Peculiarities of localization of human capital in the Russian subarctic

V A Davydenko¹, R K Khasanov², A A Dvorskaya¹

¹University of Tyumen, Tyumen, Russia
²Yugra State University, Khanty-Mansiysk, Russia

v.a.davydenko@utmn.ru

Abstract. This article examines the features of the meso-level parameters of human capital, using the example of the Arctic sub-region of the Tyumen area. The author's model of the questionnaire is proposed, which was tested using the survey algorithms corresponding to the types of human, social, organizational, psychological and regional types of capital, their operationalization and verification, respectively, by their associated structures and algorithms for analyzing data identifying residents of the subarctic region from an urban sample (n=113, error on one attribute Δ=9.5%) (March 2020). The type of research is "trial" ("pilot"), which sets an empirical goal to identify positive and negative connotations of respondents regarding the assessment of human capital on the basis of constructed scales as measurement standards. It was found that the "positive connotation" in relation to the five basic issues of the "concrete human capital" subsystem is approximately three times higher than the "negative connotation", which may indicate a prevailing trend and a key feature of the localization of human capital in the Russian subarctic. Moreover, all 24 questions on psychological capital (the PCQ-24 method) were answered with an exceptionally high positive connotation, which, first, confirms the value of the concept of "positive psychology" itself, and second, it makes you wonder why such positive data were obtained and what the results might be in other regions of the country? At the same time, the connotation "Fifty-Fifty" was noted only for some positions related to the place of residence, which may be the result of the fact that respondents living in the North, although generally positive, do not connect their future with this region or their place of residence in General.

1. Introduction

Decision-making centers in the twenty-first century are shifting towards investing and promoting human capital development. The purpose of the article is to study its structure in conjunction with other types of capital – social, organizational, psychological, regional and present their component-by-component analysis on the example of localization in the Russian subarctic. The author's model of their operationalization and verification is proposed on the example of residents of the subarctic region, whose sample (n=113, error on one attribute Δ=9.5%) was tested using survey algorithms corresponding to the types of capital (March 2020). The type of research is defined as a "trial" ("pilot"), which sets an empirical goal to identify positive and negative connotations of respondents regarding the assessment of human capital based on constructed scales as measurement standards. The empirical goal of this study is to test the author's methodology for component-based measurement of human capital, the theoretical goal is to identify and study its interdisciplinary contexts, and the project goal is to further conduct mass surveys on samples with higher representativeness for a more detailed and deep understanding of its component structure.
2. Macroeconomic, historical, and theoretical contexts
The formation of human capital in the Arctic regions was caused by their industrial development based on migration and urbanization (1960-1990s).

The transition to the market (1990-2000), together with the weakening of state influence, led to a migration outflow of the working-age population. The current stage of development is taking place in the context of the formation of a new institutional framework for state policy in the Arctic based on territorial strategies for socio-economic development and providing broad opportunities for the accumulation of human capital in the Arctic regions. In the process of economic development of the Arctic territories, the state applied a targeted approach to the accumulation of human capital through the implementation of Northern benefits, which included district coefficients and percentage allowances, annual additional leave, housing benefits, provision of living space for the duration of the employment contract, an increased length of service that entitles to a high pension. The benefits were intended to attract and retain qualified personnel, including reimbursement for the purchase of high-calorie food, warm clothing and shoes, increased heating costs, and differences in the prices of goods compared to the Central regions. Characteristic features of the Yamalo-Nenets Autonomous district according to Rosstat data for 2019 – a high level of economic activity (77%); the population has a fairly young age structure (the average age is 33 years), a high percentage of qualified citizens (84%), which in General can only indicate an objectively high level of human capital development as a factor of socio-economic prosperity in the region. In the future, it is important to embed the effects of human activity and productive structures of human capital in certain models of the regional concept, associated with sustainable development, organizational and economic mechanisms that can be used to measure the effectiveness of its implementation in the transition to the digital economy in order to make adequate use of information and cognitive clusters [1]. The Oxford Handbook on human capital, which presents articles by the world's best authors on this topic, focuses specifically on the cognitive form of human capital (cognitive human capital), which is present at both individual and collective levels and in the context of an organizational resource includes thoughts, schemas, heuristics, dispositions and knowledge structures, which, combined with resources and quality managed strategic framing, produce valuable actions and decisions for the organization [2: 121]. Cognitive forms of human capital at the micro and macro levels should eventually be easily integrated into the processes of digitalization. The quality of human capital at the macro level affects the main factors of economic competitiveness, which along with the basic endogenous economic variables, is expressed in human development indices [3]. Features of localization of human capital are important for urbanization, which contributes to economic efficiency, cities become centers of economic, cultural, and informational potential, providing a "breakthrough" in the development of the economy [4]. The theoretical construct of "human activity" focused on specific activities for the extraction of energy resources [5], should also be associated with the definition of human capital in its basic parameters. Our survey was conducted on an urban sample of residents of the subarctic region, so preliminary observations concerning the macroeconomic, historical and theoretical contexts are of fundamental importance for this article.

3. Theoretical interpretation of the research object
The object of research is the theoretical concept of human capital, the model parameters of which traditionally originate in the knowledge, skills, and other personal characteristics of individuals. At the same time, their existence is not limited to the individual level, since at the meso - and macro-levels of structural units human capital becomes a strategic resource. The resulting combinations and aggregations are always complex, and they are all specific to an organization or region; therefore, competitive advantage is achieved mainly due to a unique combination of human capital resources. The author’s theoretical interpretation of the research object is based on a poly paradigmatic study of the phenomenon of human capital, which integrates multilevel theories of various disciplinary traditions. Its interdisciplinary matrix is proposed in terms of the "umbrella" all-pervading effect of the definition of "capital", as a self-increasing value, accumulation and increment of resources, mutual conversion of their various forms, the adoption of both embodied and incorporated forms, to be embodied in individuals and relationships between people. According to the concept of P. Bourdieu there are three
states of capital: incorporated; objectified and institutionalized. The first is a set of relatively stable reproducible dispositions and demonstrated abilities that the owner of a particular form of capital is endowed with; the second means the acceptance by capital of materialized forms that are available to direct observation and transmission in their physical form; the third state involves objectified forms of recognition of this type of capital as a resource. Capital follows the logic of self-growth: the more capital of a given type, the easier it is to maintain and accumulate; accordingly, it is easier to accumulate other types of capital [6].

New perspectives for studying the processes of the emergence of human capital open economic concepts [7] and the reflection of the processes of the emergence of human capital resources in multi-level models [8]. In practice, the use of these models means that in principle it is possible to identify and explain how people's beliefs, preferences, and interests form new social structures, while revealing human capital. According to M. Russ, currently it is very actual to solve the problem of building a Foundation for a multidisciplinary and multi-level theory of human capital [9]. Continuing the important topic of strategic human resources, it is impossible not to mention the Handbook of the 2019 edition on research in the field of strategic human resources [10], where strategic human capital resources are considered as a relatively new construction, which has not yet been actively developed in the scientific literature. Research is this field requires the integration of several theoretical points of view and empirical approaches but works in this area are still rare. In this new Handbook fifty outstanding researchers in the field of strategy, organizational behavior, personnel management and organization theory have written articles that share a scientific interest in the concept of human capital resources. They draw on a variety of experience and knowledge to present two broad areas of research questions, namely: how do we conceptualize human capital resources and how do we link them to an organization? Each of these two areas of research consists of four topics, and each topic is considered from the point of view of "micro" and "macro"; as a result, the authors of each thematic area shed light on common features and differences in their scientific views on the theory and practice of the concept of human capital resources.

We should note the importance of the articles about the resources and prospects of human capital and the concepts of "knowledge, skills, abilities, and other characteristics" (abbreviated as KSAOs) [11]. The use of various new theories of fundamental, applied and practical psychology that reveal the facts, mechanisms and laws of human mental activity and their manifestations in natural conditions with the use of appropriate tests allows us to present measurements of specific manifestations of human capital. One of the limitations of the psychological approach is that by focusing on human capital at the individual level (at the unit level), we exclude important manifestations that would focus on the study of collective human capital. At the same time, the creation and testing of new theories and their actual applications at the level of the concept of psychological capital (PsyCap) allows us to attract them for the creation of our tools and verify the constructive methods of the field of positive psychology, which emphasizes the importance of focusing on positive constructs in the workplace. Especially important, in our opinion, in this regard are extremely relevant scientific articles concerning the validation and empirical verification of the modified version of the psychological capital questionnaire (PCQ12) in Spain [12], the validity and reliability of the data of the "truncated" psychological capital questionnaire in a sample of Mexican workers [13], as well as outstanding articles and monographs by Fred Luthans and his colleagues [14], [15], who developed a new theory of positive psychological capital.

4. Data and analysis methods
The basis for obtaining and analyzing data was a pilot survey in March 2020 of residents of the subarctic region (n=113, error on one attribute Δ=9.5%) developed by the authors of the article and other project participants of prof. G. F. Romashkina’s grant (see: 6. Recogngments) - according to the structures and algorithms of the questionnaire that identify the types of human capital: "specific human capital" (five questions representing a problem for a given organization); "total human capital" (five questions representing a problem for the labor market); "social capital," which was subdivided into "internal" (six questions) and "external" (six questions); "organizational capital" (six questions); "interpersonal relations in organizations" (three questions); "interpersonal relations in the place of residence" (three
questions); "loyalty to organization" (three questions); "loyalty to the community" (three questions); "positive organizational identification" (six questions); "negative organizational identification" (six questions); "psychological capital" (PCQ12 questionnaire) – 24 questions that record, respectively, such positive constructs: "self-efficacy" (belief in achieving the necessary specific goals); "optimism" (a positive attitude to success now and in the future); "stability" (the ability to go back and even go beyond it, faced with difficulties); "hope" (the presence of will and perseverance in achieving the goal, as well as the ability to plan ways to achieve this goal) [12], [13], [14], [15], [16]. These four components of the psychological capital «PsyCap» are considered to be the constructs of the "state", which theoretically places them in the middle of the continuum of state - feature. In the concept of psychological capital as a whole, these are the final achievements of the "positive probability of motivated people", also the creation of synergy in organizational achievements and such important results as financial and managerial efficiency, increased involvement, the least burnout, and other positive things. And all these advantages are especially important in the current situation of uncertainty, which is characterized by decline of financial markets and the fall of oil price.

The six-point Likert / Likert scale, developed in 1932 by Rensis Likert, was used in the survey and questionnaire processing procedures. When working with the scale, the subject evaluates the degree of their agreement or disagreement with each judgment, from "completely agree" to "completely disagree". The sum of the ratings of each individual judgment allows you to identify the attitude of the subject on any issue. Relationships to the subject of study are based on simple consistent judgments; the expression "Likert scale" means two different concepts: (1) a summative psychometric construct, that is, a property measured by the sum of points from all points related to this property; (2) a point rating scale for each individual point, which is a continuum from one critical point through a neutral to the opposite of another critical point. We used the second version of the "Likert scale", when the total rating scale for each individual item was applied – to the entire sample is expressed by the total number of responses on this scale, reduced to a percentage expression. This methodology at the first stage of data analysis allows you to do without special calculation of average values, which allows you to immediately identify "positive" and "negative" connotations for each individual item of questions based on a simple linear distribution. This approach allows us to immediately identify certain features of the localization of human capital in the Russian subarctic at the level of "rough perception" on the example of our survey. Note that if we talk about the deep scientific meaning of the definitions of self-efficacy, optimism, hope and stability, then within the framework of psychological science, the authors of the methodology quite reasonably believe that it is impossible to "break" the integrity of this psychological questionnaire, present the data obtained, analyze them or study some individual test items on certain empirical surveys, insofar as it is internally connected, integral, based and based on its own deep psychological ideology and methodology: high factor loadings and cross-loadings. However, some pure psychologists use the PsyCap 12-point psychological capital questionnaire (PCQ12) when the survey focuses on a short version of the psychological capital questionnaire [16] - a "short" or "truncated" version that consists of 12 points: three points for self-efficacy, four points for hope, three points for resilience, and two points for optimism. This means that factors can be divided into parts in principle, and this is the main point that allows us to use techniques for obtaining data and methods of analysis of "pure psychologists" relative to "pure sociologists". The authors of the article believe that any question to the Respondent can always be interpreted purely sociologically, presenting the test as a questionnaire. For psychologists, to achieve "higher validation" of the questionnaire, a special test is conducted on a heterogeneous sample from different regions and from different industries / sectors of the economy, the sample under this procedure reaches about 650 people. For a purely psychological test, this is "representativeness" if it meets certain internal criteria and is the fundamental basis for a purely psychological measurement of data connectivity and validity. At the same time, positive psychology acts as a paradigm that involves a watershed of three points: the study of positive emotions; the study of positive qualities, strengths and virtues of the individual; and the study of positive institutions that display virtues, are supported by positive emotions, and contribute to the study of positive aspects of human capital.

5. Analysis of indicators
Speaking about the sample size, it should be emphasized that the analysis of indicators is determined by the appropriate accuracy of the final generalizations from increased to approximate, from the level of the confidence interval of the allowable sampling error, which in our case is equal to $\Delta=9.5\%$ (the calculation is made using the Paniotto formula:

$$
\Delta \approx \sqrt{\frac{1}{n} - \frac{1}{N}},
$$

where $N$ is the General population; $n$ is the survey sample; $\Delta$ is the sampling error for a single attribute.

In our case, with a sample size of 113 people and an error rate of 9.5%, the differences can be recognized as significant if they overlap 9.5%, or for a rougher count – 10%.

For the 1st question from the subsystem of "specific human capital": "I have many skills that are necessary for the organization where I work", we received the corresponding accumulated frequency distribution: 16% - "disagree" and "rather disagree", then we denote this sociological fact as "negative connotation"; and 84% - "rather agree", "agree", "fully agree" this sociological fact we denote as "positive connotation". Now we are not talking about the stability, validity and connectedness of all these figures, when psychologists use technologies with high factor and cross-loads – we just determine the type of connotation: "positive" or "negative". This is an analogy with the coefficient $\chi^2$, a certain value of which fixes whether there is a connection or not. According to this algorithm, we present an analysis of indicators based on the obtained linear distribution, the accumulated frequency distribution of which fixes the maximum and minimum values of variation of the studied feature, represented by the corresponding points of the methodology.

Distribution of answers to the 2nd question from the subsystem "specific human capital": "I have a lot of knowledge that is necessary for this organization where I work" 22% - "negative connotation"; 78% - "positive connotation".

Distribution of answers to the 3rd question from the "specific human capital" subsystem: "I have expert knowledge in a certain area that is important for this organization where I work": 29% - "negative connotation"; 71% - "positive connotation".

Distribution of answers to the 4th question from the subsystem "specific human capital": "I have information about the internal policy of the organization, and where I work, its business processes and procedures" 25% - "negative connotation"; 75% - "positive connotation".

Distribution of answers to the 5th question from the subsystem "specific human capital": "I have the knowledge and professional skills necessary for the activities of the organization where I work, which I received from a mentor and mentor": 19% - "negative connotation"; 81% - "positive connotation".

If we combine the answers to all five questions about the position of the subsystem "specific human capital", we can summarize that the "negative connotation" is a spread of data from 16% to 25%, respectively, the "positive connotation" is a spread of data from 75% to 84%. If there is a sampling error of the order of $\Delta=10\%$, we can say that the "positive connotation" in relation to the five basic issues of the subsystem of "specific human capital" is about three times higher than the" negative connotation", which can be considered as the prevailing trend and a key feature of the localization of human capital in the Russian subarctic.

Psychologists set themselves more tempting and ambitious goals, for example, to determine how psychological capital synergisms work between efficiency, hope, optimism, and sustainability, and how they help explain when the basic design of psychological capital has a greater impact on productivity and desired attitude than each of the components itself. To assess this problem, psychologists identified four positive sources of hope, efficiency, resilience, and optimism as indicators of a key factor of higher-order psychological capital in a sample of 396 Mexican workers [13: 562]. While sociologists set somewhat different research goals in relation to human capital [17]. Unfortunately, such a subtle analysis as that of psychologists in our sample of 113 people is quite complex, and problems of this kind can be solved both with a significant increase in the volume of the sample population, and with the use of other more accurate methods of data analysis.
Because of the limitations of space, we are forced to stop and clarify that all the above structures and algorithms of the questionnaire that identifies the types of human capital, was marked only "positive" connotations, except for the following questions, the answers to which were divided equally: "I am well able to use a personal relationship and connection with my professional community to organize their career" (a component of human capital, described as "external social capital»); "in my area there are all conditions so that I could spend leisure time as I like" (a component of human capital, described as "organizational capital", although the meaning is closer to "regional equity" or "loyalty to the community" - this point means that some signs in the type of capital we will need to revise); "I would find it hard to change their place of residence"; "if I had to move, I would have missed my neighbors have become good friends»; "if I had to move, I would miss my neighborhood" - three components of human capital, labeled "Loyalty to the place of residence»); the answers to all questions on organizational identification (six questions) were divided equally into "positive" and "negative" connotations. In General, this seems to be due to the specifics of the North, our survey confirms that many people perceive their place of residence as temporary and do not identify their future with this harsh region.

We emphasize that all 24 questions on psychological capital (PCQ-24) were answered with an exceptionally high positive connotation, which, firstly, confirms the very concept of "positive psychology", and secondly, makes us think about why the "rainbow" features of the meso-level of development of psychological capital are being approved, as we have seen on the example of the Arctic sub-region of the Tyumen region.

Acknowledgments
The research was funded by RFBR, project number 19-29-07131, «Modelling and measurement of human capital and its forms in the context of economy digitalization: resources, flows, institutions».

References
[1] Dyatlov S, Didenko N, Lobanov O and Kulik S 2019 Digital transformation and convergence effect as factors of achieving sustainable development IOP Conference Series: Earth and Environmental Science 302(1) 012102
[2] Oxford handbook of human capital 2012 p 688 (Oxford: Oxford univ. press)
[3] Didenko N, Kulik S, Skripnuk D and Samylovskaya E 2018 A country competitiveness analysis. Adl-model involved International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM 18(5.3) 3-10
[4] Didenko N I, Skripnuk D F and Mirolyubova O V 2017 Urbanization and Greenhouse Gas Emissions from Industry IOP Conference Series: Earth and Environmental Science 72(1) 012014
[5] Didenko N I and Romashkina E S 2018 Assessment of the Influence of the Extraction of Energy Resources on the Environment IOP Conference Series: Earth and Environmental Science 180(1) 012014
[6] Bourdieu P 2001 Forms of Capital, in: Granovetter, M. and R. Swedberg (eds) The Sociology of Economic Life 96-111 (Boulder: Westview Press)
[7] Harper D and Lewis D 2012 New perspectives on emergence in economics Journal of Economic Behavior & Organization 82 (2-3) 329-337
[8] Ployhart R and Moliterno T 2011 Emergence of the human capital resource: A multilevel model. Academy of Management Review 36 127-150
[9] Russ M 2014 Value Creation, Reporting, and Signaling for Human Capital and Human Assets Building the Foundation for a Multi-Disciplinary, Multi-Level Theory p 272 (Publisher Palgrave Macmillan US)
[10] Nyberg A 2019 Handbook of Research on Strategic Human Capital Resources p 552 (Publisher: Edward Elgar Pub)
[11] Nyberg A, Moliterno T, Hale D and Lepak D 2014 Resource-based perspectives on unit-level human capital: a review and integration Journal of Management 40 (1) 316-346
[12] Djourova N, Rodriguez and Lorente-Prieto L 2019 Validation of a modified version of the
psychological capital questionnaire (PCQ12) in Spain Revista Interamericana de psicologia / Interamerican Journal of Psychology 37(2)

[13] Santana-Cardenas S, Viseu J, Inmaculada M, Nunez L and De Jesus S 2018 Validity and reliability evidence of the Psychological Capital Questionnaire-12 in a sample of Mexican workers 34 (3) 562-570

[14] Luthans F, Youssef-Morgan C and Avolio B 2015 Psychological Capital and Beyond Har p 336 (Publisher: Oxford University Press)

[15] Luthans F, Avey J B, Avolio B and Peterson S J 2010 The development and resulting performance impact of positive psychological capital Human Resource Development Quarterly 21(1) 41-67

[16] Avey J B, Avolio B and Luthans F 2011 Experimentally analyzing the impact of leader positivity on follower positivity and performance Leadership Quarterly 22(2) 282-294

[17] Romashkina G, Didenko N and Skripnuk D 2017 Socioeconomic modernization of Russia and its Arctic regions Studies on Russian Economic Development 28 (1) 22-30