	Integration, adaptation, integrated goal setting	Return on investments, integration processes	Remuneration from group results

Source: compiled by the author.

style will help the organisation reach the *Development* stage, but it is not so much an entrepreneur, or a generator of ideas that is needed, but a good administrator and organiser. It is now necessary to establish effective work and management, to form an organisational structure: the questions of 'what' and 'when' are joined by the question of 'how'.

Then, in the *Maturity* stage, the entrepreneur-oriented manager re-emerges; the focus shifts from current production tasks to development. There is an increasing emphasis on the integration and social interaction of workforce members, which makes it easier to manage the company in the current environment. The movement towards *Ageing* stage is usually associated with a weakening of entrepreneurial energy, complacency and a lack of desire to achieve more. The manager at this time needs to slow down organisational ageing, offer new ideas, focus on the 'what' and the 'why' rather than the 'how'. This role is usually assigned to production managers with a strong entrepreneurial management style.

Let's compare in *Table 6* the LCO stages and the characteristics of the in-demand

management style based on the manager's HC features and psychological traits.⁷

It is clear that management needs all the knowledge and competences, but each stage puts forward its own specific requirements for current capabilities. Usually the manager, given his/her own HC and psychological peculiarities, adheres to his/her own management style, possibly no longer corresponding to the needs of the enterprise at the current stage, which suggests the need to replace him/her and select a manager with the qualities sought.

Finally, let us consider the evolution of requirements for managers of the company, the evaluation of their performance, which key performance indicators (KPIs) will dominate the individual stages of LCO and highlight the reward criteria (target KPIs) for each stage, taking into account the evolution of the company's objectives and the current areas of managerial effort (*Table 7*).

To summarise, the results of the study indicate that the basic types of HC, as well as their constituent elements, should change

⁷ On the basis of the above characteristics, it is possible, for example, to identify management styles close to the types of managers proposed by I. Adizes [26]: P (production manager), A (administrator), E (entrepreneur), I (integrator)).

their meaning and actual characteristics (composition of the elements demanded) as they move from the initial stage to the final stage. The best case scenario is when this happens synchronously with the change of LCO tasks. This allows us to present the ontogenesis of an enterprise HC as its passing through a number of stages: *Formation, Development, Maturity, Ageing, Resurgence*, characterising the sequence of transformation of HC parameters in the process of evolution.

CONCLUSIONS

Based on the provisions of various economic and management schools, the author has shown a coherent sequence of changes in the HC of the enterprise and the factors that determine their dynamics. Thus, the systemic economic theory allowed identifying the elements of corporate and individual HC involved in the entrepreneurial, social, administrative and technical-economic spheres of enterprise activity. The concept of HC helped to detail the key components that form human capital, and the evolutionary theory of the firm helped to detail the priority managerial tasks of individual stages of company development.

The HC of an enterprise undergoes a series of transformations in its formation: an increase in size (both its corporate HC and the aggregate HC of its employees grow along with its seniority), a change in attention to the individual components of corporate and individual HC. We find that the main drivers of such transformations are the reassessment of the governance challenges that the firm faces at different stages of its life cycle: it is these challenges that determine the actual requirements for the human capital components of its workforce. And since such transformations are common to all companies, the above causes are manifested in each organisation. This, in turn, makes it possible

to talk about the uniformity of such changes and the possibility of typifying them.

Thus, the need for enterprise HC transformation is a consequence of the evolution of tasks at different stages of LCO, i.e., the causes of HC changes are the peculiarities of enterprise development at the respective stages. This made it possible to identify five stages with the same name as the LCO stages as the key phases of HC evolution, which was the main scientific outcome of the work. Another outcome is the identification of the types of corporate and individual HC whose significance prevails in the five identified development stages. Each successive stage uses more and more HC (which does not mean, however, that its productive use is automatically increased). In case of failure to provide timely human resources support to the highlighted development problems, the company's rate of establishment slows down; and vice versa, availability of the highlighted human resources helps to overcome objective difficulties in business development at the relevant stages. The results are verified by examining the evolution of key elements of a company's HC, such as corporate culture and management style.

Determination of human capital evolution trends also makes it easier to solve a number of traditional management problems: establishing a motivation system and personnel interaction style that corresponds to the specifics of the current LCO stage and expected trends; updating requirements for hired employees; conducting training taking into account projected professional competencies, etc.

The author sees as the further task of the study the operationalisation of the above trends, the measurement of the HC condition in the enterprise, taking into account the difficulties associated with its solution, because knowledge and abilities

are hardly tangible (e.g., how to correctly assess employee capabilities?) — they do not directly depend on the investments made and are of inertial nature (difficult to determine the value and timing of the investment return).⁸ The author considers the study of

the relationship between the general (useful for any organisation) and special (demanded at a specific enterprise) HC of employees as another direction of work (these views go back to [28, p. 56–79; 29, p. 112–142]). A comparison of the return on investment in the mentioned types of training will make it possible to compare their efficiency, as well as to determine the target ratio of general and special HC investments at different stages of LCO.

⁸ Thus, in [27, p. 48], which provides an overview of HC assessment methods for a company, it concludes by noting: “none of the above approaches, in our opinion, can claim to be a sufficiently accurate ...method for assessing HC of an organisation”.

REFERENCES

1. Ployhart R.E., Nyberg A.J., Reilly G., Maltarich M.A. Human capital is dead; long live human capital resources. *Journal of Management*. 2014;40(2):371–398. DOI: 10.1177/0149206313512152
2. Komarova Zh. Human capital as a main factor of increased competitiveness. *Nauka i innovatsii = The Science and Innovations*. 2018;(1):4–9. (In Russ.).
3. Flores E., Xu X., Lu Y. Human Capital 4.0: A workforce competence typology for Industry 4.0. *Journal of Manufacturing Technology Management*. 2020;31(4):687–703. DOI: 10.1108/JMTM-08-2019-0309
4. Shirokova G.V. Life cycle of the organization. St. Petersburg: Higher School of Management; 2008. 480 p. (In Russ.).
5. Kleiner G.B. System economy: Development steps. Moscow: Nauchnaya biblioteka; 2021. 746 p. (In Russ.).
6. Kleiner G.B. System management and system optimization of the enterprise. *Sovremennaya konkurentsia = Journal of Modern Competition*. 2018;12(1):104–113. (In Russ.).
7. Mil'ner B.Z., ed. Innovative development: Economics, intellectual resources, knowledge management. Moscow: Infra-M; 2010. 624 p. (In Russ.).
8. Lester D.L., Parnell J.A., Carraher A. Organizational life cycle: A five-stage empirical scale. *The International Journal of Organizational Analysis*. 2003;11(4):339–354. DOI: 10.1108/eb028979
9. Lavizina O.V. Some aspects of managing the life cycle of an organization, understood as a social system. *Menedzhment v Rossii i za rubezhom = Management in Russia and Abroad*. 2003;(5):47–60. (In Russ.).
10. Zhdanov D.A., Danilov I.N. Organizational evolution of corporations. Moscow: Delo; 2011. 272 p. (In Russ.).
11. Adizes I.K. Managing corporate lifecycles. Carpinteria, CA: Adizes Institute Publications; 2004. 460 p. (Russ. ed.: Adizes I.K. Upravlenie zhiznennym tsiklom korporatsii. Moscow: Mann, Ivanov and Ferber; 2019. 512 p.).
12. The well-being of nations: The role of human and social capital. Paris: OECD; 2001. 121 p. URL: <https://www.oecd-ilibrary.org/docserver/9789264189515-en.pdf?expires=1677524037&id=id&accname=guest&checksum=768F5C1201AED9C3F8F447A84B6FB94F>
13. Zhdanov D.A. Human capital of the enterprise in the context of the system economy. *Ekonomicheskaya nauka sovremennoi Rossii = Economics of Contemporary Russia*. 2020;(4):24–38. (In Russ.). DOI: 10.33293/1609–1442–2020–4(91)-25–38
14. Suprun V.A. Intellectual capital. 2nd ed. Moscow: Librokom; 2010. 192 p. (In Russ.).
15. Mil'ner B.Z. Organization theory. Moscow: Infra -M; 2012. 848 p. (In Russ.).
16. Magradze A.G. Human capital as a component of corporate intellectual capital: Existing methods and indices of its measurement and their impact on the market capitalization of domestic corporations. *Fundamental'nye issledovaniya = Fundamental Research*. 2019;(12–1):224–232. (In Russ.). DOI: 10.17513/fr.42652

17. Samad S. Achieving innovative firm performance through human capital and the effect of social capital. *Management & Marketing*. 2020;15(2):326–344. DOI: 10.2478/mmcks-2020–0019
18. Gratton L., Ghoshal S. Managing personal human capital: New ethos for the ‘volunteer’ employee. *European Management Journal*. 2003;21(1):1–10. DOI: 10.1016/S 0263–2373(02)00149–4
19. Zakharova O. Specificity of knowledge management in the enterprise in dependence on the stage of the person’s life cycle. *Journal of the Knowledge Economy*. 2019;10(4):1447–1465. DOI: 10.1007/s13132–018–0550–0
20. Arefieva O., Polous O., Arefiev S., Tytykalo V., Kwilinski A. Managing sustainable development by human capital reproduction in the system of company’s organizational behavior. *IOP Conference Series: Earth and Environmental Science*. 2021;628:012039. DOI: 10.1088/1755–1315/628/1/012039
21. Collings D.G., Wood G.T., Szamosi L.T., eds. Human resource management: A critical approach. Abingdon, New York, NY: Routledge; 2018. 450 p.
22. Greiner L. Evolution and revolution as organizations grow. *Harvard Business Review*. 1972;50(4). URL: https://www.ugc.ac.me/skladiste/blog_615939/objava_151912/fajlovi/GREINER%20Evolution-and-Revolution-as-Organizations-Grow.pdf
23. Schein E.H. Organizational culture and leadership. San Francisco, CA: Jossey-Bass Publishers; 1992. 458 p. (Russ. ed.: Schein E.H. Organizatsionnaya kul’tura i liderstvo. St. Petersburg: Piter; 2002. 336 p.).
24. Nonaka I., Takeuchi H. The knowledge-creating company: How Japanese companies create the dynamics of innovation. New York, NY, Oxford: Oxford University Press; 1995. 304 p. (Russ. ed.: Nonaka I., Takeuchi H. Kompaniya — sozdatel’ znaniya. Zarozhdenie i razvitie innovatsii v yaponskikh firmakh. Moscow: Olymp-Business; 2003. 384 p.).
25. Beckman C.M., Burton M.D. Founding the future: Path dependence in the evolution of top management teams from founding to IPO. *Organization Science*. 2008;19(1):3–24. DOI: 10.1287/orsc.1070.0311
26. Adizes I.K. The ideal executive: Why you cannot be one and what to do about it. Carpinteria, CA: Adizes Institute Publications; 2004. 295 p. (Russ. ed.: Adizes I.K. Ideal’nyi rukovoditel’. Pochemu im nel’zya stat’ i chto iz etogo sleduet. Moscow: Alpina Publisher; 2020. 264 p.).
27. Kravkovskaya I.N. Measurement and evaluation of the human capital of an organization: Approaches and problems. *Ekonomicheskii analiz: teoriya i praktika = Economic Analysis: Theory and Practice*. 2008;(19):41–50. (In Russ.).
28. Becker G.S. The economic approach to human behavior. Chicago, IL: University of Chicago Press; 1978. 320 p. (Russ. ed.: Becker G. Chelovecheskoe povedenie: ekonomicheskii podkhod. Izbrannye trudy po ekonomicheskoi teorii. Moscow: HSE Publ.; 2003. 672 p.).
29. Acemoglu D., Pischke J.-S. Beyond Becker: Training in imperfect labor markets. *The Economic Journal*. 1999;109(453):112–142. DOI: 10.1111/1468–0297.00405

ABOUT THE AUTHOR



Dmitry A. Zhdanov — Dr. Sci. (Econ.), Associate Professor, Leading Researcher, Central Economics and Mathematics Institute, Russian Academy of Sciences, Moscow, Russia
<https://orcid.org/0000-0001-9372-2931>
 djhdanov@mail.ru

Conflicts of Interest Statement: The author has no conflicts of interest to declare.

The article was submitted on 02.11.2022; revised on 26.12.2022 and accepted for publication on 27.02.2023. The author read and approved the final version of the manuscript.