

SUMMARY

This thesis is a detailed statistical analysis of the concept of quality of life, approaching the subject from a socio-economic perspective. The paper is divided into two main parts, each containing a specific number of chapters.

The first part of the thesis is represented by the first two chapters, outlining the theoretical background and general context of the study. In the first chapter, the current state of research on quality of life in rural areas is addressed, providing an overview of the evolution of the concept over time at the socio-economic level. The second chapter highlights theoretical approaches in machine learning data analysis, focusing on multivariate time series forecasting using the VAR method and statistical modelling of data using the RNN and LSTM methods.

The first chapter, presents introductory notions related to quality of life viewed as a multidimensional concept. The evolution of human capital is also analysed in close correlation with rural areas, the link between the two components being significant in the analysis of living standards.

The second chapter presents the objectives of the PhD thesis, the research methodology and the analytical tools used during the study. In this regard, machine learning models of the VAR - vector autoregressive and RNN - recurrent neural network types were used to analyse time series and make predictions on the evolution of the quality of life level. Another methodological approach involves the use of Analyze-IT software to study the link between variables. Using the principal component analysis was observed, the degree of association and the intensity of the relationship between the influencing factors, through taking into account the two axes of the system.

The second part of the thesis, consists of the presentation of own contributions, and is composed of four chapters. The third chapter presents the aim, objectives, information base and research method of the work on the analysis of the level of quality of life in the rural area of the North-East region. The fourth chapter focuses on the statistical analysis of the determinants of the studied phenomenon at the regional level. The fifth chapter focuses on the statistical correlation between population, environment and quality of life in rural areas of the region. The sixth chapter focuses on the holographic analysis of complex system dynamics from a fractal/multifractal perspective, essentially analysing the rural environment as a complex system.

The third chapter summarises the results obtained from the evaluation of the quality of life level, applying a modern machine learning method, which uses the field of artificial intelligence to provide a series of machine learning systems. Subsequently, mathematical models will be built, based on which the best decisions will be made. The

main goal is to highlight through innovative statistical methods the quality of life level in the rural area of the North-East development region using two computational algorithms VAR and RNN. The VAR model uses time series data, analysing time series and providing predictions, while the RNN algorithm uses neural networks to order the data into a particular category or sequence. Artificial intelligence through the use of algorithms is one of the revolutionary technologies in the field of statistics, so with the support of machine learning tools we are able to outline the characteristics of rural space in Python program.

Chapter four presents the statistical analysis of the quality of life identified in the rural area of the North-East development region through the evaluation of the relationship between variables by using the Analyze-IT spreadsheet program, which is designed to describe the data in a unique way, highlighting significant relationships between components. In this sense, remarkable results are obtained taking into account the correlation analysis between variables, but also the principal component analysis, which studies the amount of variance of the original data explained on each component according to Benzecri's criterion (the first two principal components account for 70% of the variance of the others).

In the fifth chapter, mountain and foothill localities are compared from the perspective of statistical correlation analysis in relation to population growth. In this case, the ten characteristics applied to both mountain and foothill localities will be used, and the results obtained will be quantified in correlation matrices and analysed in order to observe the degree of influence on the level of quality of life.

Chapter six introduces the holographic method of analysis of the quality of life identified in the rural areas of the North-East development region. This shows that discrete and analogue non-linear behaviours become fundamental in such an analysis, the deep learning evaluation represents as a natural consequence of the holographic one.

In conclusion, the results of the study on the rural environment of the North-East development region indicates the existence of a significant potential for the development of the concept of quality of life. In order to develop the present initiative, it is essential to take into account the elements analysed at the three-dimensional level: health, education and environment.

The paper is completed with a chapter of conclusions and recommendations, which summarizes the main results of the research and offers directions for future analysis that can be carried out in the rural area of the North-East development region taking into account the socio-economic context.