

Motivational Drivers of Population Migration (on the Example of Young People in the Arctic Zone of Russia)

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Abstract—The article presents an approach to studying the determination of migration processes, based on the sociopsychological essence of this phenomenon. The authors propose considering the activity of migration actions as a result of the interaction of environmental factors and individual personality traits based on the integrated concept of the motivational driver of migration. To identify motivational drivers of migration, a step-by-step methodology has been developed that can determine combinations of external factors and personality traits that most strongly correlate with migration activity. The methodology includes the use of such statistical methods as factor analysis, regression analysis, the chi-square test of independence, cluster analysis, and decision trees. The methodology was tested using the example of priority geostrategic territories of the Arctic Zone of Russia for a cohort of young people from the population. The empirical basis of the study was the results of a survey of 8600 people aged 16–35 years living in the Arctic territories of nine federal subjects of the Russian Arctic. The study identified ten motivational drivers of out-migration of young people from the Arctic regions, grouped into four types of factors: professional development, education, climate and ecology, and social connections. The structural components of motivational drivers are indicated and are meaningfully interpreted. The results of the study enrich the existing tools for studying migration processes, since they make it possible to analyze the complex configuration of the motivational driver of migration, which consists of a combination of environmental conditions and personality traits that have a nonlinear combined effect on the decision to migrate. Identifying the motivational drivers of migration has practical significance in adjusting the socioeconomic and migration policies implemented in the region.

Keywords: determinants of migration, motivational drivers, young people migration, motivation, factors and causes of migration, Arctic Zone of Russia

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INTRODUCTION AND LITERATURE REVIEW

Migration processes are a traditional topic for research in the social sciences and humanities. In recent years, the relevance of such research in the context of new challenges, as well as global economic and political changes, has only increased. Interregional population migrations, caused by uneven socioeconomic development of Russia's territory, also remain important for study in Russia (Mikryukov et al., 2020).

Regardless of the types of migration, the key aspect in their study is the mechanisms underlying the determination of migration processes. The study of the causes and motives of migration employs a variety of theoretical and conceptual approaches formulated by

Western researchers. The most famous among them are the laws of migration (E.G. Ravenstein), the Push-Pull Theory (E. Lee), the neoclassical theory of migration (M. Friedman and P. Samuelson), the new economics of labour migration (O. Stark, E. Katz, and E. Taylor), the network theory of migration (D. Massey), the theory of cumulative causation (G. Myrdal), etc. A substantive review and comparative analysis of these approaches are presented in numerous studies on migration topics (Ivakhnyuk, 2015; Kumpikaite and Zickute, 2012; Trofimova, 2020; Wickramasinghe and Wimalaratana, 2016). These classical migration theories, which explain various aspects of migration behavior and cause-and-effect relationships in migration processes, have not

lost their relevance to this day (Dolzhenko and Lobova, 2020).

The cited theoretical approaches explain migration behavior mainly in terms of economic, political, and social context. The greatest importance, as a rule, is given to economic factors and reasons recognized as dominant in this issue according to Ravenstein's laws of migration. Clearly, however, migration is not always stimulated solely by economic forces. In the 1960s, the Russian sociologist and economist T.I. Zaslavskaya included the behavioral (sociopsychological) factor in the mechanism of determining migration processes, including purely individual characteristics of the individual: material and spiritual interests, aspirations and attitudes, value orientations (Sotsial'nye ..., 1968). It is this factor that allows us to answer the question of why, in identical external conditions, some people migrate while others remain in place. Those personality traits that, under the same conditions, lead to differentiation in decisions made about migration can be considered subjective factors of migration (Metodologicheskie ..., 1974). In interaction with objective socioeconomic factors of the external environment, they trigger the migration mechanism.

Up to now, Russian scientists have accumulated significant experience in studying migration motivation. When studying the determination of migration processes, researchers use a wide range of definitions: causes, factors, motives, etc. However, the essence of the studied phenomenon does not change. A critical look at this problem is presented in (Rybakovskii, 2017b). The author notes that the reason is an intermediate link between the factor and the decision to migrate. Factors, in turn, act as specific components of objective conditions. Numerous studies have also been devoted to the composition of migration factors and their various classifications (Rybakovskii, 2017a; Vyacheslavov, 2015).

If we approach the practical side of the issue, various empirical studies are conducted to study the motivation for migration. One of the research areas uses statistical data sets. At the same time, migration experts note the paucity of domestic migration statistics in comparison, e.g., with foreign databases and population registries, which allow for a detailed study of migration based on microdata (Karachurina et al., 2022). Discussing the quality of statistical monitoring of migration processes at the federal level, experts acknowledge that in a number of respects the analytical value of such information is very low (Chudinovskikh and Stepanova, 2020). This directly concerns such an important indicator as the reasons for migration. A very large proportion of relocations are associated with rather vague reasons ("personal, family reasons," "other reasons," "reason not specified"), the wording of which is either too general or does not at all capture the essence of the reason. In addition, about 30% of all intracountry movements are

explained by the reason "return after temporary absence." This leads to distortion of information about the real reasons for migration (Mkrtychyan, 2020).

Therefore, publications on migration determinants are dominated by studies that search for dependences between the indicators of people's arrivals/departures and various parameters of the socioeconomic development of territories using methods of correlation-regression analysis and construction of multifactor econometric models. Thus, E.S. Vakulenko (2019) constructs a gravity model of migration to identify the motives for interregional migration in Russia using Rosstat data, which makes it possible to assess the factors of attraction and repulsion. The author concludes that for modern migrants, not only economic factors are important, but also the indicators of quality of life, infrastructure, and ecology. Wang et al. (2019), using spatial panel econometric analysis, proved the significant impact of the level of well-being on migration in Russia, expressed in terms of better working conditions, higher quality of life, and health care.

According to V.I. Mukomel (2018), given the limitations of domestic empiricism, sociological surveys and qualitative methods are becoming virtually the only source of information on migration processes in Russia. To a greater extent, sociological studies that question the determination of migration processes are local in nature, affecting individual regions, localities, educational organizations and individual categories of the population (Latova, 2021; Simakova, 2019). Large-scale sociological research on this topic is not as widespread in Russia. In VCIOM (Russian Public Opinion Research Center) research, the main emphasis is placed on the emigration sentiments of Russians,¹ as well as on labor migration from abroad.² One recent major sociological project, which covered more than 5000 people from 10 Russian regions, was a study of the demographic well-being of the country's regions (Demograficheskoe ..., 2021). The research program made it possible to identify the main reasons for internal Russian migration, which in most cases are related to work and pay.

In recent years, qualitative methods of studying migration motives, implemented in the format of interviews and focus groups, have become widespread. Mkrtychyan and Florinskaya (2020), based on in-depth interviews with two groups of migrants, analyzed the effect of attracting and repelling motives for migration. Most migrants are motivated by economic reasons for migration, and the conditions of the urban environment, the quality of infrastructure, and opportunities for personal growth and leisure are also important to

¹ Emigration attitudes: monitoring. <https://wciom.ru/analytical-reviews/analytical-review/ehmigracionnye-nastroenija-monitoring>.

² Immigrants in Russia: pros and cons. <https://wciom.ru/analytical-reviews/analiticheskii-obzor/immigranty-v-rossii-za-i-protiv>.

them. R.E. Petrachenkov (2022), based on the results of a focus group study, cites the main reasons for the migration of young people from the Komi Republic: dissatisfaction with the development of infrastructure, the urban environment, architecture, the improvement of settlements, lack of prospects, and dissatisfaction with the level and pace of economic development in the region.

Thus, the determination of migration processes is studied using various methods and approaches. Many researchers acknowledge “the ambiguity and complexity of both the decision to migrate and delimitation of individual reasons and motives that guide people when changing their place of residence” (Mkrtchyan and Florinskaya, 2020, p. 132). At the same time, a review of publications on this topic showed that, in most Russian studies, decisions on migration are interpreted within the framework of certain socio-economic structures that influence these decisions. The study of the role of the individual as the main participant in the migration process has not been given due attention (Metodologiya ..., 2007).

In this paper, we would like to focus attention not only on the socioeconomic determinants of migration behavior (which are certainly dominant), but also take into account the behavioral factor that allows individuals in identical external conditions to form different migration attitudes. The aim of the study is a theoretical and methodological understanding of the motivation of migration processes determined by the interaction of environmental conditions and personality traits. To achieve the formulated objective, a number of successive problems are solved:

- (1) formation of a conceptual basis for the study and determination of a basic definition characterizing the object of the study;
- (2) development of a methodology for assessing the mutual influence of environmental conditions and personality traits when making decisions about migration;
- (3) testing of the developed methodology and presentation and interpretation of the results obtained.

To test the developed tools, priority geostrategic territories of the Arctic Zone of Russia were selected, which are characterized by an increased significance of the migration challenge (Stepus et al., 2022). Migration outflow makes a significant contribution to the reduction in the population of the Arctic territories, which, under current conditions, creates serious risks for the development of the country’s northern territories and ensuring its national security (Khoteeva and Stepus, 2023). A comprehensive study of migration motivation will be conducted for the young people cohort of the population aged 16–35 years, which represents unique human capital for the development of the Arctic territories of Russia.

RESEARCH METHODOLOGY AND INITIAL DATA

In the foreign literature, to answer the question of why people migrate, the fairly capacious concept of migration driver³ is used, which suggests that migration is the result of not one factor/reason, but a complex configuration of many interdependent and interacting factors that ultimately lead to decisions about migration (Czaika and Reinprecht, 2022).

In this study, we decided to examine the migration driver from the perspective of the sociopsychological essence of the migration process, according to which the formation of migration decisions is the result of the interaction of personality traits and environmental factors. Factors exist objectively in the external environment and, acquiring significance for a specific individual due to his needs and personality traits, become migration drivers—the driving force behind the realization of migration intentions that arose as a result of the contradiction between the needs of the individual and the possibilities of satisfying them in the environment (region). Thus, when the sphere of current needs and personality traits, on the one hand, and the conditions of the external environment, on the other, interact, a motive arises that acquires individual significance, direction, and effectiveness in making migration decisions (Fig. 1). In the proposed concept, the motivational driver of migration is a personally oriented need, supported by external factors, expressed in specific actions of the individual aimed at making migration decisions.

To identify motivational drivers of migration, we have developed a step-by-step methodology that includes statistical methods, such as factor analysis, regression analysis, and a test based on the chi-square independence criterion (Fig. 2). To verify the presence of dependences between the components of motivational drivers, tools such as cluster analysis and decision trees are used

At the first stage of implementing the methodology, the data are prepared. In accordance with the proposed concept, the essential content of the authors’ definition of the motivational driver of migration consists of three main elements: the idea of external environmental factors, internal characteristics of the individual and the migration action that arose as a result of the interaction of the first two phenomena. This dictates the requirements for the substantive content of the initial data and the method of obtaining it—a sociological study, during which a set of elements is formed to identify the motivational drivers of migration.

The empirical basis for the study was the results of a survey of young people (16–35 years old) conducted in November 2022 in all districts and cities in the Arc-

³ <https://www.migrationdataportal.org/themes/migration-drivers>.

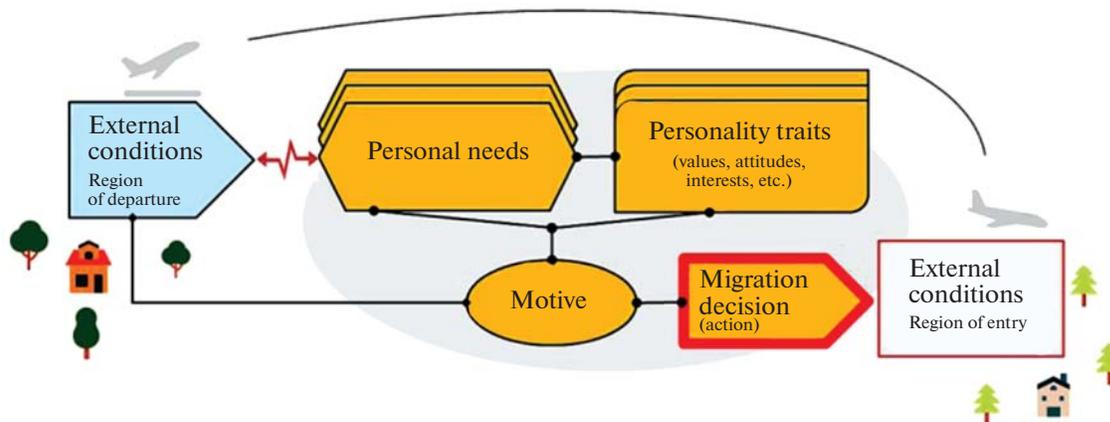


Fig. 1. Conceptual scheme of motivational driver of migration.
Compiled by authors.

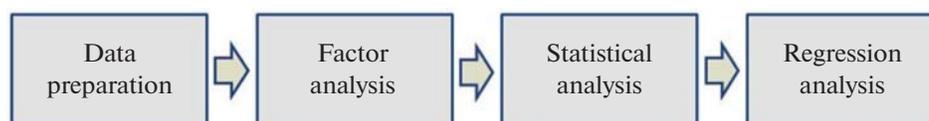


Fig. 2. Stages of identifying motivational drivers of migration.
Compiled by authors.

tic territories of nine federal subjects that are part of the Russian Arctic. The questionnaire contained blocks of questions that revealed the personality traits of individuals, the respondents' assessment of the external environment, and signs of migration actions, which made it possible to determine the variables required to identify the motivational drivers of migration.⁴ The sample population was formed separately for each region in proportion to the structure of young people by municipality, age, and gender. In total, the survey involved 86000 respondents. The sample type was combined, quota, available at the last stage. The maximum sampling error for each federal subject of the Arctic Zone is less than 5%, which demonstrates a high confidence level.

At the second stage of the methodology implementation, thematic factors are established, on the basis of which various reasons for migration are combined into groups and which determine the direction of the driver. Next, statistically significant relationships are identified between the conditions of the external environment and the personality traits of the individual, on the one hand, and the indicator of the presence of active migration actions in the individual, on the other. The final step involves constructing regression models to identify dependences between the components of the migration driver and interpreting the results.

⁴ <https://doi.org/10.5281/zenodo.10432072>.

TESTING OF THE METHOD

The proposed concept assumes that migration actions are most actively manifested when external and internal factors interact, and migration intent may exist in a passive form and not be realized without an appropriate stimulus. Based on this, it was decided to select questionnaires from only those respondents who expressed readiness for migration actions. Based on the question about the respondent's migration intentions: "Would you like to move to live in another place?"⁵ Only observations where a desire to move beyond the region of residence was noted (responses nos. 1–3) were left for further analysis—5200 people.

Also at this step, a dependent variable was defined that reflects the activity of migration actions. Based on the question: "How prepared are you to move?"⁶ respondents were divided into two groups: the presence of active migration actions (responses nos. 1 and 2)—*active migratory behavior*; lack of active migration actions when wanting to leave (responses nos. 3–5)—*passive migratory behavior*. The ratio of observations in classes was 20 and 80%, respectively. It should be noted that such class imbalance is a noncritical feature

⁵ Response options: 1, to Moscow or St. Petersburg; 2, to another Russian region; 3, to another locality in my region; 4, to another country; 5, I don't want to go anywhere.

⁶ Response options: 1, I am already in the process of moving; 2, I have made a firm decision to leave; 3, I am considering the possibility of moving; 4, I sometimes think about it; 5, I have never thought about it.

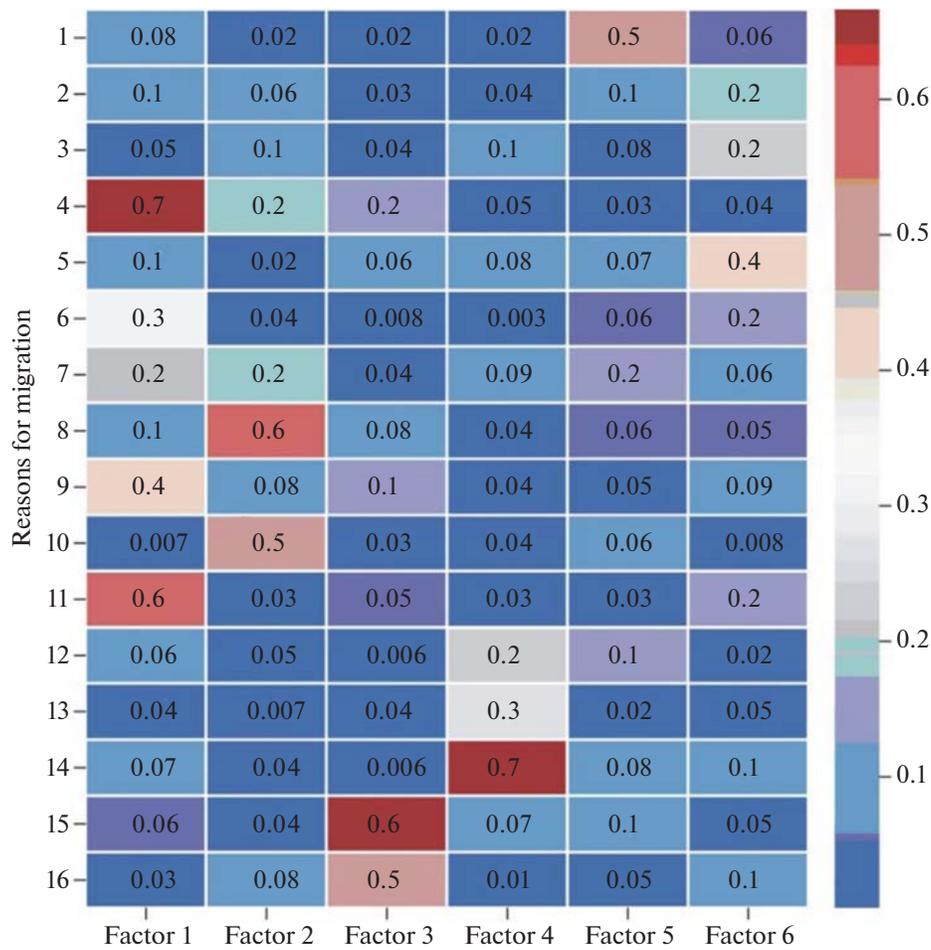


Fig. 3. Matrix of factor loadings of reasons for migration from the Arctic regions.

Reasons for migration: 1, to ensure the future of my children; 2, there is(are) an example(s) of a successful move of my friends; 3, there is a greater choice of entertainment and options for spending time there; 4, the salary is higher there; 5, there are relatives, friends there; 6, there is a demand for professionals like me; 7, there is better health care and social services; 8, there is a better climate; 9, there are better conditions for professional development; 10, there is a better ecological situation, 11, you can find a decent job there; 12, the city (country) of my dreams; 13, I will establish my personal life there (I am moving to my partner); 14, I want to live separately from my parents and be independent; 15, I want to get a quality education there; 16, I want to continue my studies there.

Compiled by authors based on calculation results.

of the data and did not affect the quality of the results obtained, in individual thematic samples, different sampling algorithms were used in testing the final models.

At the second stage of implementing the methodology, factors were identified that group various reasons for migration. For this, factor analysis using principal component analysis (PCA) method was carried out using the varimax⁷ rotation method. As a result, six main factors of out-migration of young people were identified. The final table with factor loadings is presented in Fig. 3, significant correlations are marked with a color of greater intensity.

⁷ https://factor-analyzer.readthedocs.io/en/latest/factor_analyzer.html (accessed April 1, 2023).

The first factor is “professional fulfillment”; the second, “climate and ecology”; the third, “getting an education”; the fourth, “striving for independence”; the fifth, “family”; the sixth, “social connections.” These six factors were then used to identify individual thematic samples (subsamples) in which the search for motivational drivers of migration was conducted.

The third and fourth stages are considered using the subsample “Professional realization.”

At the third stage, within each of the subsamples, individual indicators of environmental conditions and personality traits of the individual were selected that would influence migration behavior. To determine the presence of a statistically significant relationship between variables, the chi-square independence test was used, in some cases, regression models (more than

Table 1. Most significant personality traits of respondents in the subsample “Professional realization”

| No. | Personality traits | Statistic | p-value | Probability of an event | | Odds ratio |
|-----|--------------------|-----------|---------|-------------------------|---------------------------|------------|
| | | | | no traits (p_1) | traits exist (p_2) | |
| 1 | Ambition | 22.85 | 0.000* | 0.25 | 0.35 | 1.60 |
| 2 | Leadership | 14.60 | 0.000* | 0.14 | 0.31 | 1.48 |
| 3 | Individualism | 10.58 | 0.001* | 0.23 | 0.29 | 1.40 |
| 4 | Honesty | 5.99 | 0.014* | 0.40 | 0.34 | 0.79 |
| 5 | Professionalism | 4.49 | 0.034* | 0.58 | 0.53 | 0.82 |

Note. *, the hypothesis of the presence of statistically significant differences was confirmed at the level of p -value < 0.05.
Compiled by authors based on calculation results.

two values for a variable) were used for testing. Table 1 presents the results of the chi-square test for the binary variables “presence/absence of personality traits” and “activity/passivity of migration actions” (only significant relationships are retained).

The presence/absence of a personality trait in a respondent is determined on the basis of his self-assessment. An example of a question aimed at identifying this feature is given in the link.⁸ The answer to the question is discrete and suggests two possible answers: the personality quality is present (1), the personality quality is absent (0). Accordingly, the absence of a personality trait is understood as the respondent’s answer, which implies that this or that personality trait is not significant for him, and therefore does not affect the respondent’s migration actions. In the future, to simplify the presentation of calculation results, the wording “Presence/absence of personality trait” is used.

The null hypothesis was that the variables were independent: observed and expected distributions respondents with an active migration position in groups with the presence/absence of personality traits do not differ. The study identified five personality characteristics associated with migration actions: ambition, leadership and individualism: when these traits are present, the probability and odds of leaving increases; when the traits honesty and professionalism are present, the probability and odds of leaving decreases. Additionally, the odds ratio for active migration actions in groups with the presence/absence of each of the personality traits was calculated by the formula:

$$OR = \frac{p_1 / (1 - p_1)}{p_2 / (1 - p_2)}, \quad (1)$$

where OR is the odds ratio, p_1 and p_2 are the probability of an event occurring in groups, and an event is

⁸ Question 13: “Please indicate which qualities are most important to you, and what do you strive for most in your development?”

understood as an active migration position. Thus, the odds of active migration actions in the presence of certain ambitions is 1.6 times higher; in the presence of leadership traits, 1.5 times higher; the presence of such a characteristic as professionalism, conversely, reduces the odds of leaving by 18%. It is necessary to note separately that when analyzing the traits of “ambition,” “leadership” and “individualism,” their strong influence on the activity of migration actions was recorded in almost all thematic subsamples.

The average assessment of the possibility of professional realization in the place of residence (question no. 8 of the questionnaire) was used as an indicator of the external environmental conditions for the “Professional Realization” subsample. Table 2 shows the distribution of the number of responses according to assessments of the possibility of professional realization in groups with active and passive migration behavior.

From the presented data, it is clear that the higher the assessment of the possibility of professional realization, the lower the proportion of respondents with active migration behavior. To test the statistical significance of the identified differences, the chi-square independence test was used (statistic = 17.2, p -value = 0.001, dof = 4): the activity of migration behavior in the subsample “Professional realization” depends on the assessment of the possibilities of professional realization.

Thus, in the process of identifying statistically significant dependences within each of the thematic samples between the conditions of the external environment and the internal values of the individual, on the one hand, and the indicator of the activity of migration actions in the individual, on the other, predictors of future regression models—motivational drivers of migration—were identified.

At the final stage, the developed methodology involves the construction of binomial regression models to identify dependences between the components of the migration driver. The generalized linear model (GLM) of the Statsmodels⁹ Python library is used as a

Table 2. Distribution of responses of respondents with active and passive migration behavior about possibility of professional realization in place of residence, %

| Migration behavior | Assessment of possibility of professional realization, points | | | | | Total respondents, person |
|---------------------------|---------------------------------------------------------------|------|------|------|------|---------------------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Passive | 68.8 | 73.7 | 78.0 | 79.6 | 80.9 | 2.033 |
| Active | 31.2 | 26.3 | 22.0 | 20.4 | 19.1 | 569 |
| Total respondents, people | 189 | 289 | 608 | 763 | 753 | 2.602 |

Compiled by authors based on calculation results.

Table 3. Distribution of responses in subsample “Professional fulfillment”: migration behavior * “ambition, leadership and individualism” * assessment of the possibility of professional fulfillment, %

| Migration behavior | Ambition, leadership, individualism | Assessment of possibility of professional realization, points | | | | |
|---------------------------|-------------------------------------|---------------------------------------------------------------|------|------|------|------|
| | | 1 | 2 | 3 | 4 | 5 |
| Passive | No traits | 45.6 | 51.4 | 56.7 | 58.2 | 58.6 |
| Active | | 54.4 | 48.6 | 43.3 | 41.8 | 41.4 |
| Total respondents, people | | 147 | 214 | 432 | 541 | 510 |
| Passive | Traits exist | 34.1 | 40.1 | 43.7 | 46.3 | 50.4 |
| Active | | 65.9 | 59.9 | 56.3 | 53.7 | 49.6 |
| Total respondents, people | | 220 | 257 | 524 | 630 | 615 |

Compiled by authors based on calculation results.

tool. This implementation of regression analysis is adapted for estimating models with discrete dependent variables. The following formula notation of the model (*R*-style notation)¹⁰ was used in the calculations:

$$Y \sim C(X_1) : C(X_2), \quad (2)$$

where *Y* is a binary variable reflecting the presence of active migration actions; *X*₁ is a variable reflecting the presence/absence of an individual’s personality traits, *X*₂ is a variable reflecting an individual’s assessment of environmental conditions, operator *C*, designation of a categorical variable; operator “:”, designation of interaction of predictors.

The use of the proposed method assumes that the interaction of a variable reflecting the conditions of the external environment (predictor 1) and variable assessing the personality traits of an individual (predictor 2) will increase the odds of an individual exhibiting active migration actions (dependent variable). In other words, the odds of active migration actions will increase as the assessment of external environmental conditions decreases and as the transition from the absence of a personality trait to its presence occurs. For ease of perception of the results of the formation

of a motivational driver by constructing a regression model in Table 3 shows the proportion of respondents for each combination of answer options for the dependent variable and predictors, where the dependent variable is the indicator of migration behavior activity, the first predictor is the presence/absence of the personality traits “ambition,” “leadership,” and “individualism”; the second predictor is the assessment of the possibility of professional realization on a five-point scale. The presence of personality traits was determined by the self-assessment of respondents (question 13 of the questionnaire), respondents were assigned to this group if they had one or more of these traits noted.

The data show a clear pattern: the proportion of respondents with active migration behavior decreases with an increase in the assessment of the possibility of professional realization in both groups based on the presence/absence of personality traits. Comparing these groups by the level of assessment of external environmental conditions, we can conclude that the proportion of respondents with active migration behavior is higher in the group with the presence of personality traits (ambition, leadership, individualism). It should be noted separately that the difference in the proportion of respondents with an active migration position in the groups with an external environment assessment of 4 and 5 points is insignificant. This can be seen as an indication that the scale needs to be refined for measuring the assessment of environmental conditions.

⁹ <https://www.statsmodels.org/stable/index.html#>.

¹⁰ A more detailed interpretation of the formulas is presented in the relevant documentation (<https://patsy.readthedocs.io/en/latest/formulas.html>).

Table 4. Coefficients of regression model “possibility of professional realization—presence of traits (ambition, leadership, and individualism)”

| No. | Interaction of variables* | Value of coefficient | <i>p</i> -value |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|
| 1 | Presence of personality traits (0) * assessment of external environment (1 point) (Intercept) | 0.177 | 0.284 |
| 2 | Presence of personality traits (0) * assessment of external environment (2 points) | −0.233 | 0.277 |
| 3 | Presence of personality traits (0) * assessment of external environment (3 points) | −0.447 | 0.020** |
| 4 | Presence of personality traits (0) * assessment of external environment (4 points) | −0.509 | 0.006*** |
| 5 | Presence of personality traits (0) * assessment of external environment (5 points) | −0.526 | 0.005*** |
| 6 | Presence of personality traits (0) * assessment of the external environment (1 point): Presence of personality traits (1) * assessment of the external environment (1 point) | 0.482 | 0.027** |
| 7 | Presence of personality traits (0) * assessment of the external environment (2 points): Presence of personality traits (1) * assessment of the external environment (2 points) | 0.458 | 0.014** |
| 8 | Presence of personality traits (0) * assessment of the external environment (3 points): Presence of personality traits (1) * assessment of the external environment (3 points) | 0.523 | 0.000**** |
| 9 | Presence of personality traits (0) * assessment of the external environment (4 points): Presence of personality traits (1) * assessment of external environment (4 points) | 0.478 | 0.000**** |
| 10 | Presence of personality traits (0) * assessment of the external environment (5 points): Presence of personality traits (1) * assessment of the external environment (5 points) | 0.332 | 0.006*** |

Note. *The presence of personality traits is a binary variable that takes values of 0 or 1. A value of 0 means the absence of personality traits, determined on the basis of the respondent’s self-assessment; **significance at 0.05 level; ***significance at 0.01 level; **** significance at the 0.001 level.

Compiled by authors based on calculation results.

Table 4 shows the coefficients of the regression model “opportunities for professional development—ambition, leadership and individualism,” calculated as a result of the regression analysis. It should be noted that the model was constructed using corrected data that had undergone sampling by the SMOTE algorithm (increasing the number of minority class examples) to eliminate class imbalance, so that the presented model could more clearly explain the essence of the developed methodology using the example in Table 3.

In the case of a logistic regression model with ordinal variables, the coefficients of the equation are the natural logarithm of the odds ratio of an event between groups, where the event in this case is understood as the manifestation of active migration actions. Negative coefficients correspond to a odds ratio less than one and are interpreted as a decrease in the odds of active migration actions. Let us consider an example of the relationship between the obtained coefficients and the values given in the Table 3.

The intersection point (Intercept) is a base value that reflects the natural logarithm of the odds of active migration actions when assessing the conditions of professional realization at point 1 and the absence of personality traits. The value of the coefficient can be calculated using the formula:

$$\text{Intercept} = \ln \frac{P}{1 - P}, \quad (3)$$

where *P* is the probability of an event; in this case it is the probability of active migration actions in the presented group. With a probability of 0.54, the odds of an event occurring are 1.19, and the logarithm of the odds is 1.77. As can be seen from Table 3, the numerical difference between the proportions of respondents with active and passive positions is slightly more than 8%, the odds of an event in the study group is 20% higher, and the corresponding *p*-value (>0.05) indicates that there is no statistically significant difference between the values.

The interaction between variables occurs according to the assessment of environmental conditions (coefficients 2–5), then according to the presence/absence of personality traits (coefficients 6–10).

The results correspond to the hypothesis put forward during the development of the methodology: the largest proportion of respondents with active migration actions was identified in the group with manifestation of personality traits and low assessment of the conditions of the external environment; the smallest proportion of such respondents was identified in the group with the absence of personality traits and a high assessment of the external environment conditions. At the same time, statistically significant differences were found in the change in proportion of respondents with an active migration position between groups formed based on the presence/absence of personality traits and variability in the assessment of environmental

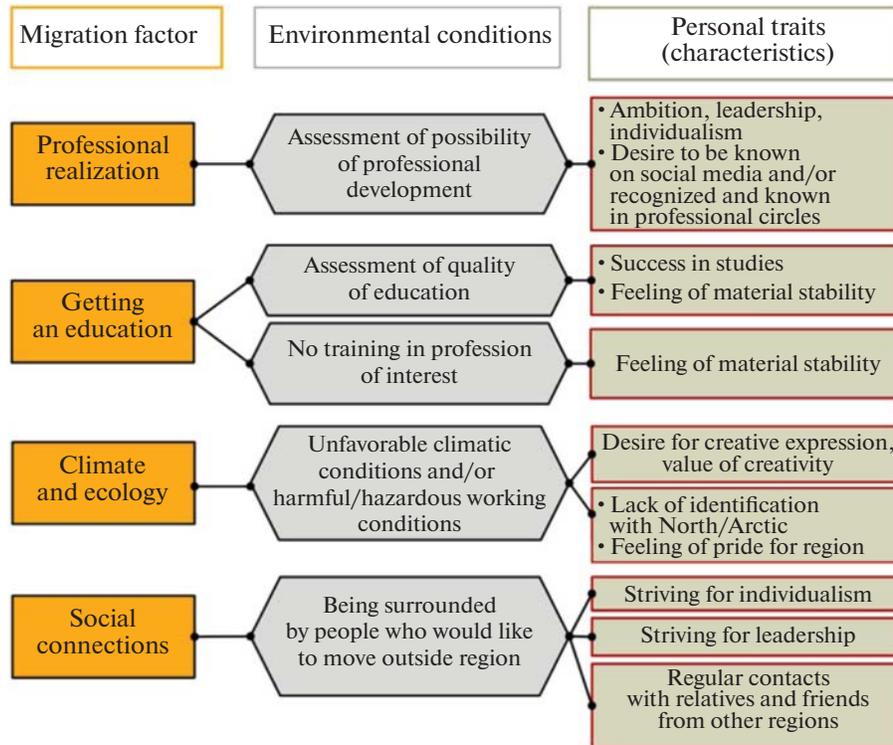


Fig. 4. Motivational drivers of young people migration from Arctic regions of Russia. *Compiled by authors.*

conditions. In both groups, there is a decrease in the proportion of target respondents depending on the magnitude of the assessment of opportunities for professional development, while the presence of personality traits significantly increases the odds of active migration actions.

RESULTS

As a result of testing the methodology, ten motivational drivers of migration of young people from the Arctic regions were identified. Figure 4 shows their components: environmental conditions and personality traits of individuals.

The interpretation of the listed drivers corresponds to the example given in the previous section of the article. Each migration factor forms a thematic sample based on the reasons why the respondent would like to move from the Arctic region. The interaction of external conditions and personality traits/characteristics increases the odds of active migration actions, we will give a few more examples based on the presented data. The migration factor “Obtaining an education” includes the motivational driver “Assessment of the quality of education—presence of academic achievements.” As in the case of the assessment of professional fulfillment, the share of respondents with an active migration position decreases as the assessment of the education system increases (five-point scale); a

similar trend is observed among respondents with the absence/presence of achievements in studies (participation in All-Russian Olympiads in subjects, participation in regional Olympiads, high USE scores >90 in one of the subjects). The largest proportion of respondents with an active migration position is observed when these characteristics interact: on the one hand, a low assessment of the quality of education in the region; on the other, the presence of academic achievements.

The “Climate and Ecology” factor includes the motivational driver “Adverse climatic conditions—lack of identification with the North/Arctic, sense of regional pride.” The lack of Arctic identification and a pronounced assessment of climatic conditions in the region of residence as unfavorable increase the odds of active migration actions among young people living in the Arctic Zone of Russia.

Let us consider another example: within the migration factor “Social connections,” the migration driver “Migration intentions of the environment—sociability” was identified (in this case, both predictors are binary). The presence of a large number of people in the respondent’s environment who would like to live and work outside the region increases the odds of active migration actions, and regular contacts with relatives and friends from other regions increase this probability many times over.

Thus, the research results confirm the existence of motivational drivers of migration, the idea of which is to study the combination of personality traits of an individual and features of the external environment that encourage active migration actions.

CONCLUSIONS

In the course of the study, based on a review of domestic and foreign sources, a conceptual model of the motivational driver of migration was defined, which assumes the interaction of micro-level factors (individual personality traits) and the external environment in making migration decisions. In the proposed model, both personality traits and assessments of the external environment are subjective in nature and are determined by the self-assessment (self-perception) of individuals, formed during a representative sociological study.

The methodology proposed by the authors for identifying motivational drivers based on statistical analysis methods allows for the formation of sets of driver parameters that allow for determining the activity of migration actions. The young people cohort of the population living in the territories of the Arctic Zone of Russia was chosen as the object for testing the proposed methodology. This example identifies ten motivational drivers that represent a combination of “personality traits—environmental conditions” and determine the processes of out-migration of young people from the Arctic territories. Together, they covered factors such as education, opportunities for self-realization, climate and ecology, and social connections. These categories reflect the specific development of Arctic territories, expressed in harsh natural and climatic conditions, limited opportunities for education and career development in a number of Arctic regions, and historically established intensive social ties with other non-Arctic regions of the country. The results of the study showed that elements of these factors serve as key motivational drivers of out-migration for young people with certain personality traits.

Thus, our approach allows us not only to see the work of one migration factor, but to study the complex combination of environmental conditions and personality traits that have a nonlinear combined effect on the decision to migrate, which enriches the existing tools for analyzing migration processes and actualizes further research in this area.

At the same time, it should be noted that the presented methodology and tools used have potential for improvement. One of these areas is the clarification of categories and individual indicators used to assess environmental conditions and individual characteristics in a survey questionnaire. Another direction of development of the methodology is the use of alternative mathematical tools, during the study, such tools as decision trees showed good results, but were not

included in the methodology and alternative classification methods.

The developed methodology can be applied to individual territories and regions of Russia, various categories of the population, and identify motivational drivers not only of out-migration, but also of incoming migration. A comprehensive study of the determinants of population migration, taking into account both environmental conditions and individual characteristics, has practical significance in adjusting the socio-economic and migration policies pursued in the region.

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CONFLICT OF INTEREST

The authors of this work declare that they have no conflicts of interest.

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