

# Population Spatial Mobility: Monitoring, Methodology of Formation, Features of Regulation

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## Abstract

Spatial mobility is a topical concept of analytical migration science, which makes it possible to assess the desires, readiness and capabilities of the population to move over certain distances and time. In the management of spatial mobility assessment requires the organization of systematic monitoring, which includes identifying the mobility potential in spatial and temporal interpretation, the status of its implementation in migration and tourism directions, the causes of displacement with an assessment of the deprivation level, as well as the consequences of displacement, in particular in the context of achieving human development goals and capitalizing on human potential. The quality system of monitoring of population spatial mobility should be the basis for mobility regulation. The formation of such systems should be carried out in several stages: development of unified approach to the formation of accounting and mobility statistics; development of methodology and conducting selective sociological survey on the population spatial mobility with the participation of state statistics authorities and the International Organization for Migration (internal and external mobility); development of a indicators system for the monitoring of population spatial mobility in context of achieving human development goals. One of the main results of the monitoring of population spatial mobility is to find out the main groups of the potentially active population in the coordinates of space and time: internal mobility, including intra-settlement, intra-regional, inter-regional (the main purpose of regulation is the development of transport infrastructure); middle-distance mobility, including cross-border, intra-state (the main purpose of regulation is the effective use of migration capital and tourism costs); long-distance mobility, including continental, remote (the main purpose of regulation is to ensure circulating migration; keeping in touch through the Diaspora Institute). Formation of high-quality system of information support for migration regulation through the monitoring of population spatial mobility will allow to depart from the practice of biased accounting of migration processes with limited and non-systematic presentation of statistics.

**Keywords:** Population spatial mobility; Migration; Space-Time coordinates; Monitoring; Analytical migration science; Human Development; Capitalization of human potential.

## 1. Introduction

Spatial mobility transforms the image of human life. People, technologies, resources (labor, capital, information), goods, markets, cultures, values are migrating now. All these movements outline the horizons for the development of the spatial mobility phenomenon. The need for its study determines the prospects for the emergence of a new research area of analytical migration science.

Current studies in the field of migration are very diverse. They refer the most general laws and patterns of population resettlement processes, spatial and temporal properties, forms of movement, approaches to modeling non-traditional migration situations, formation of migration policy and mechanisms for its implementation. At the same time, there are insufficient coverage of analytical studios where the issues of monitoring, the regulation of spatial mobility as a condition of human development at different institutional levels (economies, states, and societies) are studied in detail.

*The purpose of the article is deepening of theoretical and*

monitoring of population spatial mobility as an informational basis for regulating its movement towards ensuring human development.

*The goals of the article are:* determination of the content of population spatial mobility, methodology of its research; substantiation of components of the monitoring of population spatial mobility; approbation of the methodology for estimating the potential of population spatial mobility in space-time coordinates.

The problem of population spatial mobility broadens the focus on considering migration processes. The study methodology of spatial mobility as a modern phenomenon of human development is formed by fundamental works of such well-known scientists, as A. Toffler (1984) (mobility as

a sign of development periodization), D. Massey (2003) (migration determinants of mobility), J. Urry (2012) (mobility channels), Z. Bauman (2004) (security mobility), P. Sorokin (1941) (social mobility), T. Faist (2000) (transnationalization and migration), V. Zelinsky (1971) (mobile transitions). Among modern scientists are relevant studies of spatial mobility in urban science. In particular, the impact of vehicles on population mobility was investigated by C. Bayart, N. Havet, P. Bonnel,

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L. Bouzouina (2020). C. Wang (2020), in collaboration with Chinese scientists, explores transnational migration caused by rapid globalization, individual socio-economic and demographic problems, cultural factors. J. Banks, R. Blundell, Z. Oldfield, J. P. Smith (2012) draw attention to population geographical mobility. A. Miles and A. Leguina (2018) carried out an analysis of socio-spatial mobility directly related to the processes of social class formation. T. Wessel, L. M. Turner, V. Nordvik (2018) consider mobility in the context of changes in the ethnic composition of migration and ethnic segregation. Therefore, many scientists address the impact of migration on the development of many economic activity types, namely: U. Andrusiv et al (2020), M. Stehney et al (2020), T. Vasylytsiv et al. (2020), I. Kramarenko et al. (2020), T. Kalashnikova et al. (2019) O. Panukhnyk et al. (2019), M. Melnyk et al. (2018), O. Hrynkevych (2017; 2020). Therefore, the spatial mobility issue is multifaceted. This article is focused on issues of the population mobility regulation and monitoring.

## 2. Materials and Methods

The research methodical apparatus is formed by general scientific methods of analysis, synthesis, induction, deduction, generalization – to reveal the content of spatial mobility, to determine the components of its monitoring. The method of sociological analysis was used to test the methodology of estimating the potential of population spatial mobility in the space-time coordinates.

## 3. Results and Discussion

J. Urry, as one of the founders of the spatial mobility theory, argued that the concept of mobility can be used: to indicate what is moving or able to move; as a factor preventing fixation within certain boundaries of the unorganized mass of people (crowds) that needs regulation and social control; as the quality of social mobility in traditional sociology; as long-term processes of geographical movement (migration) (Urry, 2012).

By spatial criterion, mobility can be territorial (geographical) or spatial. *The population spatial mobility* reflects its desire, willingness and capabilities to change its location in certain space-time coordinates, which in the process of implementation is accompanied by processes of human capitalization (personal, group and social measurements). In the managerial context, the population spatial mobility is an actual regulation subject, which broadens the focus of migration policy with a comprehensive vision of the conditions of formation, practice and consequences of realization of population mobility (Bil, 2019).

Spatial mobility has two main stages – formation and implementation. At the formation stage, the potential of mobility (desire) is determined, and the implementation stage reflects how a person moves and for what purpose – tourist or migration.

The state of spatial mobility (potential, realized) is a subjective indicator. In fact, it reflects each person's self-esteem about their readiness and ability to change their location within the determined space-time coordinates. In

the accumulated dimension, the set of such self-assessments determines the spatial mobility of a certain territory. The subjectivity of mobility self-esteem is confirmed by the following criteria: personality qualities (openness to the world, trust in people and themselves, flexibility, responsiveness, localization of control, tolerance); skills (reflection, goal setting, self-regulation, self-determination); abilities (to see and understand the essence of changes in society, variability and alternative of the situation development; to think constructively, productively; to design necessary changes in the micro-society; to solve problems; to adapt to changes) (Kalynovskyi, 2000). These criteria suggest that the state of mobility is determined by internal factors. However, environmental factors that determine the desire to change location are very strong (Figure 1).

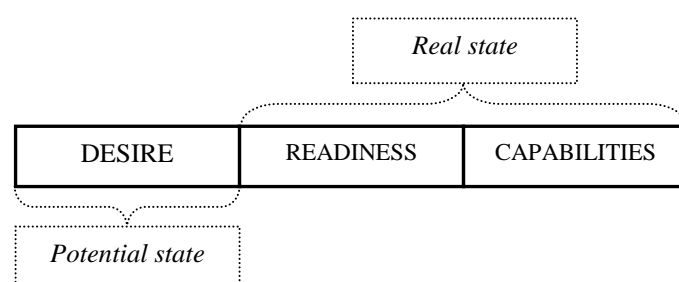


Fig. 1. Real and potential state of the population spatial mobility

The scientific and ideological basis for the regulation of population spatial mobility is the combination of approaches of prostrology, tempology and kratology in the interdisciplinary discourse of scientific knowledges (demography, migration, valeology, pedagogy, praxeology, axiology, ethnology, ecology). The quality *monitoring* should be the basis for mobility regulation. First of all, it is important to understand clearly the extent of the population spatial displacement at different distances and time. In addition to the fact of displacement, the latest challenges in the development of the global world necessitate the identification of the population's inclination to such processes – the state of spatial mobility. Therefore, a modern system of information support for migration regulation, as a reflection of the results of the use of analytical migration science methods and techniques, should be more comprehensive and include data on:

- desire of population to change their location (potential state of mobility);
- readiness and capabilities of population to change their location (real state of mobility);
- reasons for forming of population spatial mobility through calculation of The Index of Multiple Deprivation: income deprivation (lack of means of subsistence), employment deprivation (lack of access to decent work), education, skills and training deprivation (low level of education and qualification), health deprivation (poor health and nutrition), ecology deprivation (dissatisfaction with environmental conditions), safety deprivation (high crime), comfort deprivation (barriers to obtaining housing and necessary services) (Clark et. al, 2014);

- consequences of the implementation of population spatial mobility, especially in the form of migration: for persons who realize it – with a reflection on the human potential capitalization (physiological, psychological, intellectual, educational and qualification, social, cultural components); for the donor society – with a reflecting on human development indicators.

The information basis for mobility regulation is formed by data on crossing the state border of countries, quantitative, structural and some qualitative indicators of migration and tourism activity of the population. The number of international migrants reached almost 270 million people in 2020, which is 3,6 % of the world's population. The growing dynamics of the last decades is indicative: this indicator increased more than 3 times during 1960-20. The number of international migrants increased especially rapidly in the period 1985-1990, due to political processes with the creation of new states (the collapse of the Soviet Union, the unification of Germany, the revolutionary events in China). During 2019-2020, the growth rate of international migration slowed down and remains uncertain in the context of the Coronary Crisis. Most developed countries are dependent on migration. For example, in 2000, the share of international migrants in the population of high-income countries was 9,6 %, and by 2020 it exceeded 14 %. Developed countries account for almost 70 % of all immigration. Educational migration is constantly growing: if in 1990 the number of international students was 1,3 million, in 2000 – 2,1 million, in 2018 – more than 5,0 million (Migration Data Portal, 2019).

The quality monitoring of spatial mobility regulation, including migration, is a matter of global importance. In particular, among the goals of the first Global Compact for Safe, Orderly and Regular Migration (GCM), signed by the UN in 2018, was highlighted the collection and use of accurate and disaggregated data as the basis for a science-based migration policy, the provision of accurate and timely data at all stages of migration (The United Nations, 2018).

Thus, it is necessary to establish national systems for the monitoring of population spatial mobility at the state level. The formation of such systems should be carried out in several stages:

- 1) development of unified approach to the formation of accounting and mobility statistics;
- 2) development of methodology and conducting selective sociological survey on the population spatial mobility with the participation of state statistics authorities and the International Organization for Migration (internal and external mobility);
- 3) development of a indicators system for the monitoring of population spatial mobility in context of achieving human development goals.

Selective sociological surveys on the population spatial mobility are relevant in the second stage. In Figure 2 reflects the author's view on the priorities of the sociological assessment of the population mobility, which allow to identify the causes, potential and consequences of its realization.

In assessing the population spatial mobility, the core information should be finding out her space-time coordinates. Distance and time are important drivers of mobility. Therefore, during the survey of the desire, willingness and capabilities to change location, should be determined:

- 1) spatial aspects of mobility: another settlement within the region; to a neighboring region within the country; to any other area within the country; to the capital of country; to a neighboring country; to any other country on the continent; to any country in the world with better conditions;
- 2) temporal aspects of mobility: at any time; up to 1 month; for the period from 1 to 6 months; for a period of 6 months to 1 year; for the period from 1 to 3 years; for a period of 3 years or more; forever.

Determining the mobility potential for specific distances and time is one of the main recommendations for the monitoring of population spatial mobility. In order to test the proposed methodology, a pilot survey was conducted in January 2019 to find out the potential of mobility in spatial and temporal interpretation on the example of the population in Lviv and Lviv region in Ukraine. The number of respondents was 507. The main sample of respondents (83.2%) are persons aged 25-40 years who already have some work experience. This shapes their vision for current development opportunities and employment. Also, this age group already has certain social obligations (family, friends and professional contacts), so it is an interesting research object. The majority of respondents (87.2%) are persons with higher education or scientific degree, employed (84.2%). The answers structure regarding the desire (unwillingness) to change the location of the respondents is shown in Fig. 3.

Finding the potential of population mobility allows to allocate the main groups of active-mobile persons in the coordinates of space and time (Fig. 4)

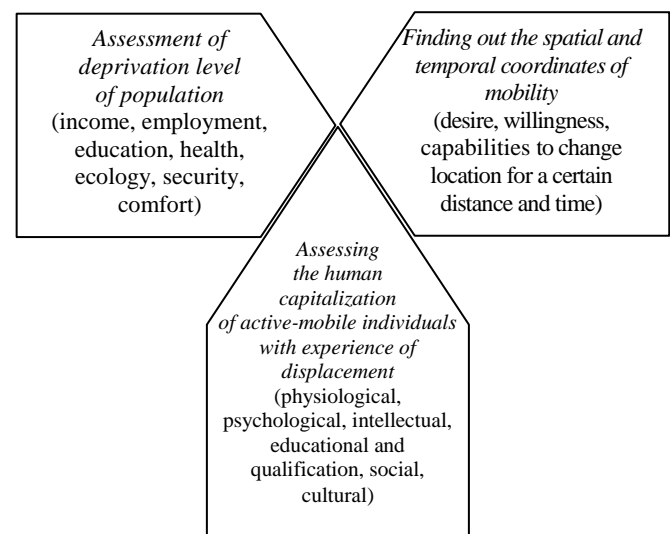


Fig. 2. Main directions of sociological assessment of the population spatial mobility  
Source: suggested by the authors

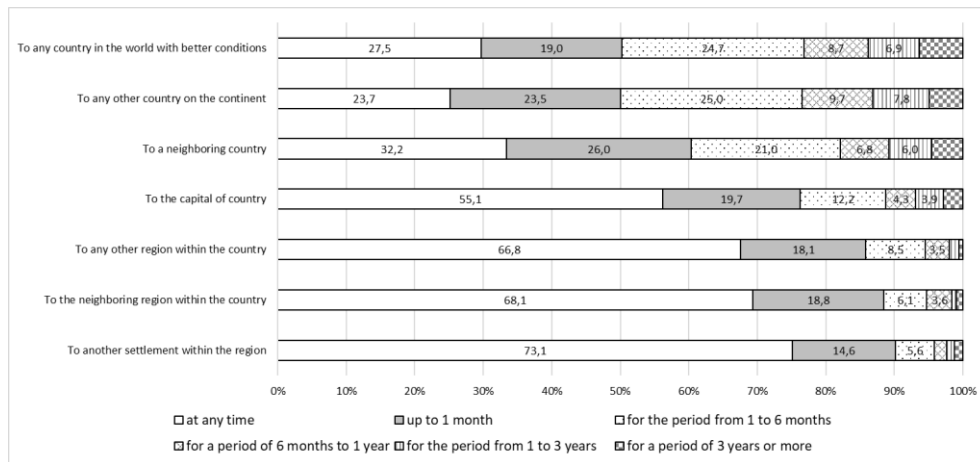


Fig. 3. Potential of population mobility in spatial and temporal interpretation, based on the example of Lviv region (Ukraine)

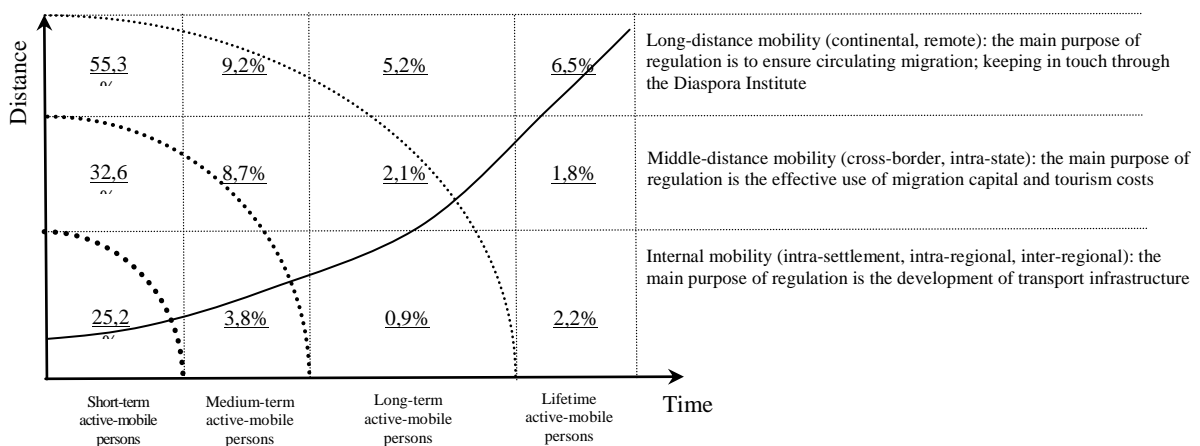


Fig. 4. Main groups of potentially active-mobile population in space-time coordinates, based on the example of Lviv region (Ukraine)

Assessment of the population spatial mobility in space-time coordinates is the basis for substantiating the priorities of its regulation. Many interpretations of the results of assessing the state of the population mobility are possible. One of the promising directions is the formation of geoinformation systems for spatial mobility display. G. and N. Andrienko (Great Britain) are actively working on the method of geospatial systems of spatial-temporal data. In particular, the authors provide geo-visual analysis software for «Spatial Decision Support». Scientists note that that spatial decision support means computerized assistance to people in the development, evaluation and selection of the right strategies, plans, scenarios, projects or activities where problems have a geographical or spatial component (Andrienko et.al, 2007).

Further practical introduction of geo-visual analysis technologies with an understanding of the features of population mobility, especially in large cities, will allow to justify decision-making: long-term – in terms of sustainable space planning, risk minimization, infrastructure management, strategic business planning; in the short term – on emergency response, logistics of resources (Ministry of Economic Development and Trade

of Ukraine (2017).

The final stage of the monitoring of population spatial mobility is to *evaluate the consequences of its implementation*. This assessment should be carried out through the lens of achieving human development goals, with the inclusion of sampling surveys by the public statistical services and the International Organization for Migration. Actually, the third stage of formation of the national monitoring system involves a special block of statistical analysis – development of a indicators system for the monitoring of population spatial mobility in context of achieving the human development goals.

Achieving human development goals at the country level is generally appreciated by the highest levels of government. For example, this is the Ministry of Economic Development, Trade and Agriculture estimates in Ukraine. These are indicators that reflect the achievement of the goals of poverty alleviation, quality lifelong learning, gender equality, decent work and economic growth etc (Andrienko et.al, 2007).

The Table 1 presents the main indicators for the monitoring of population spatial mobility in the context of achieving human development goals. They are proposed

in terms of opportunities to assess the consequences of mobility. Especially valuable will be the results in the

focus of the study of population external mobility.

Table 1

Directions of the monitoring of population spatial mobility in the context of human development (impact assessment)

Human development goals	Consequences of population spatial mobility
Overcoming poverty	<ul style="list-style-type: none"> <li>- Changing financial and economic status as a result of displacement (mobile person and family members)</li> <li>- Assessment of income at new place of residence</li> <li>- Assessment of cost structure of mobile person</li> <li>- Experience/willingness to invest the migratory income into business, self-employment, other productive purposes</li> </ul>
Decent work and economic growth	<ul style="list-style-type: none"> <li>- Assessment of working conditions at new place of residence (level of pay, working hours, security, organization of workplace, social protection, career opportunities etc.)</li> <li>- Assessment of job search opportunities at new place of residence</li> <li>- Experience in finding employment at new place of residence in violation of labor law</li> <li>- Assessment of own labor productivity at new place of residence and previous place of work</li> </ul>
Good health and well-being	<ul style="list-style-type: none"> <li>- Physical and mental health change as a result of displacement (capitalization of the physiological component of the human potential of the mobile person)</li> <li>- Social protection and access to services from the donor and recipient countries (with external mobility)</li> <li>- Experience of traumatism, treatment at new place of residence</li> <li>- Living and rest conditions at new place of residence</li> <li>- Impact of change of residence on the family (saving, destruction), children and their mental health</li> </ul>
Quality education	<ul style="list-style-type: none"> <li>- Change of educational qualification and intellectual level as a result of displacement (capitalization of educational qualification and intellectual components of human potential of mobile person)</li> <li>- Matching the profession and the employment sphere at new place of residence of the acquired educational and qualification level</li> <li>- Assessment of the quality and accessibility of educational services at new place of residence</li> </ul>
Gender equality	<ul style="list-style-type: none"> <li>- Manifestations of discrimination, including on grounds of nationality, religion, sex</li> <li>- Facts of Human trafficking</li> <li>- Birth and parenting opportunities at new place of residence (especially for women)</li> </ul>
Reduction of inequality	<ul style="list-style-type: none"> <li>- Change in social status as a result of displacement (capitalization of the social component of the human potential of mobile person)</li> <li>- Change of socio-cultural level, values, self-identification (capitalization of the cultural component of the human potential of mobile person)</li> <li>- Assessment of quality and accessibility of social services at new and previous place of residence</li> </ul>
Peace, justice and strong institutions	<ul style="list-style-type: none"> <li>- Assessment of the institutional trust of mobile person in the migration regulatory institutions</li> <li>- Access to Diaspora Institute, educational and cultural institutions for preserving national identity</li> </ul>

The proposed indicators will allow monitoring the impact of mobile processes on human capitalization at different institutional levels – human, economy, state, society.

business structures and budget institutions in the community, the number of employees, and the size of average wages), it is reasonable to emphasize the dependence of these rates on the size of the UTC (Figure 3).

#### 4. Conclusion

Therefore, the establishment of the monitoring system of population spatial mobility at country level is a complex task. Its implementation requires: a clear position of

scientists and experts, uniting their efforts to justify the priorities for improving the statistical base of spatial mobility; political will on the part of public authorities regarding the need to develop a monitoring system, to understand the relevance of spatial mobility regulation as such, with a departure from the policy of extreme resolution of acute social problems, including those related to migration. Despite the complexity of the task, changing the statistical support of population mobility analysis will have an invaluable impact on the effectiveness of regulating all socio-economic processes in countries. They should be based on human potential, the resource on which the economic development and well-being of the population depend on the efficiency of use. Formation of a high-quality system of information support for migration regulation through the monitoring of population spatial mobility, the reasons for its formation and the consequences of its implementation will allow to depart from the practice of biased accounting

of migration processes with limited and non-systematic presentation of statistics.

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