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## Developing Databank as an Instrument for the Elder People Wellbeing Analysis

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### Abstract

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Recent researchers succeed in well-being measuring of elder people life. Russian scientists have to run after the leaders investigating the official statistics data and analyzing the trends of indices. Within the project in Evaluation and enhancement of social, economic and emotional wellbeing of older adults we designed the model of older generation well-being measuring and the database to calculate objective and subjective indices according to this model. This paper is focused on the database created to elder people well-being research. The information system' structure is subscribed. It is consisted of database and web-interface. Either the results of its application for elder people well-being assessing are presented. Using the information system we defined some trends in indices dynamics for Tomsk region at 2000 - 2013. We found the next results: the employed pensioners' number increases significantly, the rural pensioners number is declining. The elder people's availability for using IT grew from 5.56 per cent to 78 per cent of the respondents during 2007-2013. There is a positive dynamics in all analyzed social objects visiting availabilities for elder people. More than 80 per cent of respondents can visit medical clinic, department store, pharmacy and the bank office on foot. The social care and Pension Fund nearness is less.

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**Keywords:** Well-being estimation; elder people; information system; database; Tomsk region.



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## 1. Introduction

During last 10 years the researchers' interest for elder people wellbeing grows significantly. Methodology of surveys is large and incorporates such categories as welfare, life needs satisfaction, happiness, health, active aging and others listed at the economic literature on the factors associated with subjective well-being (Dolan, Peasgood, & White, 2008), and Veenhoven's Database of Happiness (Veenhoven, 2016). Scientists involve economic and mathematic modeling, indices correlation, statistical datasets analysis to subscribe relations in economic growth, elderly people's income, their employment, health, social and household activities, environment quality and wellbeing. These problems become very serious now because of population senescence of European countries, USA and also Russian Federation. Any governance begins from the current situation analysis.

There are a number of databases and reviews, which give a lot of measuring for analysis. The most known of them are:

- the Global Age Watch Index (AW),
- the Active Ageing Index (AAI),
- the OECD Better Life Index (BLI),
- OECD Regional Well-Being: A User's Guide,
- the Eurostat Feasibility study for Well-Being Indicators.

We are to note that all these information systems allow getting information about well-being indices for state level but not for region. The data about Russia are presented in these bases incompletely without the elder people group allocation.

But this problem of elder people's well-being is very important for Russian Federation because of the constant increase of pensioners and the declining of able-bodied people ratio in the population structure. Russian economy's feature is the significant difference in regional indices of elder people's well-being and it must be considered in any research. Economic Higher School researchers constructed the database of well-being in Russia but it includes population of all ages in conjunction. It helps to calculate the well-being indices for the country level but is inadequate for regional level: the number of elder people respondents living in the regions is too small to get the correct assessments in our problems. The accessed data in the Russian official statistics are not full.

Within the project in Evaluation and enhancement of social, economic and emotional wellbeing of older adults we designed the model of older generation well-being measuring and the database to calculate objective and subjective indices according to this model. This paper is focused on the database created to Tomsk region elder people life problems research. The structure of this database and its application results for Tomsk region elder people well-being are presented in this work.

## 2. Information System of elder people Well-being Analysis

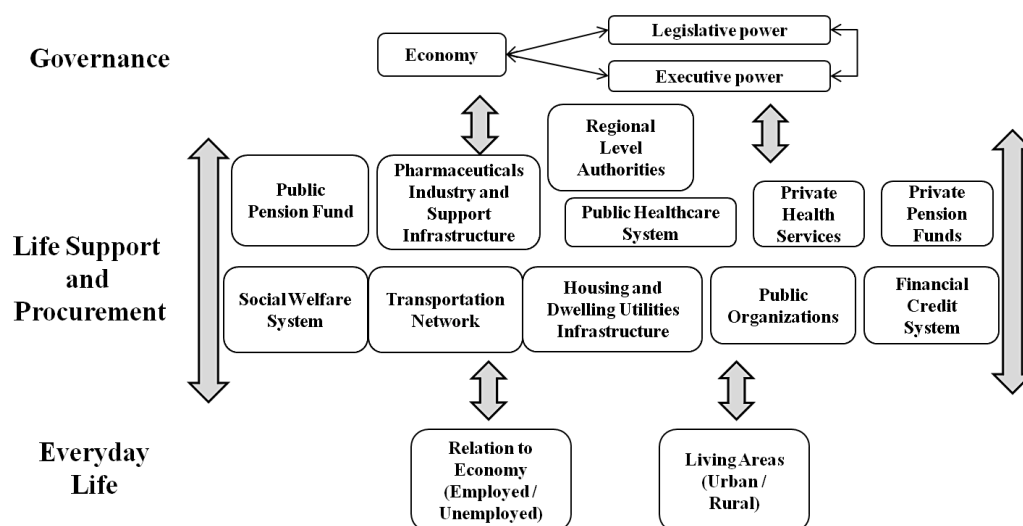
### 2.1. Structuring model of elder people Well-being

The older generation's well-being is actively researched by leading scientists (Bowling (1995), Murrell et al. (1999), McKenna et al. (1999), Carr, Gibson & Robinson (2001), Hyde et al. (2003), Alexandrova (2005), Cummins (2005), Easterlin (2006), Kahneman & Krueger (2006), Costanza et al.

(2007)). The model of older generation well-being used in this paper is based on hierarchy of functions related to the management and life procurement support and includes two levels of impacts: system and practical. The overall holistic model of elderly population's well-being was developed on the basic principles of system analysis approach and presented in the report for the 26<sup>th</sup> International Business Information Management Association Conference (Pavlova, Monastyrny & Gumennikov, 2015). The systemic approach integrates a number of both subjective and objective indicators calculated and presented in such databases and reviews as:

- the Global Age Watch Index (AW),
- the Active Ageing Index (AAI),
- the OECD Better Life Index (BLI),
- OECD Regional Well-Being: A User's Guide,
- the Eurostat Feasibility study for Well-Being Indicators.

Invariant parts of the presented model are functions of governance and procurement support. The governance functions are performed by such structural elements of the system as the “Government” and the “Economy”, creating a balance between the desirable and the possible. The function of procurement support is performed by institutions and organizations, creating and supporting living environment for the elderly people. The variable part of the model is a social target group itself in a variety of individual characteristics, problems, needs and opportunities on the level of everyday life (Fig.1). This approach allows researching multiple target groups and generating modifications of the model, depending on the research goals.



**Fig. 1.** Holistic model of the elderly population's well-being (Pavlova et al., 2015)

The presented model serves as the base for the development of the information system database of elderly people well-being.

## 2.2. Databank designing

The database structure is developed according to the proposed model for estimation the population well-being. It includes:

1. Types of studying objects: «Government», «Provision», «Economy», «Retired households», «Near surroundings (friends and acquaintances)», «Other population» and the detailed descriptions (27 objects);

2. Needs and resources: «Health and physical activity», «Revenue», «Accommodation», «Growth», «Communications and social connections», «Social activity», «Leisure», «Mobility».

3. Indicators (45 source indicators plus calculating indicators).

4. Connections between objects, needs and resources, and indicators.

Our information system consists of database and web-interface.

Web-interface is the part of web-site <http://statlwl.tpu.ru/>. It allows to add data into the database and also to display data (the user need to login in order to have an access for database).

For creating the database we chose the database server MySQL. For implementing the web-interface to the database and the methodologies for calculation the values of indicators we used PHP. And we also used Twitter Bootstrap on the client side of web-interface.

As for the web-interface, we have a certificate of registration of the computer program («The control program for database of indicators of well-being of older people», certificate of the Russian Federations' state registration № 2015619013, authors: Barisheva G.A., Monastirni Y.A., Spitsin V.V., Shabaldina N.V., Gumennikov I.V.).

Physical model of the created database is shown on Figure 2.

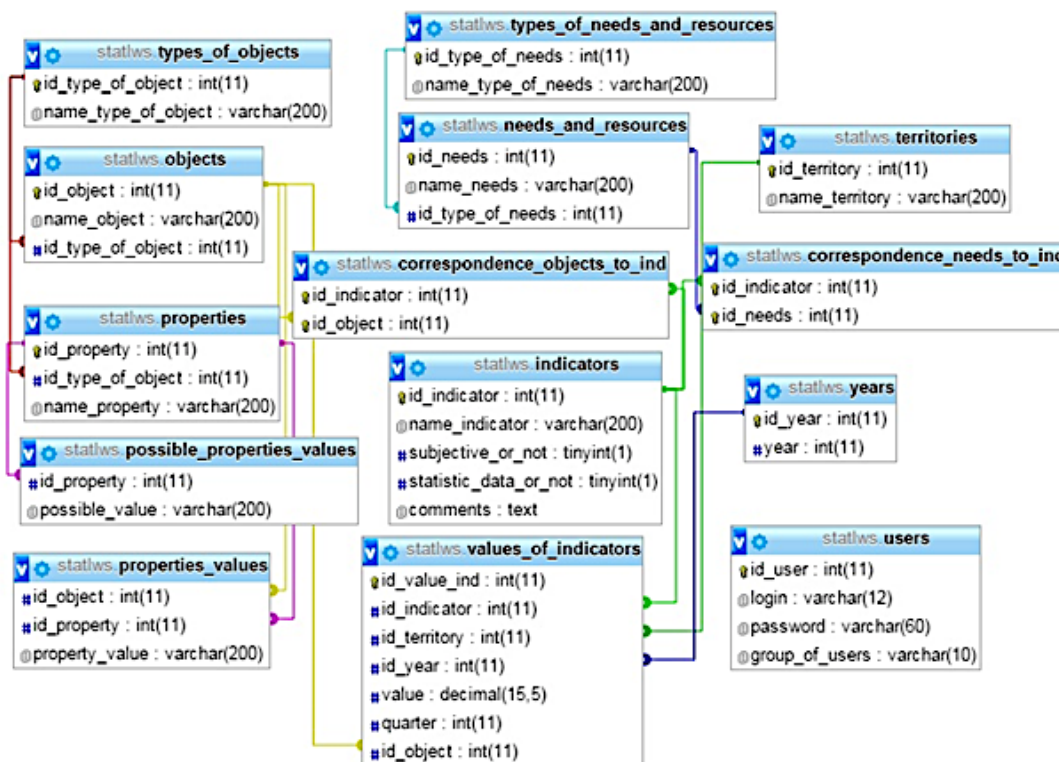


Fig. 2. Population well-being database' physical model

We filled the database based on the official statistics of well-being of older people that we've got from TomskStat (Pavlova et al., 2016). Created database contains 45 source indicators, it covers the time period from 2000 to 2013 years, and in the current step includes more than a thousand of values of

the source indicators (1021 values). In addition to the source indicators, the created information system allows to generate different user requests and based on such a request to calculate automatically the values of calculating (not source) indicators (for example, there can be the growth rate for the specified year, the structure by objects, the ratio of the indicators). Having in mind these calculating indicators, one can assure that the quantity of the displaying data is much more than the number of values of indicators stored in database.

### 3. Results of information system applying for elderly people Well-being Analysis: case of Tomsk region

Examining the dynamics of basic indicators we found some trends in elder people's well-being during last 12 years. Below we present the results for the three areas of research:

1. The structure dynamics of pensioners' number (dynamics of the share of employed pensioners and the share of rural pensioners)
2. The pensioners' availability for social objects (medical, consuming, financial and social care).
3. The pensioners' availability for IT-using (computer, internet).

#### 3.1. Tomsk region elder people's structure dynamics

The structure of pensioners in Tomsk region shows stable growth of employed persons ratio. The rise dynamics is reflected in the table 1 data.

**Table 1.** Dynamics of employed pensioners ratio for Tomsk region.

Year	Pensioners, ind.	Employed pensioners, ind.	Employed pensioners ratio, %
2002	249 591	59 933	24,01
2003	250 402	55 392	22,12
2004	251 705	60 782	24,15
2005	255 202	67 838	26,58
2006	256 179	73 947	28,87
2007	259 066	80 865	31,21
2008	261 964	87 632	33,45
2009	268 120	92 732	34,59
2010	272 592	100 030	36,7
2011	276 598	106 280	38,42
2012	279 690	112 156	40,1
2013	283 609	117 872	41,56

As we can see, a small recession of 2003 was changed by a stable increase since 2004 so the number of employed elder people was doubled during ten years. The pension amount in order to state laws was increased on 294 per cent, so we can presume that the elder people tried to rise their welfare.

At the same time, we are to state the decrease of rural pensioners' number ratio in the Tomsk region's elder people structure (Table 2).

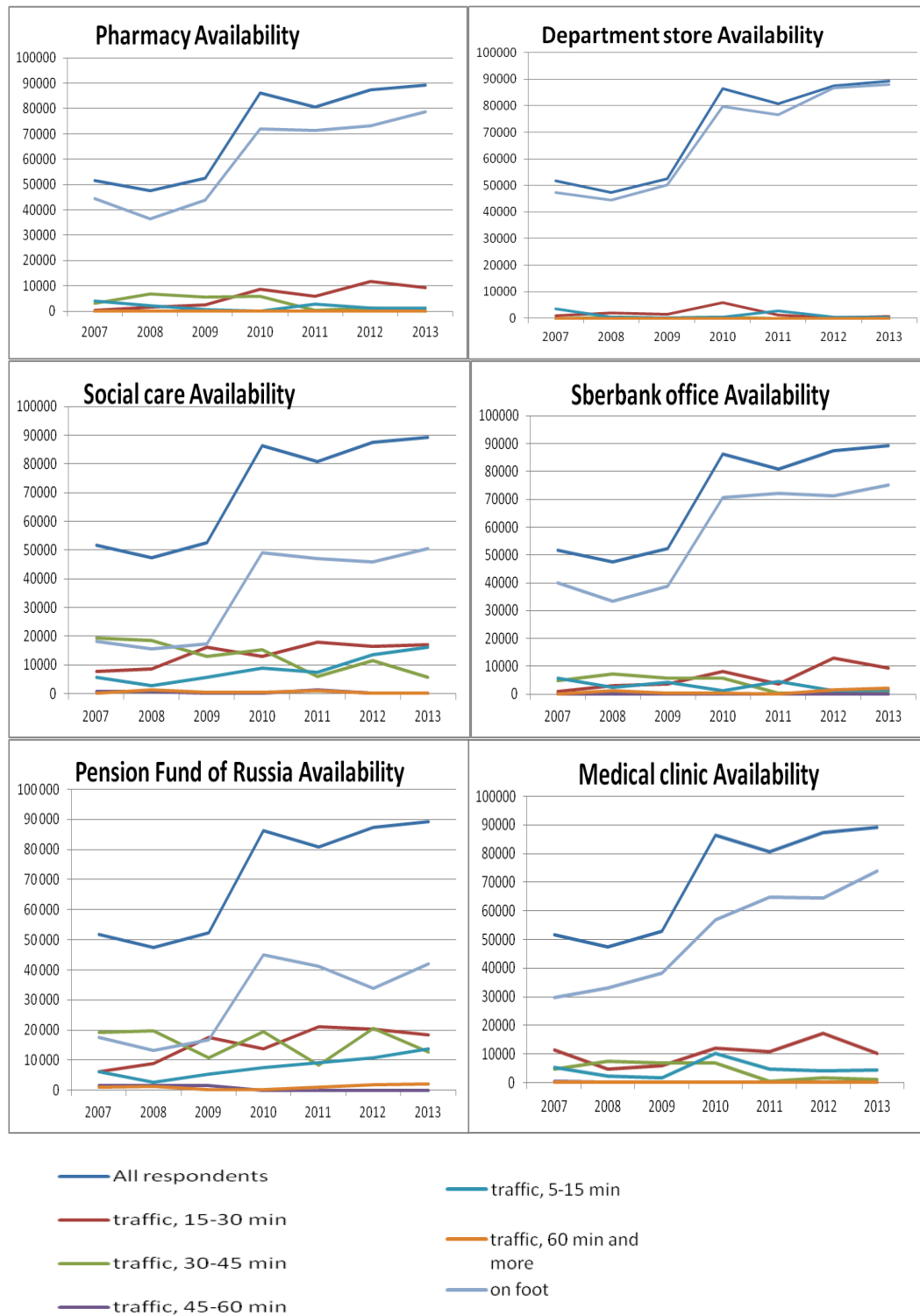
**Table 2.** Dynamics of rural pensioners' ratio for Tomsk region.

Year	Pensioners, ind.	Rural pensioners, ind.	Rural pensioners ratio, %
2002	249 591	99 996	40,06
2003	250 402	97 877	39,09
2004	251 705	97 011	38,54
2005	255 202	96 166	37,68
2006	256 179	95 286	37,2
2007	259 066	95 276	36,78
2008	261 964	95 723	36,54
2009	268 120	97 401	36,33
2010	272 592	97 937	35,93
2011	276 598	98 699	35,68
2012	279 690	99 227	35,48
2013	283 609	100 232	35,34

We can see that the number of rural pensioners is stable (increase for 0.2 per cent) for last twelve years but the whole number increased for 13.6 per cent. It means, in our opinion, that elder people left the countryside for towns joining to their children or other relatives. Above trend may be connected with the higher pension amount and social objects vicinity which is higher in big localities such as Tomsk and other towns of the region (Asino, Kolpashevo, Strejevoy and in lesser degree Kedrovyy).

### *3.2. Tomsk region elder people's social objects availabilities*

We've realized some growth of social objects availability for pensioners, while assessing database indices. The interview is based on the interval assessments of pensioners living at Tomsk and in countryside. The dynamics is described at the Figures 3. They reflect the growth of pensioners availabilities to visit the important objects required to create better life level.



**Fig. 3.** Pharmacy availability dynamics in Tomsk region.

It is undoubted that the social objects moved nearer to pensioners of Tomsk region since 2007, so they can get the pharmacy, medical clinic, department store, social care service, bank office and Pension Fund in a shorter time on foot or by traffic less than a half hour. The respondents answered, that the grocery store was available on foot initially.

The dynamics can be traced in the Table 3

**Table 3.** Dynamics of social objects' availability growth for Tomsk region.

Social object	2007, on foot ratio, %	2013, on foot ratio, %
Medical clinic	57.3	82.6
Pharmacy	86.1	88.3
Department store	91.3	98.6
Sberbank office	77.3	88.1
Social care office	34.9	56.5
Pension Fund office	34.0	47.2

We can conclude that the Tomsk region officials tried to bring medicals and bankers closer to pensioners last seven years.

### 3.3. Tomsk region elder people's IT - using

As for computer and internet usage, the elder people demonstrate the growing interest for these activities, which is subscribed at the Table 4.

**Table 4.** Dynamics of using IT pensioners' ratio for Tomsk region.

Year	Pensioners, using IT, %	Pensioners, using internet aye, %	Pensioners, using internet from time to time, %	Pensioners, using PC, %	Pensioners interviewed, ind.
2007	5,56%	0%	2%	4%	104 008
2008	23,21%	3%	3%	17%	82 226
2009	32,94%	5%	6%	22%	83 596
2010	38,77%	5%	10%	24%	132 100
2011	45,22%	12%	10%	24%	178 898
2012	46,64%	13%	8%	25%	149 875
2013	78,01%	26%	12%	39%	146 637

There were insignificant ratio of elder people using IT (PC and Internet) in 2007, but in 2013 their number reached 78 per cent.



#### 4. Conclusions

During our research we successfully created and applied information system (consisting of database and web-interface) in assessments elder people's well-being. Examining the dynamics of several basic indicators we defined some trends in elder people's well-being in Tomsk region during last 7-12 years:

- the employed pensioners' number is raising significantly from 24% in 2002 to 41.5% in 2013;
- the rural pensioners' number is declining from 40% in 2002 to 35% in 2013;
- the average availability for using IT is growing quickly;
- the average availability for visiting social objects is growing irregularly, but shows good ratio of nearness: for more than 80% respondents medical care, bank and department store could be reached on foot in 2013 instead of 57% in 2007. The social care and Pension Fund offices' nearness is less: 47-57% in 2013 instead of 34% in 2007.

At the same time we faced with some difficulties:

1. Official statistics gives incomplete data in well-being measuring. We have no information about gender and age structure of pensioners and the only solution was to perform complementary interview.
2. There are no detailed subscriptions of information systems created to help in well-being measurements, so our research was performed particularly for Tomsk region, but it seems appropriate to use it for all regions of Russia
3. The next stage of research will be dedicated to creation of the instruments allowing to calculate indices including both subjective and objective data in order to verify their meanings.

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