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INTUITION AND BUSINESS INTELLIGENCE – THE INTEGRATION KEY TO CORRECT BUSINESS DECISION-MAKING

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ABSTRACT

Can intuition as an affective judgment derived from quick, unconscious, and holistic associations be viewed as an integral part of business intelligence – a concept that has been trying for decades to eliminate it from the business decision-making process? How valid is it to discuss such an integration, given the premise of exclusive objectivity and rationality that is expected from decision-makers, without the involvement of emotions, as a form of non-rational and irrational behavior? From the previous questions, the work aims to prove that intuition has not completely disappeared from the concept of business intelligence, but how it is integrated into the same concept as a rational component arising from the subconscious of the decision maker, ensuring quick and correct business decision-making. Essentially, intuition serves as a tool in business decision-making, with this approach stemming from a positive feeling, a limited understanding, and a subconscious process, which in conditions of uncertainty, unpredictability, and rapid change, as a functional element offered to a rational and factual approach to the concept of business intelligence, offers decision-makers the right choice in a sea of facts and indicators. The survey research, in which 69 decision-makers took part, provided the basis for the analysis of the set hypotheses and provided the opportunity to form the key to quick and correct business decision-making through the integration of intuition and business intelligence as inseparable dimensions of the business decision-making process.

Keywords: *intuition, business intelligence, integration, components, business decision-making*

1. INTRODUCTION

Taking into account the fact that thirty years ago, and specifically before the emergence of the concept of business intelligence, in 1989., business success was based only and exclusively on luck and intuition, a sudden transition to a more rational and intelligent approach to creating business excellence could not fully eradicate the intuitive approach to business decision making. Choosing a solution to a problem with the best results in defined business conditions is objective and rational, but choosing a solution to a problem according to criteria of a personal nature with a satisfactory but not the best solution is subjective, with the fact that it can still be rational. Although management points to the issue of objectivity and rationality and does not place subjectivity within the scope of its teaching, it certainly leaves room for experimentation. Business intelligence also behaves within these frameworks. As much as it tries to minimize the question of intuition in its factual offering of a solution, it does not eliminate it completely. However, in raising the question of considering the riskiness of certain decision-making styles, the question of considering the influence of the same style on the decision-making process itself and the outcomes of those decisions is also raised.

The work aims to indicate the safe simultaneous application of intuition and business intelligence in the business decision-making process. Posing hypotheses in this context to prove their integration connection for the need for correct business decision-making, but also the understanding of intuition as a component of business intelligence itself. As intuition comes from knowledge with a basis in past experiences located in the subconscious of the decision maker, and as business intelligence through presented information represents only knowledge, and both concepts are interpreted as rational processes, a basis is formed for establishing a decision-making approach that is partly subjective and partly rational with based on the information and “good feeling”.

2. THEORETICAL FRAMEWORK OF INTUITION AND BUSINESS INTELLIGENCE, AS THE INTEGRATION KEY OF CORRECT BUSINESS DECISION-MAKING

Business decision-making, in the twenties of the last century, imposes a new strictness on decision-makers, defining the decision as the result of consideration and the beginning of action (Buchanan and O`Connell, 2006). With the advent of the Industrial Revolution, the beginnings of classical management, as a rational approach to management, were established, forming the basis of its development through the twentieth century into a version of management that is more modern in itself, especially in terms of thinking and adopting technology as a support for decision-making (Amrozi et al., 2020).

The questions, how far it is possible to set each version of a solution to a problem without making mistakes and how far it is possible to make a correct decision under conditions of exclusive uncertainty, find answers in the space left for experimentation, and provide decision-makers with access to the right decision through a dynamic search for solutions according to the principle of trial and error (Sikavica et al., 2008). The same principle in making business decisions can be reduced to a minimum by applying objective, true, accurate, clear, complete, timely, safe, and protected information, which as such becomes useful, high-quality, and effective business information (Javorović and Bilandžić, 2007), which provides business intelligence.

Business intelligence tools are sources of specific information based on historical data as the key to correctly predicting the future (Williams and Williams, 2007). Business intelligence is an activity with a ready-made business-intelligence report, which in interaction with the thought activity of the decision-maker creates business knowledge as a support for the business decision-making process with an action element (Javorović and Bilandžić, 2007). Previously, thinking activity could be defined by a feeling, as an intuition, as a quick and unexpected thought, created without effort, to solve a problem (Hogarth, 2001). Intuition, as an approach to business decision-making, emerges from the subconscious of the decision-maker, often as a too-quick response to a given problem, although it is a rational process based on knowledge derived from past experiences (Bulog, 2014). It is necessary to include intuition in analyses regardless of the presence of technology that follows business management because decision makers use intuition, turning it into an organizational ability of business intelligence and, within the framework of the analysis, showing it as a process of quick business decision-making with a low level of behavioral control and expressed trust in recommendations (Isik, 2010). IT is used in evidence-based decision-making, while managers' intuition remains key in the decision making process (Adam and Dempsey, 2020). Although technology provides answers to the questions posed, forming a solution to a possible problem, it is still not entirely sufficient by itself for the business decision-making process, which seeks confirmation of the solution in intuition and past experiences.

The previous authors quite clearly defined the basis of the possible establishment of a new substantive basis of business intelligence and intuition as an integration basis of better business decision-making with their definitions. Although many business intelligence applications do not use intuition in analysis, intuition in business intelligence still occupies a small but steady segment. By integrating intuition and business intelligence in business decision-making, a model is proposed as the essence of business decision-making characterized by essential rationalism, facts, feelings and emotions.

3. METHODOLOGICAL FRAMEWORK AND RESEARCH RESULTS

For the research, data were collected through a survey questionnaire, sent to the e-mail addresses of potential respondents in the category of active medium and large business entities, classified according to the Accounting Act (NN 78/15, 134/15, 120/16, 116/18, 42/20, 47/20, 114/22). Hypotheses were confirmed with the SPSS software package. Statistical significance between the defined variables was demonstrated by Pearson's correlation coefficient. Descriptive statistics were used to evaluate the value of the minimum, maximum, arithmetic mean, and standard deviation of all set variables.

The subject of the research is determining the importance of integrating intuition and business intelligence in the context of more correct and safer business decision-making. The goal is to determine the understanding of intuition as a segment of business intelligence and, as such, to establish the basis for their simultaneous use in quick and safe business decision-making. In the research, it is operationalized with business decision-making as a dependent variable and the integration of intuition and business intelligence as an independent variable. The task was to collect data using a survey questionnaire, as a research instrument, and prove with the same that intuition and business intelligence are the key to more correct business decision-making, through several dimensions measured by a Likert scale of five degrees of intensity. The independent variable, the integration of intuition and business intelligence, was measured through their integration in unpredictable situations, but also in recurring situations, in the speed and correctness of their application and the results they offer through the final business decision. The dependent variable, business decision-making, was measured through accuracy, timeliness, correctness, information, and the speed of the business decision.

Based on the subject and the set goal, the research tasks were defined, as determining the possible setting of intuition as a component of business intelligence as a subconscious, but rational thought of the decision maker, and in determining the existence of a connection between the simultaneous use of intuition and business intelligence and business decision making. Based on the same tasks, two research hypotheses were set: H1: Intuition is a functional element of the rational and factual concept of business intelligence, and H2: The simultaneous use of intuition and business intelligence positively affects business decision making.

The problem of the research extends to raising questions of familiarity with the concept of business intelligence in general, while the problem rises to an even higher level with the question of integrating two approaches that have been trying to exclude each other from the decision-making process for decades. In posing the question, who can have contact with business intel-

ligence, intuition, and decision-making, and accordingly, who can provide possible new knowledge about setting the integration key of correct business decision-making, the answer is found in managers of all levels of decision-making, as the most competent research sample.

Previous research does not specifically reveal the simultaneous use of intuition and business intelligence in business decision-making. However, some authors have operationalized the concept of business intelligence with intuition as one of its dimensions and in this context pointed to the importance of the concept of business intelligence in supply chain management (Luetić, 2017) and the influence of the business environment on the possibilities and success of applying business intelligence with intuition as its component (Isik, 2010). The authors thus emphasized that business intelligence does not completely exclude intuition, even though the opposite has been claimed for decades. Business intelligence does not neglect intuition, although it tends to reduce it in its basic settings. Managers, almost $\frac{3}{4}$ of the time spent making business decisions, use intuition more often than facts, while directors of business entities require factual decision-making (Liataud and Hammond, 2006). It previously indicates the need to understand and connect two, seemingly, opposing points of view.

The purpose of applying business intelligence in business entities, regardless of the activity of its application, is in the function of business decision-making based on safer decision-making with a factual basis. The results of the research by Bilandžić et al. (2012), prove that the same application is difficult to confirm in Croatian business entities, and Bilandžić and Lucić (2018), who do not rate it as particularly present. Dukić et al. (2016), on the other hand, indicate the importance of more intensive use of the concept of business intelligence to make more rational decisions in business entities of all sizes, and they manage to confirm this on a sample of 125 surveyed entities.

Hanlon (2011) offered a model of intuition, based on a sample of 12 senior managers, highlighting its construct and identifying its elements, offering an answer to the question of applying intuition in decision-making, emphasizing that the reality of decision-making is quite messy, which leaves room for managers to rationalize and intuition itself. According to research by Adam and Dempsey (2020), managers rarely have the comfort of basing their decisions on a rational analysis and therefore depend on intuition and judgment and typical ad-hoc decision making processes with a very pronounced presence of subjectivity.

3.1. RESEARCH RESULTS

The research includes 69 medium and large business entities, active in the territory of the Republic of Croatia. Of these, there are a total of 52 medium-sized business entities (75,4% of the sample) and 17 large business entities (24,6% of the sample). The largest number of business entities, 25 of them are engaged in tourism and hospitality, followed by banks and insurance companies and business entities from the field of trade with 11 business entities each. The IT sector is represented by 7 business entities, production is represented by 5 business entities, construction by 3 business entities, healthcare by 2 business entities, and 2 business entities define their core business activity as business services – legal, consulting, and accounting. Without specifying the basic area of their activity, 3 business entities are singled out, which continue to complete the research. Decision-makers in four categories were singled out as a target group: members of the board or supervisory board, sector directors, service directors, and heads of departments, as decision-makers at all organizational levels.

Of the respondents who started filling out the questionnaire, 11 are presidents of the management board or members of the supervisory board, 19 are sector directors, 31 are service directors and 8 are department heads. Respondents present themselves as employees in managerial positions and are considered to be a category of respondents with the appropriate information and experience needed to realistically fill out the survey questionnaire. The sample is dominated by men, 46 respondents or 66,7% of the sample, while there were 16 or 23,2% of the surveyed women. Seven people did not answer the above question. Respondents in the age group from 31 to 40 dominate, of which there are 21, followed by 18 respondents aged 41 to 50, 13 of them under the age of 30, while 12 of them are between the ages of 51 and 60 and 5 in over 61 years old.

The respondents' opinions about the characteristics of correct business decision-making and its connection with intuition and business intelligence were evaluated using a classic Likert scale, with five levels of agreement, from "I do not agree at all", which is evaluated with a score of 1 to "I completely agree", which was evaluated with a grade of 5. The interpretation of the value of the linear correlation coefficient (Pearson's coefficient), in setting the strength of the correlation between two variables, was carried out according to the following guidelines: from 0,00 to 0,20 as a slight connection between the variables, from 0,20 to 0,40 as an insignificant association of variables, from 0,40 to 0,70 as a significant association of variables, and from 0,70 to 1,00 as a very high association of variables (Petz, 1997).

Within the framework of the subject analysis, an evaluation of the benefits of support by business intelligence and intuition in making business decisions was carried out, whether it is about recurring situations or conditions of great uncertainty, which, in addition to facts, also require the application of intuition, i.e. the “good feeling” of the maker decision in predicting the conditions of future business activity. The above is illustrated by the results of several auxiliary statements, which aim to verify the empirical adequacy of the intuitive approach to making correct business decisions in the conditions of modern business supported by the application of business intelligence.

The respondents largely agreed with the concept of the integrative use of business intelligence and intuition in business decision-making, as indicated in the table below. They defined intuition even more clearly as a segment of the concept of business intelligence and in this context created the basis for confirming the research hypothesis H1: Intuition is a functional element of the rational and factual concept of business intelligence. The confirmation of the hypothesis comes partly from Table 1, and partly from the specific question: Is intuition as a good feeling, in all conditions, and especially in conditions of uncertainty, unpredictability, and speed of change, defined as a functional element of the concept of business intelligence, as rational and factual support for the business decision making process?, and the calculated indicator on the question in question, the value of which was formed based on the mean value of 4,39 with a standard deviation of 0,808.

Table 1. Assessment of prerequisites for the simultaneous use of business intelligence and intuition in business decision-making

Claim	N	Min	Max	Mean value	Standard deviation
The business decisions you make, with available information, require a high level of subjectivity and acquired knowledge.	69	2	5	4,12	0,738
Although you make business decisions by applying business intelligence, you still give importance to intuition in recurring situations.	69	2	5	4,13	0,640
You believe that it is crucial to use both facts and intuition to make quick and correct business decisions.	69	2	5	4,12	0,777
You tolerate business decisions made with a combination of business intelligence and an intuitive approach to decision-making because of the positive results that the same decision brings.	69	2	5	4,22	0,683

Source: Created by the author

Table 1 reveals the use of four statements, with which respondents agreed to a high degree, from a minimum mean score of 4,12 to a maximum of 4,22, on a scale with scores from 1 to 5, as business intelligence and intuition, as an independent variable, integratively present in business decision-making, as a dependent variable, which is the basis for the continuation of the analysis of the subject matter. The greatest perceived influence of intuition and business intelligence on business decision-making is observed in tolerating business decisions made by the simultaneous use of intuition and business intelligence due to positive financial results (4,22).

Evaluating the relationship between the dependent variable and the independent variable is based on multiple indicators, namely the focus of intuition and business intelligence on the accuracy and timeliness of business decision-making (4,39), the use of creative intuition and “good feeling” as an approach to correct business decision-making with the simultaneous application of business intelligence as its support (4,32), business intelligence support in facilitating the inclusion of intuition in business decision-making through making better, more informed decisions (4,17), business intelligence support in paying attention to past experiences when making quick business decisions (4,13), business intelligence support in the use of procedural knowledge through experience and feeling and emotion as part of an intuitive approach in timely business decision-making with positive financial performance (4,16). Evaluation of the determinants of the simultaneous use of intuition and business intelligence in business decision-making, through a calculated aggregate indicator, the value of which, formed based on the mean values of the previously defined multiple indicators, is 4,23 with a standard deviation of 0,725.

Table 2. Evaluation of the determinants of the simultaneous use of business intelligence and intuition in business decision-making

		pi_intuition	decision-making
pi_intuition	Pearson correlation	1	,761**
	Sig. (2- sided)		,000
	N	69	69
decision-making	Pearson correlation	,761**	1
	Sig. (2- sided)	,000	
	N	69	69

** . The correlation is significant at the 0.01 level (2-sided).

Source: Created by the author

Correlation analysis determined the potential connection of the integration effect of intuition and business intelligence on the correctness of business decision-making. Based on the results of Pearson’s linear correlation, we can

speak of a statistically high significant correlation (Sig. < 0.01) and a very high correlation of variables, considering the value of Pearson's coefficient of 0,761 (table 2). Based on the established empirical relationship, intuition, and business intelligence in integration are statistically extremely significantly related to the correctness of business decision-making. The research hypothesis, H2: The simultaneous use of intuition and business intelligence positively affects business decision-making, following the confirmed empirical relationship of the observed variables, is accepted.

4. CONCLUSION

A possible link between two, at first, opposing concepts was established. The results of the research reveal that intuition as an affective judgment derived from fast, unconscious and holistic associations can be viewed as an integral part of business intelligence. This clearly proved that business intelligence, as a concept that has been diminishing the meaning of intuition in its content for years, still does not remove it completely. The results also show how intuition and business intelligence can be viewed as two concepts that, in integration, form the key to correct business decision-making. This points to some new findings in the matter of the necessity and exclusive objectivity and rationality of business decision-making and their clear connection with irrational and subjective "good feeling". It previously proves that intuition is present in business intelligence as a rational component of the subconscious action element of the decision maker, which provides the basis for quick and correct business decision-making, but also that it can be viewed as a separate concept supported by the application of the concept of business intelligence. The decision-makers clearly emphasized that intuition and business intelligence are concepts that are desired and used equally in all decision-making conditions. This does not diminish the importance of information, nor the importance of "good feeling", but emphasizes the need for their simultaneous application in making business decisions.

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INTUICIJA I POSLOVNA INTELIGENCIJA – INTEGRACIJSKI KLJUČ ISPRAVNOG POSLOVNOG ODLUČIVANJA

SAŽETAK RADA

Može li se intuicija kao afektivna prosudba proizašla iz brzih, nesvjesnih i holističkih asocijacija promatrati sastavnim dijelom poslovne inteligencije – koncepta koji se desetljećima trudi istu izbaciti iz procesa poslovnog odlučivanja? Koliko je ispravno spominjati takvu integraciju s obzirom na poimanje isključive objektivnosti i racionalnosti koja se očekuje od donositelja odluka bez uplitanja emocije, kao oblika neracionalnog i iracionalnog ponašanja? Iz prethodnih pitanja proizlazi cilj rada u dokazivanju kako intuicija nije u potpunosti nestala iz koncepta poslovne inteligencije, već kako je integrirana u isti koncept kao racionalna komponenta proizašla iz podsvijesti donositelja odluka, osiguravajući brzo i ispravno poslovno odlučivanje. U osnovi je intuicija alat poslovnog odlučivanja te je pristup odlučivanju proizašao iz dobrog osjećaja, ograničenog razumijevanja i podsvjesnog procesa, koji u uvjetima nesigurnosti, nepredvidivosti i brzini promjena, kao ponuđeni funkcionalni element racionalnom i činjeničnom pristupu koncepta poslovne inteligencije, donositeljima odluka nudi ispravni izbor u moru činjenica i pokazatelja. Anketnim se istraživanjem, u kojem je sudjelovalo 69 donositelja odluka, pružila osnova za analizu postavljenih hipoteza te se pružila mogućnost za formiranje ključa brzog i ispravnog poslovnog odlučivanja kroz integraciju intuicije i poslovne inteligencije kao nedjeljivih dimenzija procesa donošenja poslovnih odluka.

Ključne riječi: *intuicija, poslovna inteligencija, integracija, komponente, poslovno odlučivanje*