Секция 8

ПРОБЛЕМЫ МЕНЕДЖМЕНТА ПРЕДПРИЯТИЙ И ИННОВАЦИОННОГО УПРАВЛЕНИЯ ТРУДОМ

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THE ROLE OF BIG DATA IN DECISION MAKING: CASE STUDY ON REAL ESTATE MARKET ANALYSIS

Introduction. The emergence of the smart technologies bring the world to our fingertips resulted in an unprecedented increase in data generated, which is known as Big Data. As stated in [1] «no dimension of modern enterprise activity today remains untouched by digital technologies». The companies that want to keep their place in the market had to adjust to the changes and integrate Big Data and analytics to their core strategy and process of decision making. It is a big challenge to make use of Big Data and it requires time and a good action plan. The first thing for the companies to do would be taking this new paradigm serious and understanding how to leverage Big Data in long-run by adopting a data-driven approach in decision making. The commonly accepted major success factors for benefiting from Big Data can be summarized as [2–5]: analytic skills, business domain knowledge, collaboration, technological infrastructure, investment, management skills, leadership, vision, identifying/hiring the right talent, organizational culture/restructuring, organizational learning, supportive climate, data-driven mindset, information sharing culture, data strategy alignment, clear strategy, data quality.

Big Data, as in every other business area, has affected the real estate market. The newly emerged technologies and Big Data lead to changes in the real estate valuation industry. The biggest change was the new valuation models that assess the value of a property without the need for the physical inspection of a real estate appraiser. These models are referred to as automated evaluation models (AVM) [6].

Hypostat is a yearly statistical review report on Europe's, and beyond, mortgage and housing markets published by European Mortgage Federation (EMF) [7]. In this case study the data shared in the Hypostat 2019 was used to analyze the Europe's housing market, with the inclusion of United Kingdom. Different spreadsheets about issues like owner occupation rates, change in nominal house prices, total dwelling stock, interest rates on residential loans and so on are provided. Due to the unavailability of data for every country on each spreadsheet, a subset with only Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom, and Norway. A principal component analysis performed in Rstudio revealed that there are 3 or 4 major factors that affect the housing markets in the aforementioned countries. These factors are responsible and can explain the 86 % of the variability in the dataset. Since the uncovering the meaning of the factors require more data on the housing markets of the countries, it is left out of the scope. The factor analysis performed with 3 factors and 4 factors respectively gave similar results and were used in building linear regression models with the factors being the independent variables, and owner occupation rate the dependent variable. This analysis enabled the reduction in dimensions of the dataset, as the number of independent variables were reduced from 9 to 3 and 4 without loss of any information. The results of the linear regression models were as follows.

Results of the linear regression models

Models	Multiple R-squared	Adjusted R-squared
model1	0,5162	0,4557
model2	0,5535	0,4759

The results of the principal component analysis were also used in cluster analysis which gives us clusters whose members are similar to each other as possible while being as dissimilar as possible to the members of other clusters.

Conclusion. Big Data is a very important asset that can become even more valuable when used properly. It has caused changes in the market dynamics of almost all business areas. It is a must that companies adjust to the technological changes and integrate Big Data into their businesses if they want to have a place in the market. In the real estate market the automated valuation models provide more detailed analysis which also takes the factors that cannot be analyzed by physical inspection. The case analysis provided gives insights about the Europe's house markets which can be used in further research. With more data the meanings of the factors can also be uncovered which in turn will provide a clearer picture on Europe's house markets.

References

1. *Bhimani, A.* Exploring big data's strategic consequences / A. Bhimani // J. of Information Technology. — 2015. — Vol. 30. — P. 66–69.

2. The Age of Analytics: Competing in a Data-Driven World [Electronic resource] / N. Henke [etc.] // McKinsey & Company. — Mode of access: https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/the-age-of-analytics-competing-in-a-data-driven-world. — Date of access: 02.02.2020.

3. *Poleto, T.* The Full Knowledge of Big Data in the Integration of Inter-Organizational Information: An Approach Focused on Decision Making / T. Poleto, V.D.H. de Carvalho, A.P.C.S. Costa // Intern. J. of Decision Support System Technology. — 2017. — Vol. 9, iss. 1. — P. 16–31.

4. *Brooks, P.* A framework for developing a domain specific business intelligence maturity model: Application to healthcare / P. Brooks, O. El Gayar, S. Sarnikar // Intern. J. of Information Management. — 2015. — Vol. 35. — P. 337–345.

5. *Cato, P.* An Investigation into the Implementation Factors Affecting the Success of Big Data Systems / P. Cato, P. Gölzer, W. Demmelhuber // Proc. of the 11th Intern. Conf. on Innovations in Information Technology. — 2015. — P. 134–139.

6. *Xiao, Y.* Business Expanding and Strategic Decision-Making Innovation for Real Estate Valuation Companies Based on Big-Data / Y. Xiao, L. Xu // Proc. of the 20th Intern. Symposium on Advancement of Construction Management and Real Estate. — 2017. — P. 1057–1068.

7. Hypostat 2019 — A Review of Europe's Mortgage and Housing Markets [Electronic resource] / L. Bertalot, J. Johnson, D. Westig, S.G. Pérez (eds.) // ECBC. — Mode of access: https://hypo.org/ecbc/publications/hypostat/. — Date of access: 17.04.2020.