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# ASSESSING THE SIGNIFICANCE OF INTELLECTUAL CAPITAL IN RETAIL TRADE THROUGH CONJOINT ANALYSIS[2]

*In the conditions of widespread application of information and communication technologies, intellectual resources as a result of human intelligence, knowledge and experience are the leading source of development and growth. Intellectual capital, encompassing all the intellectual resources from which businesses derive growth in various forms, is emerging as the leading form of capital today.*
*The aim of this publication is to assess the significance of joint impact and the extent to which elements of intellectual capital contribute to value creation and the establishment of conditions for manifestations of competitive advantages in retail trade.*
*The study was carried out using conjoint analysis. After a brief historical overview of the development of the conjoint analysis methodology, its relationship with the hierarchical process analysis developed by Thomas Saaty is shown and a full profile conjoint analysis is conducted. The necessary data were obtained by carrying out surveys with managers from consumer goods retail chains. Based on the obtained ratings – partial, average, and overall – of the 'utility' and 'importance' categories, conclusions have been drawn regarding the joint impact and the extent to which the elements of intellectual capital contribute to value creation in retail trade.*
*Keywords: intellectual resources; intellectual capital; conjoint analysis; retail trade, retail chains.*
*JEL: M21; O34*

## 1. Introduction

The rapid development of information and communication technologies causes an increase in the speed rate of knowledge dissemination as well as of possibilities for its implementation in the form of innovations, know-how, image, trade mark and other tangible and intangible assets. Modern business practice shows that the growth and success of market entities and the difference between market values and balance sheet company values are increasingly dependent on the knowledge applied as a kind of intellectual resource. According to Sveiby, knowledge management is the art of generating value from the company's intangible assets (Sveiby, 1997). The increasing competition in the retail market stimulates research on the

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role of intellectual capital in creating competitive advantages. Further theoretical development of the market requires more empirical applications of existing and new methods and methodologies to better assess the utility and significance of the different elements of intellectual capital.

The aim of this publication is to assess the significance of joint impact and the extent to which elements of intellectual capital contribute to value creation and the establishment of conditions for manifestations of competitive advantages in retail trade.

The goal is achieved by solving the following tasks:

- Review of the literature on the origin and development of conjoint analysis and its application to empirical research;
- Identifying the significant combinations of intellectual resources that jointly impact value creation in retail;
- Assessment of the importance of intellectual resources through the main characteristics of the conjoint analysis "utility" and "importance";
- Assessment of the extent of the joint impact of the elements of intellectual capital – human, organizational and relational – on value creation in retail trade.

Intellectual capital is seen as a collection of intellectual resources or knowledge, whose use in economic and social life increases worth, value and wealth in a variety of its forms (Pozharevska, 2017). Intellectual capital has three components according to the agent where the capital lies: human capital lies in people, structural capital lies within the organisation and relational capital lies in the relations between the organisation and environment (Sveiby, 2001). Most researchers accept the view that intellectual capital comprises three main elements – human capital, structural or organizational capital, and relational capital, but there is still no consensus on which term is more appropriate – structural or organizational capital (Galabova, 2022).

Three stages can be distinguished in the development of the economic theory and practice focused on intellectual capital research (Dumay, Garanina, 2012). The first one includes the last two decades of the XX c. and is devoted to the clarification of the nature and scope of intellectual capital, the second one focuses on its measurement while the third stage is related to intellectual capital management and encompasses large-scale empirical research.

Over the last few years, numerous methods for the assessment of intellectual capital have been suggested in specialised literature. D. Luthy (1998) and M. Williams (2001) systematize scientific research by dividing these methods into four main groups:

- Direct Intellectual Capital Methods (DICM);
- Market Capitalisation Methods (MCM);
- Return on Assets Methods (ROA);
- Scorecard Methods (SC).

Based on a long-standing research experience in intellectual capital management, G. Roos, S. Pike and L. Fernstroem add a fifth group of assessment methods – the so-called Proper Measurement Systems (PMS), one of which is conjoint analysis (Roos, et al., 2005).

Generally, the implementation of most of these methods is realized at a company level and often requires confidential information and the presence of developed financial markets in the given country, which results in a number of limitations.

The present study was conducted using conjoint analysis, the idea of which originated in the economic theory a century ago. A study of the emergence of conjoint analysis helps reveal the meaning and significance of the complex and ever-changing method used today with the help of specialised software. A full profile conjoint analysis was conducted after a brief historical overview of the development of conjoint analysis methodology, showing its connection with the hierarchical process analysis proposed by Thomas Saaty. The data needed were collected through surveys of retail chain managers and members of the Association for Modern Trade in Bulgaria, offering consumer goods. The data reveal the views of the managerial teams.

As a result of the applied conjoint analysis in retail trade, based on the obtained ratings – partial, average, and overall – an assessment has been made of the joint impact and the extent to which the elements of intellectual capital contribute to value creation in retail trade.

## 2. Literature Review on the Origins of Conjoint Analysis

Conjoint Analysis (CA) is a term used to refer to the methods of eliciting individuals' preferences about alternatives and with regard to the study context they are related to the choice of goods, services, resources or course of action. It is an unconscious multi-attribute system for the joint measurement of the impact of the studied features (attributes) on a particular choice. Conjoint analysis is based on mathematical representations of rank orderings of datasets. It is aimed at determining the combination of a limited number of features (attributes) with the greatest joint impact on the respondents' choice or decision-making.

The idea of conjoint analysis, which is also popular in economic literature as joint analysis (formed from the word combination CONsidered JOINTly), can be found in the economic theory of a century ago. As Kevin Gray notes, the foundations of conjoint analysis can be seen in the analysis of variance – ANOVA (Gray, 2017). In 1921, Ronald Fisher was the first to apply the analysis of variance. Through this method, an answer is sought to the question of whether a factor whose values are presented on a nominal scale (they represent some categories) has an impact on a variable whose values are presented on a numerical scale – an interval scale. The idea of controlling the impact of side factors in the analysis of variance (ANOVA) is used in conjoint analysis as well.

In fact, the idea of conjoint analysis can also be sought in other statistical methods – starting from the chi-square method and moving on to regression analysis. The reason for this statement is the very way conjoint analysis works. It is aimed at establishing the most significant combination of features (attributes) for a given consumer aggregate by applying

statistical methods, most often variance or regression analysis. Factor variables in statistical analysis and conjoint analysis are in their nature a kind of technology and are considered as a whole and not in terms of their individual elements. In conjoint analysis, the various combinations of elements are observed as a whole and although respondents are given the opportunity to see these elements, the assessment and the ranking of the combinations are made as a whole. Thus conjoint analysis makes it possible to find latent, invisible factors that affect respondents' choices.

Economic literature shows that the analysis of variance is applied in experimental psychology as well, and this is a field where the roots of conjoint analysis are also to be found, especially in psychometrics. Carol and Green point out that "at the moment, conjoint analysis and the related technique of experimental analysis are the most commonly applied methodologies of measurement and analysis of consumer preferences" (Carroll, Green, 1995, p. 385). As a method, conjoint analysis was developed by the American psychologist and mathematician Duncan Luce and the statistician John Tukey in 1964 (Luce, Tukey, 1964).

Since the 1980s, conjoint analysis has been widely used in a lot of sectors. Paul Green notes that "the development of conjoint analysis and its application in marketing and business studies is remarkable both with its eclectic roots (psychometrics, statistics, operations research, economics) and with the fact that it reflects the efforts of a multitude of experts – academia, marketing specialists, practitioners from the industry, software experts." (Gustafsson, Herrmann, Hubert, 2007).

Hauser and Rao describe the later developments and application of conjoint analysis, after Paul Green, and pay attention to its relation to multidimensional scaling. "The strength of multidimensional scaling (MDS) include the ability to present the multidimensional consumer perceptions and preferences with regard to a certain set of products. Multidimensional scaling decomposes based on holistic judgements in order to reveal these perceptions and preferences" (Hauser, Rao, 2002).

It is known that as a form of non-linear dimensionality reduction, multidimensional scaling is a means of visualisation of the degree of similarity. One of the tasks of conjoint analysis in psychology as well, is "to reveal the structure of the examined set of stimuli…The procedure of structure building is based on the analysis of objective or subjective information about the similarity between the stimuli or the information about the preferences for a set of stimuli. In the case of subjective data analysis, two problems are solved simultaneously. On the one hand, the objective side of subjective data is shown and, on the other, the factors affecting the decision-making process are defined" (Koschachek, 2021).

Paul Green tries to increase the power of multidimensional scaling. "He sought a means to decompose consumer preferences to part-worth contribution of product features. Thus researchers can not only explain the preferences for existing products, but also simulate preferences for completely new products, determined by feature combinations… Some authors such as Luce and Tukey (1964), and Krantz, Luce, Suppes and Tversky (1971) investigate behavioural axioms that would allow the decomposition of overall judgement… Conjoint analysis is of psychometric origin as a theory of decomposition of an ordinal scale of overall judgement into interval scales for each component" (Hauser, Rao 2002).

Paul Green takes advantage of this joint theory of measurement and adapts it to the solving of marketing and product problems and in 1971 Green and Rao pioneered the application of conjoint analysis in the field of marketing (Green, Rao, 1971). Later on, G. Roos, S. Pike and L. Fernstroem apply conjoint analysis to the management of intellectual capital by decomposing managerial preferences to part-worth contribution with regard to the elements of intellectual capital so as to stimulate various ideas for its management.

According to Kevin Grey, the term conjoint is used quite loosely by marketing researchers and, actually, most of the time it refers to the discrete modelling method which builds on earlier studies and is often associated with the pioneering work of the economist Daniel MacFadden. At the beginning of the 1970s, MacFadden provided the basis for the choice of modelling among a number of alternatives (Grey, 2017).

The historic review of the development of conjoint analysis methodology showed that there are a lot of similarities between conjoint analysis and the Analytic Hierarchy Process theory developed and popularised by Thomas Saaty in 1980. The similarities between the two methods are of crucial importance to understand the way conjoint analysis functions, especially given its application by using software products today. These similarities are found with regard to several directions:

First, when defining the nature and purpose of the methods, Thomas Saaty explains the essence of the method of the analytic hierarchy process – "The Analytic Hierarchy Process (AHP) is a theory of measurement through pairwise comparisons and relies on the judgements of experts to derive priority scales. It is these scales that measure intangibles in relative terms. The comparisons are made using a scale of absolute judgements that represents, how much more, one element dominates another with respect to a given attribute" (Saaty, 2008).

In conjoint analysis, the importance of the attributes for each surveyed expert is measured through pairwise comparisons the way that Saaty introduced in the 1980s. The aim of conjoint analysis is to find out what combination of a limited number of features has the greatest joint impact on the respondents' choice when making decisions. In marketing, conjoint analysis is used to establish the optimal set of features of a given product that would ensure a maximum result in the market by combining the interests of producers, merchants and consumers. In the present publication, conjoint analysis is aimed at defining what combinations of limited intellectual resources have the greatest joint impact on the choice the surveyed managers make to create value and prerequisites for the manifestation of competitive advantages in trade chains.

Second, Thomas Saaty considers hierarchy on a macro scale and, in the broadest sense, presents the philosophy of the optimal relationship between the elements of a structure or system, which is a universal methodology and is largely embedded in conjoint analysis. According to him, "The Analytic Hierarchy Process (AHP) is a closed logical structure that provides for analysing complex problems in all their varied forms using simple rules and leading to the best answer. In addition, the application of the method allows the inclusion in the hierarchy of everything that a researcher has on the problem under consideration, such as knowledge and imagination. This, in my view, is a balanced way of solving a difficult problem: leave mathematics behind and let the richness of the structures carry the weight of

the complexity. No mathematics can replace the human mind and experience in interpreting the real world“ (Saaty, 2008). In conjoint analysis, respondents, in their capacity as experts or potential users of a given product, determine their preferences by comparing the various combinations of features and on the basis of certain relevant compromises. Whether it will be in establishing price levels, in the development of new products, in the management of intellectual resources, or in conjoint analysis judgment is made based on experience, preferences, knowledge and competencies. There seems to be no better way to express the basic principle of conducting research in conjoint analysis, which is ultimately reduced to prioritising qualitative over quantitative analysis.

Third, according to Saaty, “In addition, our method allows a group of people to interact based on the problem they are interested in, to modify their judgements and, as a result, to combine their group judgements in accordance with the main criterion: when performing a pairwise comparison of objects with respect to some feature or features in relation to a higher purpose, feedback provides the key to reconciling group judgements in a rational way”. As can be seen, this is an interactive approach implemented in all spheres where an acceptable decision must be made either by consensus or by accepting the decision of the majority of the respondents. Applying conjoint analysis in this particular study and based on the obtained assessments – partial, average and general, for the categories of utility and importance, conclusions were made with regard to the place and role of the individual elements of intellectual capital in terms of the creation of value in retail trade.

Fourth, Saaty reveals the nature of the concept of hierarchy and concludes: “When the mind is faced with a lot of controlling and non-controlling elements related to a difficult situation, it combines them into groups according to the distribution of some attributes among these elements... These elements, in turn, can be grouped according to a different set of properties, creating elements of another, higher level, and so until the single element is reached – the peak that can often be identified with the purpose of decision-making. What has just been described is usually called hierarchy, i.e. a system of multi-layered levels, each of which comprising a lot of elements or factors“. In this respect, it should be noted that the methodology, developed and repeatedly tested in different economic sectors by Goeran Roos, Stephan Pike and Lisa Fernstroem, for the management of intellectual capital requires the preparation of a hierarchical tree of intellectual resources as a necessary prerequisite and an entry to the realisation of conjoint analysis. With regard to the given study, “the different economic behaviour of resources allows their grouping as traditional and intellectual at the first research level. At the second research level, traditional resources, in turn, decompose into financial and tangible ones, while intellectual resources decompose into human, structural and relational ones. According to Goeran Roos, Stephan Pike and Lisa Fernstroem, the constituent elements of each subgroup form the mandatory minimum third level of detail in the investigation. Resources are subdivided until the fifth or even seventh level depending on the research objectives and these branches are visualised in the form of a hierarchical resource tree“ (Nikolova, 2018).

Fifth, according to Saaty “the main question in the language of hierarchy is how strongly the individual factors at the lowest level of the hierarchy affect the top – the common goal. The unevenness of the impact for all factors leads to the need to determine the intensity of the impact or, as we prefer to say, the priorities of the factors. The prioritisation of the lowest-

level factors relative to the objective can be reduced to a sequence of prioritisation tasks for each level, and each such task to a sequence of pairwise comparisons. Comparisons remain the basic building blocks of our theory even if the original problem is complicated by feedback conditions between different levels or factors" (Saaty, 2008). There is no more accurate description of the essence of conjoint analysis than the one Saaty gives on a completely different occasion, but generally valid, for solving tasks and problems of a very different nature in theory and practice. With the application of the Analytic Hierarchy Process theory, developed and popularised by Thomas L. Saaty, basically, two main goals are achieved: "The first one is to achieve a relatively objective ordering of the elements of each hierarchical level on some scale depending on their importance to the elements of the higher hierarchical level. The second objective is to find out whether and to what extent there is consistency in the individual assessments and opinions of the experts on the studied problem" (Iliychovksi, 2018). In addition, the fulfilment of these goals is found in the interpretation of the concepts of utility and importance in terms of conjoint analysis.

Sixth, with regard to the basic principle of conducting research in conjoint analysis – "We will show that the old proverb that apples and oranges cannot be compared is wrong… You may prefer an orange for some characteristics and an apple for others… We may be indifferent to size and colour, but the degree of our preference for taste may vary depending on the time of day. Our thesis that complex comparisons of this kind often occur in reality requires the development of a certain mathematical approach. The method will split for similar comparisons in dynamics. The practice of decision-making is concerned with weighing alternatives, each of which satisfies a particular set of desired goals. The challenge is to select the alternative that best meets the entire set of objectives" (Saaty, 1993). Those familiar with the conjoint analysis method are aware that it presents various variants (combinations) of features and the relevant persons must, based on their experience, knowledge, perceptions and competencies, determine the combination that satisfies them to the greatest extent in order to achieve the specific purpose.

Fifty years ago, Paul Green and Vithala Rao introduced the idea of conjoint analysis: "Conjoint measurement is a new development in mathematical psychology that can be used to measure the joint effects of a set of independent variables on an ordered dependent variable… This procedure requires only a rank ordering of the input and yields an interval scale score as the output" (Green, Rao, 1971). In addition, areas of marketing research are discussed in which it is possible to apply the method as well as some of the limitations to its implementation.

Bryan Orme (2010) writes that prior to Paul Green and Jerry Wind's (1975) article, namely in 1974, the vice president of Market Facts, Richard Johnson (Johnson, 1974), published an article about "a customer problem involving a durable commodity product and trade-offs between twenty-eight separate product features, each of which has about five different implementations or levels. The problem is much more complicated than the one solved by Green and his colleagues by using full-profile conjoint analysis, so Johnson invented the so-called method of double trade-offs. His article is devoted to trade-off matrices. Instead of asking respondents to assess all attributes simultaneously and in a full profile, Johnson breaks the problem down into focused trade-offs including only two attributes at a time. Respondents

are asked to rank the cells in each table in terms of their preference for joint levels" (Orme, 2010).

In 1978, Green and Srinivasan published an article that was instrumental in popularising conjoint analysis and its implementation in theory and practice. As the authors note, "since 1971 conjoint analysis has been applied to a wide variety of problems in consumer research. This paper discusses various issues involved in implementing conjoint analysis and describes some new technical developments and application areas for the methodology" (Green, Srinivasan, 1978). The importance of this article is determined by the fact that it starts by making a brief overview of the history of conjoint analysis, then moves on through the steps of the method application: choice of preferred model (vector model, ideal-point model, part-worth function model, mixed model), method of securing data, two-factor-at-a-time (trade-off analysis), full-profile (concept evaluation), stimulus construction of the full profile model – fractional factorial design, random sampling from multi-variate distribution, presentation stimuli – verbal description (multiple cue, stimulus card), paragraph description, pictorial or three-dimensional model representation, measurement scales for the dependent variable – paired comparisons, rank order, rating scales, constant-sum paired comparisons, category assignment and assessment method – MONANOVA, PREFMAP, LlNMAP, Johnson's non metric trade-off algorithm, multiple regression, LOGIT, PROBIT, a variety of tests, as well as indicating the many areas of conjoint analysis application, and ends with an overview of the method development over the years since its introduction.

The practical value of conjoint analysis is evidenced by its wide use in research work and the development of various types of it, which is evident from a number of publications by Bulgarian and foreign authors: Krastevich, T., Smokova, M. (2012); Karadzhova, Tsv. (2012); Netseva-Porcheva, T. (2012); Iliychovsky, Sv. (2018); Eggers, F., & Sattler, H. (2011); Gustafsson, A., Herrmann, A., & Huber, F. (2013); Rao, V. R. (2014); Michael Steiner and Martin Meißner, (2018), etc.

The historic overview of the emergence of conjoint analysis helps to reveal the meaning and significance of the complicated and continuously modifying method that is applied nowadays by using specialised software. The basis of the method is the comparative analysis which depending on the chosen type of conjoint analysis is realised in a different way.

## 3. Methodology

In conjoint analysis, two of the characteristics obtained as a result of its implementation are of primary importance:

- utility and
- importance.

**Utility** can be part-worth and generalised (average). Conjoint utility or part-worth utility is presented on an interval scale. What is special about this case is that this scale has an arbitrarily chosen zero point. The arbitrary origin of the scaling for each feature results from the use of dummy variables in the design matrix. It is possible to add a constant in the part-

worths for all levels or for all features being investigated and this will not change the interpretation of the results obtained. When a specific type of dummy coding is used, a coding effect is achieved where the benefits are scaled so that the sum is zero for each characteristic. The partial or part-worth utility is calculated for each level, for each feature (attribute). The set of utilities is obtained by each respondent, and each specific combination is equal to the total utility for the given profile (combination). Conjoint utility (part-worth utility) is calculated by monotonic or multiple regression analysis with dummy variables by using the analysis of variance or logistic model.

The second type of utility is generalised (average) utility – again for each factor, but it is generalised based on all respondents' opinions and presented in three variants as minimum, maximum and average utility.

Utility (both individual and average) provides insight into the impact of each intellectual resource on the value creation process for a business company. The created value, in turn, provides prerequisites for manifestations of competitive advantages in trade. The effect can be both positive and negative.

**Importance:** This characteristic is related to each intellectual resource at two levels – individual and average. The first option is the importance or significance of the factor, according to each respondent, and the second one is the aggregate or average rating of importance calculated on the basis of the opinion of all respondents. Importance, individual and average, shows respectively how significant the specific intellectual resource is for each of the surveyed managers (individual levels) and on average for all surveyed persons.

Importance is calculated on the basis of utility. Very often, it is necessary to determine the relative importance or significance of each feature or for each intellectual resource. This is done by calculating the difference between each feature and the total utility of the study population. This difference is the range in utility values. It is calculated as a percentage of the relative ranks obtained for the aggregate of the importance values of the individual features, adding up to 100%. Importance depends on the particular level of the feature chosen for the study. When calculating the importance of features (attributes), it is always relative to other features that are used in the study.

Researchers can compare one feature with another in terms of importance only within the particular conjoint analysis (CA), but not between different studies.

Conjoint analysis is a way of eliciting individuals' preferences about alternatives related to the context of the study and in terms of a choice of goods, services, resources or a course of action. The aim of conjoint analysis is to determine which combination of a limited number of features (attributes) has the greatest joint impact on respondents' choices or decision-making.

In retail trade, conjoint analysis is most often used to reproduce as closely as possible the situation of real choice when consumers have to make compromises about the existing alternatives of a product or service. "This technique serves to discern the hidden product features that have value for consumers" (Netseva-Porcheva, 2012). As a result, information is obtained about consumer preferences.

In the present study, conjoint analysis is used as a part of the methodology for intellectual capital management developed by Goeran Roos, Stephan Pike and Lisa Fernstroem to assess the significance of intellectual capital in retailing in creating value and prerequisites for the manifestations of competitive advantages determined by the categories "utility" and "importance" of the elements of intellectual capital – human, organizational and relational.

The basis of the method is comparative analysis which depending on the selected conjoint analysis model is implemented in a different way.

First, the scope and boundaries of the problem should be defined – the exact definition of what is measured and what is not. In practice, it is about realising the priority of qualitative over quantitative analysis. The solution to this problem requires a really good knowledge of the phenomenon to be examined.

Each product or service, in particular – each element of intellectual capital, has its features that as called attributes in conjoint analysis. Correspondingly, each attribute has its meanings or levels. Qualitative methods such as group discussions, in-depth interviews and expert evaluations are used to determine them. Determining the features of the studied phenomenon and establishing their levels is associated with the construction of the so-called measurement structure. From a practical point of view, it is recommended to limit the number of investigated attributes and their levels, since their excessive amount does not lead to more significant results, but undoubtedly complicates the process as a whole. In the case of competing products or services, each of the products or services has its own set of features with corresponding meanings, i.e. there are different combinations of elements. If a new product is developed, it is presented in several versions which are correspondingly different combinations of features. These combinations are given to the respondents who may be users or experts. In conjoint analysis, each combination is called a profile.

In the next stage, the measurement structure turns into an operational mathematical measurement system so that each stakeholder has a system. This is achieved by using a second survey in which corresponding weights are assigned by the surveyed experts to each combination selected through the conjoint analysis design procedure. By using a software product (SPSS, Exce, etc.) and corresponding processing of the obtained data, the combinations are sorted by importance. The results are analysed based on the criteria for utility (effectiveness, productivity, value) and importance – the significance of the joint influence of factors, in the case considered – of intellectual resources in the process of the creation of value and prerequisites for the formation of competitive advantages.

The requirements of the general theory of value judgements are observed when setting the objective and conducting the relevant analysis in retail trade. They basically encompass a few rules, known as Lyon's principles, that are followed in every study:

- The object, organisation or part of an organisation to be measured or evaluated must be precisely defined;
- The definition includes all stakeholder opinions and requirements;
- All participants (stakeholders) are equal, i.e. they have equal importance;
- Each participant is responsible for the truth of their position.

In the present study, the following sequence was observed in the application of conjoint analysis in retail trade:

First, the studied features and their levels are determined. The input data in the conjoint analysis are the elements of intellectual capital and its levels in the form of intellectual resources identified using a proposed and verified (with the first survey) theoretical model of the generalised hierarchical tree of resources in the investigated consumer goods trade chains (Nikolova, 2018).

***Table 1. Conjoint analysis design***

| Observations | Human capital | Organizational capital | Relational capital |
|---|---|---|---|
| Profile 1 | Motivation | Company culture | Regulators |
| Profile 2 | Personal qualities | Business processes | Suppliers |
| Profile 3 | Education and training | Business systems | Customers |
| Profile 4 | Personal qualities | Intellectual property rights | Local community |
| Profile 5 | Personal qualities | Company culture | Financial institutions |
| Profile 6 | Motivation | Strategy and organisation | Other partners |
| Profile 7 | Education and training | Innovations | Regulators |
| Profile 8 | Motivation | Information infrastructure | Competitors |
| Profile 9 | Skills and experience | Information infrastructure | Other partners |
| Profile 10 | Personal qualities | Business systems | Owners |
| Profile 11 | Skills and experience | Intellectual property rights | Suppliers |
| Profile 12 | Education and training | Information infrastructure | Educational institutions |
| Profile 13 | Skills and experience | Business processes | Educational institutions |
| Profile 14 | Skills and experience | Strategy and organisation | Клиенти |
| Profile 15 | Competences | Innovations | Клиенти |
| Profile 16 | Skills and experience | Company culture | Competitors |
| Profile 17 | Motivation | Business systems | Suppliers |
| Profile 18 | Education and training | Business processes | Owners |
| Profile 19 | Competences | Intellectual property rights | Regulators |
| Profile 20 | Competences | Business systems | Local community |

*Source: Developed by the author.*

At step two, the type of conjoint analysis is chosen as well as the so-called "conjoint analysis design" or "experiment design": a limited number of significant combinations (profiles) are found out of several hundred possible combinations of human, organizational and relational resources (elements of intellectual capital). The software used to make the "conjoint analysis design" in this case is Excel. The twenty combinations (profiles) presented in Table 1 were selected as the object of investigation and research based on an optimisation procedure.

At step three, these combinations were provided in the form of a second survey of 25 respondent managers from the management teams of retail chains for consumer goods, members of the Association for Modern Trade in Bulgaria. Each of the managers evaluated the importance of the combinations of intellectual resources to create value in retail using scores from 1 to 20. In practice, each of the surveyed managers selected and indicated the preferred influence of the combinations of intellectual resources as elements of intellectual capital creating value for the trading company and providing prerequisites for the manifestation of competitive advantages in the sector of trade.

At step four, the actual conjoint analysis is carried out after the results from the second survey have been entered. In this case, it is associated with the application of monotonic regression analysis and subsequent analysis of variance, which assess the degree of impact of combinations of intellectual resources on value. Based on the scores obtained – partial, average or total, for the categories of utility and importance, the joint impact of intellectual resources is assessed and conclusions are drawn regarding the contribution of the individual elements of intellectual capital to the creation of value in retail trade and prerequisites for manifestations of competitive advantages. The obtained results are analysed and presented in a tabular form in the following presentation.

## 4. Main Findings and Results

In the present study, conjoint analysis is carried out as a full-profile conjoint analysis by first applying monotonic regression analysis (regression analysis) and then analysis of variance. What is special about monotonic regression analysis is that it is applicable when the factor variables are both metered and non-metered (full profile conjoint analysis – Monotone regression and the MONANOVA model differ only in the fact that the explanatory variables are either quantitative or qualitative. They are based on linear regression in the first case, and on the ANOVA model in the second.). Conjoint analysis is used to assess the significance and joint impact of different types of intellectual resources in the creation of value in a commercial firm and the prerequisites for the formation of competitive advantages.

***Table 2. Initial intellectual capital in conjoint analysis***

| Categories | Elements of Intellectual Capital | | |
|---|---|---|---|
| | Human capital | Organizational capital | Relational capital |
| Cat. 1 | Education and training | Strategies and organisations | Customers |
| Cat. 2 | Skills and experience | Business processes | Suppliers |
| Cat. 3 | Personal qualities | Business systems | Other strategic partners |
| Cat. 4 | Motivation | Information | Competitors |
| Cat. 5 | Competences | Company culture | Owners |
| Cat. 6 | | Innovations | Financial institutions |
| Cat. 7 | | Intellectual property rights | Local community |
| Cat. 8 | | | Regulators |
| Cat. 9 | | | Educational institutions |

*Source: Developed by the author.*

The input data in the conjoint analysis are the elements of intellectual capital and its levels in the form of intellectual resources, identified using a proposed and verified (with the first survey) theoretical model of the generalised hierarchical tree of intellectual resources in the studied retail chains of consumer goods (Nikolova, 2018).

In this particular study of the importance of intellectual resources for the creation of value in retail chains, the behaviour of 21 intellectual resources is analysed with the element of human capital involved with five resources at the third research level: education and training, skills and experience, personal qualities, motivation and competences. Organizational capital is involved with seven resources: strategy and organisation, business processes, business

systems, innovations, information infrastructure, company culture and intellectual property rights. Relational capital is involved with the following resources: suppliers, other strategic partners, customers, competitors, local community, regulators, owners and educational and financial institutions (Table 2).

As stated above, there are two criteria used for the assessment of the impact of intellectual resources in creating value in consumer goods trade chains – utility and importance.

### *4.1. Analysis of the utility of intellectual capital in retail trade*

The **utility** was analysed for intellectual resources of the second and third research levels of the generalised hierarchical tree for the surveyed trade chains. The utility provides a general idea of the impact of each resource on the process of value creation for commercial firms.

The results allow us to establish which of the 21 intellectual resources are of the greatest impact, positive or negative, on the process of creating value for the commercial firm.

It is important to specify that in the calculation of utility and the presentation of its values, an interval scale is used which is characterised by a subjectively chosen zero value. This means that from the negative value of utility, it does not follow that the relevant resource has a negative contribution to the value formation of the firm, but shows the impact of the relevant resource relative to the impact of other resources.

The second feature to note as a consequence of the interval scale, is that the sum of the positive values of utility is equal to the sum of the negative values of utility. The total of all utilities, both positive and negative, equals zero.

**The maximum individual values of utility** are concentrated in two groups of resources (Table 3). The first group of resources are the elements of human capital, and the second – the resources of relational capital. The view is confirmed "that human resources improve the financial performance of commercial enterprises and are seen as a major source of competitive advantage in commerce" (Ignatova, 2021). The exception is two of the respondents for whom organisational resources, and more specifically business processes as their third research level element, have the greatest impact on the value creation process for retail chains.

Personal qualities as an intellectual resource are indicated by 10 of the 25 respondent managers as the greatest contributor to the creation of utility and real prerequisites for the manifestation of competitive advantages in trade chains. The range within which the individual ratings of utility for the resource of personal qualities at the third research level is from 5.35 to 7.71.

The other 13 maximum individual ratings of utility are scattered among the following resources: motivation – 3, suppliers – 2, other strategic partners – 1, customers – 4, competitors – 2 and regulators – 1.

Table 3 presents three assessments of the utility of intellectual resources at the second and third research levels – minimum, maximum and average.

***Table 3. Minimum, maximum and average value of the assessment of intellectual resources according to the criterion of utility***

| Source | Minimum | Maximum | Average/mean |
|---|---|---|---|
| Human – Competences | -8,30 | -1,01 | -5,24 |
| Human – Personal qualities | 1,25 | 8,63 | 5,28 |
| Human – Motivation | 0,78 | 7,51 | 4,23 |
| Human – Education and training | -7,26 | 0,53 | -3,64 |
| Human – Skills and experience | -4,18 | 1,53 | -0,63 |
| Organizational – Business processes | -0,46 | 11,78 | 3,54 |
| Organizational – Business systems | -3,99 | 2,34 | -1,69 |
| Organizational – Innovations | -7,61 | 2,86 | -1,16 |
| Organizational – Information infrastructure | -1,83 | 5,66 | 1,84 |
| Organizational – Intellectual property rights | -5,77 | -0,03 | -2,85 |
| Organizational – Strategy and organisation | -4,38 | 3,66 | -0,05 |
| Organizational – Company culture | -6,25 | 2,98 | 0,37 |
| Relational – Suppliers | -4,82 | 5,27 | 1,06 |
| Relational – Other partners | -1,58 | 6,19 | 3,58 |
| Relational – Customers | 2,23 | 10,08 | 4,78 |
| Relational – Competitors | -5,26 | 7,41 | 2,45 |
| Relational – Local community | -6,73 | 4,30 | -0,32 |
| Relational – Regulators | -0,49 | 9,69 | 2,57 |
| Relational – Owners | -9,29 | -2,37 | -5,75 |
| Relational – Educational institutions | -10,66 | -0,98 | -4,52 |
| Relational – Financial institutions | -11,05 | 1,34 | -3,86 |

*Source: Developed by the author.*

**The average values of the utility** for each resource were calculated based on the data from all respondents and are presented in descending order in Table 4.

***Table 4. Average value of the assessment according to the criterion of utility***

| Intellectual resources | Grade |
|---|---|
| Human – Personal qualities | 5,28 |
| Relational – Customers | 4,78 |
| Human – Motivation | 4,23 |
| Relational – Other partners | 3,58 |
| Organizational – Business processes | 3,54 |
| Relational – Regulators | 2,57 |
| Relational – Competitors | 2,45 |
| Organizational – Information infrastructure | 1,84 |
| Relational – Suppliers | 1,06 |
| Organizational – Company culture | 0,37 |
| Organizational – Strategy and organisation | -0,05 |
| Relational – Local community | -0,32 |
| Human – Skills and experience | -0,63 |
| Organizational – Innovations | -1,16 |
| Organizational – Business systems | -1,69 |
| Organizational – Intellectual property rights | -2,85 |
| Human – Education and training | -3,64 |
| Relational – Financial institutions | -3,86 |
| Relational –Educational institutions | -4,52 |
| Human – Competences | -5,24 |
| Relational – Owners | -5,75 |
| Total | 0,00 |

*Source: Developed by the author.*

Table 4 presents the ratings for the average values of utility arranged in descending order and visualises the grouping of resources into two groups, which are almost the same in terms of the number of resources that fall into them, 10 and 11, respectively. The first group includes 10 out of a total of 21 observed resources that have positive utility values. The highest score for utility are personal qualities with 5.28, and the lowest is company culture with 0.37.

The idea of grouping both positive and negative values of average utility is to form subgroups of intellectual resources that, according to experts, create approximately a similar average utility for the commercial firm, which suggests that they create similar prerequisites for the manifestation of competitive advantages.

Based on the average **positive values of utility** there can be formed five subgroups.

The first subgroup includes three resources, two of which represent human capital – personal qualities with 5.28 and motivation with 4.23, and a resource representing relational capital – customers with 4.78. “Relational capital represents the organization's potential due to ex-company intangible assets which include the knowledge embodied in customers, suppliers, government, or related industry associations” (Bontis, 1999). “Part of the future lies with retail companies that personalise sounds and aromas, i.e. customise what their associates know about a user” (Petrova, 2021). The next three subgroups include two resources, each as follows: the second subgroup – other strategic partners with 3.58 and business processes with 3.54; the third subgroup includes regulators with 2.57 and competitors with 2.45. Subgroups two and three are characterised by very close average values of utility, which means that, in respondents’ opinion, their contribution to the creation of value and prerequisites for the formation of competitive advantages is almost the same. The fourth subgroup includes the resources of information infrastructure with 1.84 and suppliers with 1.06.

It can be concluded that the intellectual resources of the third research level – personal qualities (5.28), customers (4.78) and motivation (4.23) have the greatest impact on the process of value creation in the observed commercial companies. This suggests that they create, to the greatest extent, prerequisites for manifestations of competitive advantages in consumer goods trade chains.

The second group, referring to the **negative average values**, for the evaluation of utility can be divided into 4 subgroups. In the first subgroup fall "strategy and organisation" with an almost zero average value for utility – 0.05, "local society" with -0.32, which is almost a symmetrical mean of the resource "company culture" (0.37) and "skills and experience" with -0.63. The second subgroup includes the elements of organizational resources of innovation with -1.16, business systems with -1.69 and intellectual property rights with -2.85. The results raise questions as commercial practice proves that ”the brand image and reputation of a retail business are increasingly important intangible assets for building consumer loyalty, securing income and return on investment in retail trade” (Dimitrova, 2022). The penultimate subgroup includes the resources “education and training” with -3.64, “financial institutions” with -3.86 and “educational institutions” with -4.52. It was established that during the period 2008-2017 “the relative share of the employees with a degree in science and technologies in the sector of trade in Bulgaria is several points higher compared to the European Union” (Perkov, 2018). The last subgroup includes the resources with the lowest average scores for

utility and these resources are “competencies” with -5.24 and “owners” with -5.75. The obtained low average values for utility with regard to the resource of competencies are perceived as a lower degree of impact of this resource in the process of value creation at the moment and suggest the presence of potential in the application of the competence approach as a management tool. It is a well-known fact that “the investment in the development of skills and competencies generates economic benefit and allows full use of human potential” (Stoyanov, 2015).

Based on the conducted analysis of the resources which have a negative sign with regard to the creation of value for trade chains, it is concluded that the importance of the resources "owners" -5.75 and "competencies" -5.24 is the lowest. These scores should not be considered in an absolute sense, but rather relative to the remaining resource combinations (See Table 2). The evaluation is based on the position of each combination of three resources relative to all others. The negative average values of the utility evaluation of resources do not mean that these resources have a negative impact on the value creation of trade chains. They are interpreted to mean that they are evaluations presented on an interval scale with a subjectively chosen zero starting point and take into account their lower degree of impact on value creation for trade chains at the moment compared to other intellectual resources.

From the obtained results presented in Tables 4 and 5, it can be summarised that there is no group of intellectual resources that has clearly expressed only positive or only negative values of the average utility. All three types of intellectual resources at the second research level – human, organizational and relational – have elements with both positive and negative values. Therefore, there is no reason to categorically point out a leading intellectual resource in the creation of value and prerequisites for the manifestation of competitive advantages in the studied trade chains.

### *4.2. Analysis of the importance of intellectual capital in retail trade*

In addition to utility, conjoint analysis deals with the feature of importance. Importance is related to the individual resources at two levels – individual and average. It shows how important the given resource is for each respondent manager (individual levels) as well as an average for all respondents. It is calculated based on utility and at the expert level the following steps are followed:

- The difference between the maximum and minimum value of utility for each type of third-level intellectual resource for the corresponding second-level resource is calculated. For example, for the intellectual resources of human capital in Table 3, the maximum value is 7.25 and the minimum is -8.05, and the resulting difference is 15.29 = 7.25 – (-8.05). Similarly, the differences are calculated for organizational and relational resources. Their differences are 17.09 and 16.20, respectively.
- In the second step, the three differences obtained for the intellectual resources of human, organizational and relational capital are added up – 15.29+17.09+16.20 and the sum is 48.58.

- At the third step, each of the three obtained differences is divided by the total sum of the differences and the obtained value is multiplied by 100. In this way, the relative utility of each of the intellectual resources in the total utility determined by each surveyed expert is obtained, i.e. (15.29/48.58) x 100 =31.48% for intellectual resources, elements of human capital; (17.09/48.58) x 100 =35.18% for organizational resources and (16.20/48.58) x 100 =33.34% for relational resources. This is the way in which the individual values of importance presented in Table 5 were obtained. The individual evaluations of intellectual resources according to the criterion of importance in Table 5 were obtained on the basis of the described calculation procedure applied to the individual evaluations of intellectual resources according to the criterion of utility from Table 3.

***Table 5. Individual assessment of intellectual capital according to the criterion of importance***

| Expert number | Intellectual resources that are elements of: | | |
|---|---|---|---|
| | Human capital | Organizational capital | Relational capital |
| 1 | 31,48 | 35,18 | 33,34 |
| 2 | 33,80 | 23,83 | 42,37 |
| 3 | 21,49 | 31,26 | 47,25 |
| 4 | 28,51 | 32,89 | 38,60 |
| 5 | 27,47 | 28,88 | 43,65 |
| 6 | 35,63 | 22,99 | 41,38 |
| 7 | 23,71 | 30,67 | 45,61 |
| 8 | 40,23 | 26,04 | 33,73 |
| 9 | 38,68 | 28,47 | 32,85 |
| 10 | 39,81 | 27,11 | 33,08 |
| 11 | 35,52 | 20,94 | 43,53 |
| 12 | 43,39 | 16,03 | 40,58 |
| 13 | 46,57 | 18,33 | 35,10 |
| 14 | 44,30 | 21,56 | 34,14 |
| 15 | 38,43 | 22,92 | 38,65 |
| 16 | 39,46 | 22,35 | 38,18 |
| 17 | 45,31 | 21,65 | 33,04 |
| 18 | 36,06 | 24,15 | 39,79 |
| 19 | 47,04 | 16,83 | 36,13 |
| 20 | 36,41 | 15,47 | 48,12 |
| 21 | 24,50 | 26,89 | 48,61 |
| 22 | 30,39 | 29,10 | 40,52 |
| 23 | 35,68 | 31,29 | 33,03 |
| 24 | 32,48 | 19,22 | 48,31 |
| 25 | 40,42 | 23,18 | 36,40 |

*Source: Developed by the author*

The individual evaluations of the intellectual resources according to the criterion of importance in Table 5 show the relative importance of each of the intellectual resources at the second research level for individual experts in the process of value creation in trade chains. The limits within which these evaluations vary in terms of importance are presented in Table 6, in the columns for minimum and maximum value of the evaluation. For intellectual resources as elements of human capital, the minimum value is 21.49, and the maximum is 47.04. The largest difference measured by the standard deviation is found here

– 7.11. This means that with regard to intellectual resources as elements of human capital, there is the greatest difference between the assessments of individual experts regarding the contribution of these resources to the creation of value for the investigated retail chains.

***Table 6. Summary assessment of intellectual capital according to the criterion of importance***

| Source<br>Intellectual resources that are elements of: | Minimum | Maximum | Average | Standard deviation |
|---|---|---|---|---|
| Human capital | 21,49 | 47,04 | 35,87 | 7,11 |
| Organizational capital | 15,47 | 35,18 | 24,69 | 5,41 |
| Relational capital | 32,85 | 48,61 | 39,44 | 5,37 |

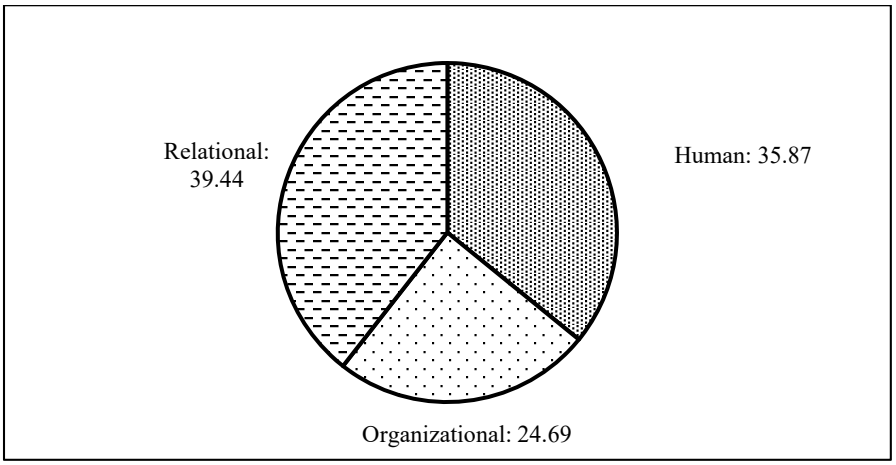
*Source: Developed by the author.*

Second in width of the interval are organizational resources with a lower limit of 15.47 and an upper limit of 35.18, and a standard deviation of 5.41 (Table 6). Third are relational resources with a lower limit of 32.85 and an upper limit of 48.61, and a standard deviation of 5.37, i.e. the variance is quite close to the amount of variance in organizational resources.

Two facts are noteworthy of the analysed values:

The first one is related to the maximum values for intellectual resources as elements of human and relational capital whose values are very close – 47.04 and 48.61 respectively, which is a difference of 1.57 percentage points only.

***Figure 1. Average rating of intellectual capital according to the criterion of importance***




*Source: Developed by the author*

The second fact is related to the standard deviation values for organizational and relational resources, where the difference is only 0.04 percentage points. This means that the differences in experts' assessments with regard to the contribution of organizational and relational resources in the creation of value for trade chains are almost equal in size. It can

be assumed that the close degrees of variation in the evaluations of organizational and relational resources are due to the approximately equal perception of their importance as a management tool.

The summarised (average) ratings for the importance of each of the intellectual resources at the second research level are presented in Table 7 and illustrated in Fig. 1. The aggregate or average importance rating indicates how important the relevant intellectual resource is according to all respondents.

The data show that, according to all surveyed managers, relational resources are the most important for creating value in the studied trade chains, the second most important are intellectual resources as elements of human capital, and the third position is occupied by organizational resources. The obtained values for the mean scores for the criterion of importance are relatively close, which means that there is a balanced relationship between the three types of intellectual resources of the second research level which are elements of human, organizational and relational capital, respectively.

The ranking of intellectual resources by importance in the value creation process for retail chains in the conjoint analysis differs from the ranking in the first survey related to the compilation of the resource tree of intellectual resources in retail trade and makes visible the effect of the application and the importance of conjoint analysis (Table 7).

According to the results of the conjoint analysis, relational resources which in the first survey the respondent managers ranked third are the most significant according to all respondents for creating value in the studied retail chains. It has been found that "the unique nature of customer relationships is something that competitors cannot imitate" (Dimova, 2009). Intellectual resources as elements of human capital from the first place are repositioned to the second place as a result of the applied conjoint analysis, and organizational resources are repositioned from the second to the third place.

***Table 7. Ranking of intellectual capital according to the criterion of importance***

| First survey<br>(resource tree)<br>Intellectual resources that are elements of: | Second survey<br>(conjoint analysis)<br>Intellectual resources that are elements of: |
|---|---|
| Human capital | Relational capital |
| Organisational capital | Human capital |
| Relational capital | Organisational capital |

*Source: Developed by the author.*

In this study, the conjoint analysis is based on the assessment of combinations of three intellectual resources and their joint influence on the creation of value in retail trade, while the first survey determines the importance of each resource on its own relative to all others.

In conjoint analysis, the significant combinations of intellectual resources making up the experiment design are compared, evaluated, and ordered as a whole, regardless of the possibility for the respondents to see the individual elements of the combinations. In this way, the conjoint analysis considers the joint influence of the intellectual resources of the relevant combination in accordance with the capabilities of the intellectual resources for value

creation in retail trade. At the same time, it allows us to take into account latent and invisible factors influencing the choices and judgements of experts in determining their priorities.

## 5. Conclusions

The conclusions of the conducted research can be summarised in two directions:

- to what extent the method applied is suitable for the achievement of the goal set;
- assessing the significance of joint impact and the extent to which elements of intellectual capital contribute to value creation and the establishment of conditions for manifestations of competitive advantages in retailing.

The answer regarding the use of conjoint analysis is positive. Although its main application is in the field of marketing, it is obvious that this method is closely related to the analysis of hierarchical processes created by T. Saati, as well as to the methodology of G. Roos, S. Pike and L. Fernstroem for the management of intellectual capital and with its help a wide range of tasks from various fields are solved. The present study answered questions managers are faced with in practice and not only in retail trade. They are related to the possibility to define the most important intellectual resources and their joint effect for the achievement of various economic goals. With the quantitative assessments of the "utility" and "importance" of intellectual capital, a step forward is made in evaluating their significance for value creation in retail trade. The application of conjoint analysis in retailing provides a better understanding and deeper justification of the role of different elements of intellectual capital on market performance.

The analysis of the results obtained for the partial and overall "utility" and "importance" makes it possible to draw the following conclusions:

The maximum individual values of utility are concentrated in two groups of intellectual resources. The first group includes intellectual resources as elements of human capital and the second – intellectual resources as elements of relational capital. Personal qualities as an intellectual resource are indicated as the greatest contributor to utility creation. The average positive values for utility show that the intellectual resources of the third research level – personal qualities, customers and motivation, affect the process of value creation in the surveyed commercial firms the most. This fact suggests that they create to the greatest extent prerequisites for manifestations of competitive advantages in consumer goods trade chains.

The results for "utility" show that there is no group of intellectual resources that has clearly positive or only negative average utility values. All three types of intellectual resources at the second research level – human, organizational and relational – have elements with both positive and negative values. Therefore, at the moment there is no reason to single out a leading intellectual resource in the creation of value and prerequisites for manifestations of competitive advantages in the surveyed trade chains.

The analysis of the "importance" and of the standard deviation values in particular for the organisational and relational resources shows a minimal difference. This means that the

differences in the experts' assessments with regard to the contribution of organizational and relational resources in creating value for trade chains are almost equal in size.

The summary assessment of the importance of each of the intellectual resources at the second research level shows that the greatest importance in creating value for the studied trade chains is assigned to relational resources, followed by intellectual resources, elements of human capital, and the third position is occupied by organisational resources.

The results obtained from the conducted empirical research do not contradict the theoretically conditioned logic about the decisive role of human capital in the process of value creation and sustainable competitive advantages for commercial companies in retail trade. Organizational and relational resources, including the intelligence, knowledge and experience created and accumulated by previous generations can be considered derivatives of the human factor development in modern economic activity. The undisputed significance of man and human capital as a main creator and bearer of intellectual resources requires its constant and multifaceted analysis, but the results from this research also raise the question about the deeper study of relational capital and its potential as a modern management tool.

To sum up, the conducted research leads to the conclusion that a balanced relationship is observed between intellectual resources, elements of human, organizational and relational capital, without any of the three groups of intellectual resources establishing themselves, at the present moment, as the undisputed leader in the process of value creation for the researched retail chains.

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