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THE IKEA EFFECT IN HUMAN-AI COLLABORATION: DOES THE EFFECT EXIST FOR NON-PHYSICAL PRODUCTS? PART II.

According to the IKEA effect, people are willing to pay more for a product they have created through their own perceived effort than they would for an off-the-shelf product. In our research, we investigated whether the IKEA effect would exist (1) if ChatGPT were also involved in creating the product and (2) if the final product is textual content. We conducted a randomized controlled trial that included all the background factors known to jointly trigger the IKEA effect.

Our results show that the IKEA effect can be detected in human-AI collaboration when the product is non-physical content. We have demonstrated that participants (1) produced a superior product based on their subjective preferences and (2) would purchase it at a higher price. However, in our research, (3) the IKEA effect applied not only to the end product, but also to the instrument: members of the IKEA group were more satisfied with ChatGPT and would pay more for the application in terms of the product they created.

Thus, by including all known background factors that jointly trigger the IKEA effect, we have successfully refuted previous studies that were unable to prove the IKEA effect in the field of text generation.

Artificial intelligence is a technological opportunity that allows shoppers to personalize products or select and access them more quickly. The IKEA effect could be exploited in this area. Our paper contributes to the practical identification of the boundary conditions necessary to trigger the effect.

2 The research method ——— 2.1 Task used in the experiment ——— In our research, we use ChatGPT, a freely available tool developed by OpenAI, which is essentially an advanced chatbot that can handle almost any text-based request. Since its three years of existence, the tool has developed a large number of uses, e.g., assisting text writers in repetitive tasks, avoiding bias, improving clarity, assisting proofreaders, metadata annotation of texts, language translation, literature search (Lund et al. 2023). We will not address here the ethical issues related to the use of the tool, as they are not related to our subject, but only mention their existence, such as the existence of biases encoded in the texts used to teach the model or the issue of plagiarism (on the dilemmas raised by general ethical issues related to Ai, see for example Somosi and Hajdú, 2023).

The participants in our research were asked to create a text for a brochure of up to one page about a foreign destination of their choice using ChatGPT. Travel is a popular topic, and there is hardly anyone who has not searched the internet for travel information, so participants are expected to have a basis for comparison when judging the information gathered using ChatGPT. We expect that by relying on AI, more focused and structured information can be collected. Therefore, we believe that the task is suitable for measuring the IKEA effect because (1) travel is a popular and well-known topic and easy to work with, (2) the task does not require any special knowledge because the text can be written based on the research participant's own preferences, ideas and knowledge, (3) the subjects can also evaluate the appropriateness of the product.

It was important to us that the task involved collaboration between the individual and ChatGPT, and we also know that to trigger the IKEA effect, the individual needs to perceive their own effort. Therefore, we structured the task to emphasize their own work: they were asked to (1) first come up with a destination, (2) design the structure, (3) style and tone of the brochure, (4) write the prompts based on these (see Online Appendix for the exact wording of the tasks). They were also asked to share their solutions to these four subtasks in a questionnaire, and only then could they turn to ChatGPT. Here, they were free to write the text of the brochure: they could work in several steps, clarify their request, and improve ChatGPT's proposal until they reached the solution considered as final. The task was thus developed by the research participants in a guided way, in sub-tasks, and we controlled the right ratio of human and machine work.

Before the actual experiment, we did the task ourselves for testing purposes, and we also tested the task and the questionnaires in a pilot experiment with some members of the target group. Based on this experience, we revised the task several times, because we emphasized that it should not be long in time, should keep a balance between the work of the individual and the ChatGPT, should not be complicated, that it should require the help of other tools (Google, YouTube, acquaintance, etc.) and should be completable. These factors were designed to allow the IKEA effect to emerge.

The IKEA group's final research task was as follows (translated from Hungarian):

> Dear Participant!
> Assume you work as a copywriter for a marketing agency. Your task is to write the text for a brochure promoting a trip abroad, up to one page, using ChatGPT. The aim of the task is to produce material that is concise but highly informative for all travel planners. The brochure will be successful if it makes people want to travel here! Your task is only to write the text, the design of the material is not part of the current task. Please follow the steps below, step by step.
> 1. Task: please write down which foreign location you would like to promote in the brochure (location is optional):
> 2. Task: please list the aspects you would like to use to build your brochure. Have a structural plan, give structure and organization of your material.
> 3. Task: write down the tone, style, mood, etc. of the text of the brochure.
> 4. Task: Based on your structure and instructions, formulate your request to ChatGPT. Please write down your prompt. (If you use ChatGPT in English, you can also share it in English)

| 5. Task: Get help from ChatGPT! Use the prompt you wrote in the previous exercise and use ChatGPT to compose the text of the brochure. Work in several steps, clarify your request, improve ChatGPT's suggestion with additional prompts and/or editing where you feel it is necessary! You are free to work with ChatGPT! Please, upload the whole ChatGPT conversation! (If you use ChatGPT in English, you can also share it in English)
| 6. Task: please upload your final brochure!

In the control group, we gave a task that prevented the IKEA effect: the task was also to create a brochure promoting a foreign location, but it was a brochure written by us and created in collaboration with ChatGPT (see Online Appendix), so the participant was presented with a ready-made output. They had one task: to review the material they had received. They were given a short questionnaire to give feedback on whether they were satisfied with the material, whether the brochure had achieved its purpose and whether they would make any changes to the material. The control group's task was as follows (translated from Hungarian):

> Dear Participant!
> Below is a brochure promoting a trip abroad, created with the help of ChatGPT. The aim of the task was to create a content using ChatGPT that is concise but highly informative for all travel planners. The design was not part of the assignment, only the writing of the text. The aim of the brochure is to make you want to visit the destination. Suppose you work as a copywriter for a marketing agency. Please read, revise, and evaluate the text of the brochure according to the criteria below on a scale of 1 to 7, where 1=not at all and 7=absolutely yes.

2.2 Questionnaires, statistical tools ——— The questionnaires completed by the IKEA and control groups were identical. Before completing the experimental task, each participant was asked to fill in a questionnaire on two topics (note [1]). The first was a short demographic questionnaire to collect information on the participant's gender, age, place of residence, and job, and the second measured how participants perceived ChatGPT before they encountered the task. They then completed the task (which, we saw, was different for the IKEA and control groups) and were asked about their opinions on the quality of the given brochure. Afterwards, participants in both groups were given a brochure we had prepared about the Dominican Republic, and we assessed this by measuring their willingness to pay for their own brochure as well as for the brochure we had prepared. Finally, we measured their opinion of ChatGPT again, this time not in general, but in relation to their task.

The following questions were used:

| 1. IKEA effect: „How much work did you put into the brochure yourself?"
| 2. Opinion on the quality of the produced brochure: „How good do you think the produced brochure is?"
| 3. The role of ChatGPT in the quality of the brochure produced: „Do you think ChatGPT produced a better-quality brochure than if it had been produced using a tool other than artificial intelligence (whether it's a travel guide, a friend's help, Google search, YouTube, etc.)?"
| 4. Willingness to pay: „Please indicate between 0-500 HUF how much you would pay for your brochure produced with ChatGPT" (question for IKEA group only) and „Please indicate between 0-500 HUF how much you would pay for a brochure produced by someone else with ChatGPT promoting the Dominican Republic" (question for both groups)
| 5. Opinion on ChatGPT regarding the assignment: „Are you satisfied with ChatGPT in terms of the evaluation of the brochure produced?"

For information not directly related to the purpose of the research, but relevant to us, we also asked how much our respondent would pay for the ChatGPT service.
For validity, we asked several alternative questions for each point, each with a short text response, to check participants' answers and to filter out any inconsistencies and contradictions.

Most of the variables used in the study were defined on Likert scales (1-7, following Norton et al.). The reliability of questions on the same item was assessed using the principal component analysis components' AVE index (average variance extracted) and the CR (construct reliability) index. A one-sample t-test was used to test the deviation of the mean of the scores given by the respondents from its middle value (4), a two-sample t-test to compare the mean scores of the IKEA and control groups (using a one-sided counterhypothesis, abbreviated as HA in the following), and a paired t-test to test the within-group deviation of the mean scores given for the IKEA and control groups. In the case of two-sample t-tests, we used the appropriate test variant if the difference in variances made it necessary. For all statistical tests, the standard 5% significance level was used as the threshold. We always considered the practical significance of the differences in addition to statistical significance. Due to the sample size of 20, it is recommended to treat the results of the tests with caution, therefore in all cases descriptive statistics were also used to interpret the results.

2.3 The research subjects ——— From the research of Norton et al. (2012), we know that if an individual cannot complete the task, the IKEA effect dissipates. We therefore included individuals who could complete the research task and were not constrained by their lack of knowledge of ChatGPT. The research task was designed in such a way that it does not require a high level of knowledge of ChatGPT, as very few individuals have such knowledge yet. As ChatGPT has been tested and used continuously since its launch in the first author's field of expertise, online marketing, we included 20 individuals working in this field who were known to use the tool regularly. All of them agreed to participate in the research.

They were randomly divided into IKEA and control groups of 10-10 people. The research was conducted online, using an online questionnaire, so that participants could complete the task at a time of their choice, even in several steps. Participants' feedback indicated that they spent on average 35 minutes completing the questionnaire and the task and all of them solved the task in one step. All our questions received a valuable response.

The IKEA group consisted of 5 men and 5 women, with an average age of 37.5 years, 90% of them urban and all of them working in a city. 60% of them are business owners, senior or middle managers and 40% are employees. The control group consisted of 6 men and 4 women, with an average age of 38.8 years, 90% urban and also

90% working in a city, 10% abroad. 50% are business owners, senior or middle managers and 50% are employees. In other words, the two groups did not differ significantly on the basis of these background factors.

3 Results ——— During the principal component analysis, four principal components were created, namely:

- PC 1: Variables measuring the collaboration between human and artificial intelligence.
- PC 2: Opinion formed about ChatGPT.
- PC 3: Opinion formed AI's capability to replace human labor after the research task.
- PC 4: Opinion formed AI's capability to replace human labor before the research task.

Table 1 shows the AVE and CR indices, which measure the reliability of questions on the same component. In the case of AVE, the agreed threshold is 0.5, and in the case of CR, it is 0.7, above which values indicate adequate reliability. In the case of the second component, the AVE is slightly lower than the 0.5 threshold, while the other values are adequate. We can therefore say that the variables within the principal components are consistent with each other. The CR results also supported the reliability of our questionnaire. That is, each construct meets the criteria for reliability and convergent validity of our questionnaire.

Principal component	Number of manifest variables forming the principal components	AVE	CR
PC 1	10	0.73	0.96
PC 2	6	0.47	0.84
PC 3	2	0.63	0.78
PC 4	2	0.80	0.89

TABLE 1: AVE AND CR VALUES FOR THE PRINCIPAL COMPONENTS
SOURCE: AUTHORS

Now let's move on to the individual variables that measure the IKEA effect (Table 2). The IKEA effect requires the perception of one's own effort. The mean of the IKEA group members' responses to the relevant question was 5 (SD=1.155), compared to 2.5 for the control group (SD=0.707), a significant difference in terms of magnitude of the difference and statistically significant difference based on the two-sample t-test. The responses to the question on the quality of the brochure produced also differed between the two groups, with a significant difference both practically and statistically: the IKEA group had a mean of 5.8 (SD=0.632), all scoring above 4, while the control group had a mean of 4.2 (SD=0.422). The latter score was not significantly lower than 4, indicating a medium rating, i.e. the control group was uncertain.

Examining the role of ChatGPT in the quality of the brochure produced, the IKEA group gave a mean score of 6.8 (SH=0.422), all scoring 6 or 7, which is significantly different from 4, the midpoint of the scale. The control group had a mean of 5.4 (SD=1.713)

and was not significantly less than 4, but the means of the two groups were both practically and statistically different, so it is statistically proven that the IKEA group perceived more strongly the role of ChatGPT in the quality of the brochure produced.

Turning to willingness to pay: the IKEA group would have paid on average 295 HUF for a brochure they produced themselves (SD=137.052), while they would have paid on average 132 HUF for a brochure they received (SD=88.544), i.e. they would have been willing to pay on average more than twice as much for a brochure they produced themselves, which is both practically and statistically significant difference.

The IKEA group's willingness to pay for their own brochure was also compared with the control group, the latter group would have paid on average 151 HUF for a ready-made brochure that they could only review (SD=153.511), which is a statistically significant difference. In other words, the presence of the IKEA effect, i.e. the fact that the research participant was able to create the brochure themself using ChatGPT, also meant a significant increase in willingness to pay, almost twofold, in this comparison.

In the evaluation of the completed brochure, the IKEA group gave an average response of 6.2 (SD=0.632) and the control group an average response of 4.1 (SD=1.197), which is also a practically and statistically significant difference. Furthermore, the IKEA group would pay on average 2,740 HUF for the ChatGPT service (SD=1834.969), while the control group would pay on average 1,395 HUF (note [2]) (SD=1,779.474), so the IKEA group indicated almost twice the average price. The difference is definitely significant in practical terms, and it can also be considered statistically significant, even though the corresponding p-value, 0.06, is close to the threshold. So the IKEA effect was not only present for the product of the task, but also for its instrument (!).

Variable	IKEA group			Control group			Comparison
	Mean	SD	One-sample t-test	Mean	SD	One-sample t-test	Two-sample t-test
How much work did you put into the brochure yourself?	5	1.155	p=0.011[1)]	2.5	0.707	p<0.001[2)]	p<0.001[3)]
How good do you think the produced brochure is?	5.8	0.632	Everyone gave a value higher than 4 (p<0.001)	4.2	0.422	0.9163)	p<0.001[4)]
Do you think ChatGPT produced a better-quality brochure than if it had been produced using a tool other than artificial intelligence (whether it's a travel guide, a friend's help, Google search, YouTube, etc.)?	6.8	0.422	Everyone gave a value higher than 5 (p<0.001)	5.4	1.713	0.985[3)]	p=0.031[4)]

Please indicate between 0-500 HUF how much you would pay for your brochure produced with ChatGPT. (question for IKEA group only)	295 HUF	137.052	[4]	question for IKEA group only			p=0.020[5] and p<0.001[6]
Please indicate between 0-500 HUF how much you would pay for a brochure produced by someone else with ChatGPT promoting the Dominican Republic. (question for both groups)	132 HUF	88.544	[5]	151	153,511	[5]	0.740[7]
Are you satisfied with ChatGPT in terms of the evaluation of the brochure produced?	6.2	0.632	p<0.001[2]	4.1	1.197	0.601[3]	p<0.001[4]
How much would you pay per month for the current (free) version of ChatGPT?	2,740 HUF	1834.969	[5]	1,395 HUF	1,779.474	[5]	p=0.060[4]

Notes: 1) HA: Mean>4 (the middle of the scale); 2) HA: Mean<4 (the middle of the scale); 3) HA: the average in the IKEA group is higher; 4) We did not perform a one-sample test because there is no reference value to compare the mean to; 5) Two-sample t-test, HA: the average in the IKEA group is higher; 6) Paired t-test for the IKEA group to compare the prices of the self-made brochure and the brochure made by others, HA: the average of the former is higher; 7) HA: the average of the two groups differs

TABLE 2: DISTRIBUTION OF QUESTIONS MEASURING DIMENSIONS OF THE IKEA EFFECT IN THE TWO GROUPS (WITH THE EXCEPTION OF THE AMOUNT MEASURED IN HUF, ALL VARIABLES WERE MEASURED ON A SCALE OF 1 TO 7, WHERE HIGHER NUMBERS ALWAYS CORRESPOND TO HIGHER VALUES). SOURCE: AUTHORS

4 Summary ——— The fact that the IKEA group members felt that they had invested more effort shows that the background condition of our experiment was met. The results of our research show that the IKEA effect can be triggered not only by human effort: the effect can also be detected for human-AI collaboration. Furthermore, the IKEA effect exists not only for physical products, but also for the creation of non-physical products (content). We have shown that with the involvement of AI, subjects (1) produced a better product based on their own subjective judgements and (2) would buy it more expensively, both in comparison with a product they did not produce themselves and with the control group.

However, the IKEA effect in our research was not only for the product of the task, but also for its means: members of the IKEA group were more satisfied with ChatGPT in terms of the product created and would pay more for the service it provided.

Our results thus refute the findings of Mehler et al. (2024): the IKEA effect can be detected not only in image generation, but also in text generation, i.e. it is a truly general phenomenon that exists under multiple boundary conditions. We designed our research based on the literature describing the mechanism of action of the effect (Norton et al. 2012), as we found that Mehler et al. research did not provide the conditions necessary to induce the effect. In contrast to them, we assigned a task in the experiment that did not require either technological or job-specific knowledge and whose success could be judged by the subjects, so that they were able to perceive the added value of their own work. Furthermore, we structured the task in such a way that we did not leave the steps of the task to the individual, but broke it down into parts that we controlled, thus controlling the ratio of human to machine work - this is important because the predominance of machine work inhibits the perception of individual effort and thus the creation of the IKEA effect.

5 Limitations ——— The subjects of our research were not members of the general population, but marketing professionals who have experience in using ChatGPT because of their job, and the task itself was a task close to that of a marketing professional. However, we do not believe that this significantly influenced our results.

Our sample size was twenty, and although there is conflicting literature on the sample size criterion for the t-test, we treated the results of the test with caution, relying on descriptive statistics and practical judgement of effect size.

We measured the willingness to pay for the completed brochure while the completed brochure was saved on our subjects' computers. However, this was the case for both the control and the IKEA group, so we do not hypothesize an effect on the outcome.

6 Applicability of our findings ——— Artificial intelligence already has many practical applications in business and marketing, such as its use in pricing (see for example Danyi 2019). In the field of online marketing, it is of primary importance to identify the factors that can improve sales results, whether it is increasing the propensity to buy or the average basket value. The business value of the IKEA effect lies in the fact that, if it can be triggered, it can also be used to drive sales by increasing individuals' willingness to pay.

Artificial intelligence is a technological opportunity that allows shoppers to personalize the products they want to buy, or to select and access them more quickly. The IKEA effect could be well exploited in this area. Previous research on self-made physical products has shown that shoppers are 63% more willing to pay in the presence of the IKEA effect (Norton et al. 2012). In our research, we measured almost 100% higher price for non-physic products and human-AI interaction.

The exploration and analysis of the relationship between the effect and artificial intelligence can be of significant value from a commercial perspective, as multiple implementations of human-AI collaboration are expected to emerge in the future. To put this into practice, we consider the factors identified in our paper, the absence of which in previous research (Mehler et al. 2024) prevented the effect from materializing, as key to its practical realization.

END OF PART II.

Poznámky | *Notes* ——— [1] All research questionnaires can be found in the online appendix. Available at: <https://www.researchgate.net/publication/392862672_Research_documentation_for_the_paper_entitled_The_IKEA_effect_in_human-AI_collaboration_-Does_the_effect_exist_for_non-_physical_products_published_in_Marketing_Science_

Inspirations_June_2025> | [2] The control group also included an unrealistically high price of HUF 50,000 per month, this outlier was excluded from the analysis (as a presumed typo).

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Kľúčové slová | Key Words ——— IKEA effect, artificial intelligence, ChatGPT, human and artificial intelligence collaboration | *IKEA efekt, umelá inteligencia, ChatGPT, spolupráca ľudskej a umelej inteligencie*

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Résumé ——— ***IKEA efekt v spolupráci človeka s umelou inteligenciou: Existuje tento efekt aj v prípade nefyzických výrobkov? Časť II.***

Podľa IKEA efektu sú ľudia ochotní zaplatiť viac za výrobok, ktorý vytvorili vlastným úsilím, ako za hotový výrobok. V našom výskume sme zisťovali, či bude IKEA efekt existovať (1), ak sa na tvorbe produktu podieľa aj ChatGPT a (2), ak je konečným produktom textový obsah. Vykonali sme randomizovanú kontrolovanú štúdiu, ktorá zahŕňala všetky základné faktory, o ktorých je známe, že spoločne vyvolávajú IKEA efekt.

Naše výsledky ukazujú, že IKEA efekt možno zistiť pri spolupráci človeka a umelej inteligencie, ak je produktom nefyzický obsah. Preukázali sme, že účastníci (1) na základe svojich subjektívnych preferencií vyrobili lepší produkt a (2) kúpili by ho za vyššiu cenu. V našom výskume sa však (3) IKEA efekt uplatnil nielen na konečný produkt, ale aj na nástroj: členovia skupiny IKEA boli s aplikáciou ChatGPT spokojnejší a zaplatili by za ňu viac z hľadiska vytvoreného produktu.

Zahrnutím všetkých známych základných faktorov, ktoré spoločne vyvolávajú IKEA efekt, sme teda úspešne vyvrátili predchádzajúce štúdie, ktoré neboli schopné dokázať IKEA efekt v oblasti tvorby textu.

Umelá inteligencia je technologická príležitosť, ktorá umožňuje kupujúcim personalizovať výrobky alebo rýchlejšie si ich vybrať a dostať sa k nim. V tejto oblasti by sa mohol využiť IKEA efekt. Náš článok prispieva k praktickej identifikácii hraničných podmienok potrebných na spustenie efektu.

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FORM IDEAS TO INNOVATION: A CREATIVITY-DRIVEN MODEL FOR NEW PRODUCT DEVELOPMENT IN THE ALGERIAN AGRO-FOOD INDUSTRY

This study investigates the creativity process involved in product innovation within the context of an Algerian agro-food company. Based on the Structured Analysis and Design Technique (SADT) and the Creative Problem Solving (CPS) model, the research proposes a framework for modelling creativity throughout the innovation process. Using a qualitative approach, the study reveals how creativity tools and methods contribute to the design of innovative products and the integration of customer needs. The research emphasizes the importance of interdisciplinary collaboration and highlights the dynamic interplay between creativity and innovation. Findings suggest that structured modelling enhances internal coordination and supports more effective decision-making in new product development. This study contributes to both theoretical understanding and managerial practices by offering a replicable model for creativity-driven innovation.

1 Introduction ——— Creativity and innovation have become critical success factors in dynamic and competitive environments, especially in sectors such as agro-food. Creativity represents the ability to generate novel and valuable ideas, whereas innovation refers to the successful implementation of those ideas into products or services. Although closely related, these concepts have distinct characteristics and should not be used interchangeably. In this way, creativity is generally associated with ideation and imagination, while innovation emphasizes execution, market viability, and value creation.

According to the psychoanalytic approach (Freud 1958), creativity is the result of the interaction between conscious reality and unconscious impulses. For the psychometric approach (Torrance 1974), creativity is a quality not restricted to an individual (Guilford 1950). The systemic approach (Csikszentmihalyi and Gardner 1994), creativity results from the combination of the individual, the field, and the domain. Similarly, the mystical approach (Runco 1999; Sternberg and Lubart 1999) associate creativity with aesthetic, expressive, and artistic outcomes. Furthermore, the cognitive approach (Sternberg and Lubart 1999) focuses on cognitive skills and the process of creative thinking.

Finally, the multivariate approach to creativity (Lubart et al. 2003) views creativity as the result of the convergence of four aspects: cognitive, conative, emotional, and environmental. According to Aznar (2009), creativity is a process set in motion to develop new ideas or provide innovative solutions to a problem or challenge (conceptual, technical, commercial, social, etc.).

Kao (1996), Mohanty (1999), and Özsmer (1997) view creativity as a source of efficiency in guiding marketing and research and development (R&D) activities. Consequently, innovating without creativity results in the launch of minimally original innovative products, leading to costly marketing budgets with a high risk of failure and significant financial consequences for companies. The challenge for businesses is to find new ideas and convert them into innovative concepts through methods and tools designed to improve, organize, and facilitate creativity (Gotteland, Haon and Boule 2017).

In Algeria, the agro-food industry includes over 31,557 companies with more than 170,000 employees (ONS 2023). Production in the agro-food industries continues to grow, with a variation of +3.7% during the first quarter of 2023. Today, agro-food companies are facing an economic situation (inflation and decreased purchasing power) brought about by the effects of the health crisis and political and economic decisions (reduction in raw material imports). As a result, these companies face the challenge of attracting and retaining customers and stimulating the needs of new consumers to drive purchasing behaviour. Therefore, the issue of creativity and innovation has become central to these companies' concerns in order to generate new ideas and transform them into innovative products and solutions that create value for customers. This highlights the importance of directing marketing research towards understanding the mechanisms and structure of creativity within agro-food companies and determining the appropriate tools and methods for developing innovative products. To address this, we have formulated the following question:

How does creativity contribute to the development of innovative products within Algerian agro-food companies?

From this main question, the following sub-questions arise:

- What techniques are used to enhance creativity within companies?
- What is the relationship between the process of creativity and the process of innovation within Algerian agro-food companies?

To address our research questions, we have chosen the multivariate approach to creativity as the theoretical framework (Sternberg and Lubart 1999) and the „Creative Problem Solving“ (CPS) process (Parnes and Osborn 1992). In this context, improving creativity can lead to more competitive, consumer-focused products. Accordingly, this paper introduces a model of creativity in product innovation using the SADT method combined with the CPS model.

Our study does not aim to create an exhaustive list of creativity tools and methods leading to product innovation, our objective is to: identify the motivations and constraints associated with implementing a creativity approach and simulate a model of the process of creativity linked to the process of the development of the innovative products within Algerian agro-food companies. To achieve this, we have opted for an anasynthesis approach within a qualitative iterative framework developed in seven stages (Legendre 2005, p. 74).

2 Research objectives ——— This study aims to examine how creativity is integrated into the product innovation process within an Algerian agro-food company. The objective is to develop a model that captures the interaction between creative thinking and structured product development in a practical business context.

The research takes a multidisciplinary approach, focusing on the complementarity between engineering-oriented R&D activities and the psychological and organizational dimensions of creativity. It also seeks to identify the key variables necessary for building a relevant and effective model. Specifically, the study seeks to:

- Identify the motivations for and challenges in implementing creativity methods within the company.
- Understand how creativity and innovation are linked in practical, real-world settings.
- Develop a structured process model based on the SADT (Structured Analysis and Design Technique) and CPS (Creative Problem Solving) frameworks.
- Assess how useful and relevant this model would be in a real company setting.

3 Theoretical background ——— The development of innovative products primarily revolves around two main axes: the process of innovation and creativity, and the combination of these two processes.

3.1 Creativity according to the multivariate approach ——— The literature review of different approaches to the process of creativity has revealed the existence of divergent definitions of the concept as well as factors influencing their organization within companies. However, the definition of creativity that is widely accepted is that of Sternberg and Lubart (1995), cited by Sternberg (1999 p. 35): „Creativi-ty is the ability to produce something that is both new and appropriate to the context in which it manifests".

Lubart (1999) considers creativity as the result of four factors: cognitive, conative, emotional, and environmental. It explains creativity through the joint and interactive influence of individual, cognitive, and conative characteristics (intellectual or personal aptitudes), and the environmental context (culture, family, and organizational environment) on creative potential. Consequently, the result of creative production varies according to the context.

Creativity is viewed by Lubart (1995) and Drazin et al. (1999) as both a process and an outcome. They explain creative production through two dimensions: the first involves the generation of new ideas („insight") through mental processes that encompass mental mechanics and emotional energy. The second involves producing solutions by transforming the ideas generated through the process of creativity into operational solutions suited to given contexts.

In marketing research, creativity involves the skills and abilities developed through methods and tools. It is closely linked to motivation, emotion, and personality factors (Pradhan et al. 2017). This underscores the importance of exploring the process of creativity and the use of tools and methods for idea generation and problem-solving.

Amabile (1996) was the first to propose a model of creativity within organizations. She defines creativity as the result of the interaction between organizational and individual factors. This interaction provides the company with a high level of productivity, leading to the emergence of new ideas and their transformation into solutions.

Moreover, developing emerging ideas into business opportunities in a given context can involve: the combination of the process of creativity and the process of innovation. To explain the mechanism of integrating creativity within the innovation process, we refer to the CPS model for creativity and the Stage-Gate System model for innovation.

In this study, creativity is defined following Sternberg and Lubart (1999) as the capacity to produce work that is both novel and appropriate. The research the (CPS) model developed by Parnes and Osborn (1992), with comprise stage of problem identification, idea generation and implementation planning.

3.2 The CPS process of creativity mode ——— The CPS process used in this research consists of three phases: the first is a thorough consideration of the problem, the second is the transformation of ideas into innovative solutions tailored to the encountered problems, and finally, the third is the implementation of an action plan to develop the solution into an innovative product (Aznar 2012). These three phases are further divided into eight steps by Wolfe (2007). According to her, „...with these steps of intuitive production and constructive analysis, the creative process is both a structured and flexible method that allows for traversing all phases of concept creation or problem resolution by integrating creativity in an operational manner", as cited by Aznar (2014 p. 28). Each step of the CPS process involves two alternating phases: divergence, which is a projection into the imagination of the right hemisphere of the brain (intuitive thinking), and convergence, which is the alignment of imagination with the constraints of reality, representing the left hemisphere of the brain (logical, analytical, and evaluative thinking), as illustrated in Figure 1.

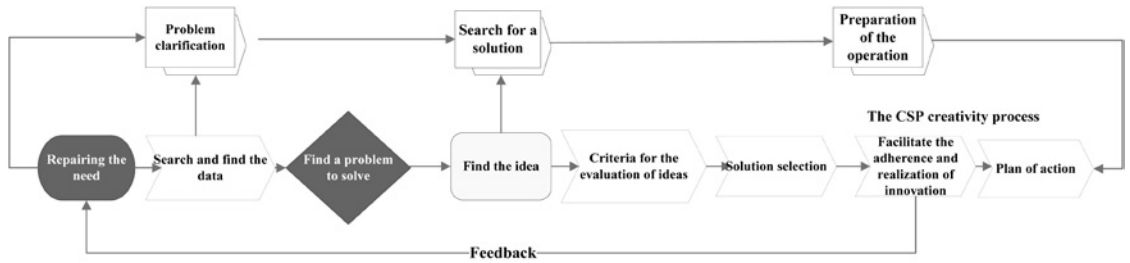

FIGURE 1: PHASES OF THE CPS MODEL
SOURCE: AUTHORS ACCORDING TO CREATIVE EDUCATION FOUNDATION (2014)

3.3 Innovation models: The „Stage-Gate System" process of innovation model by Cooper (1990) ——— Innovation involve a systematic process of transforming creative ideas into market-ready products. Cooper's Stage-Gate model (1990) is wisely adopted in industry and consists of five stages: idea screening, development, validation, launch preparation and commercialization.

The model Stage-Gate System process (Cooper 1990) includes all stages of the development and launch of new products (Figure 2). At the end of each stage, deliverables are presented related to the functions of the company: marketing, engineering, production, quality, sales, etc.

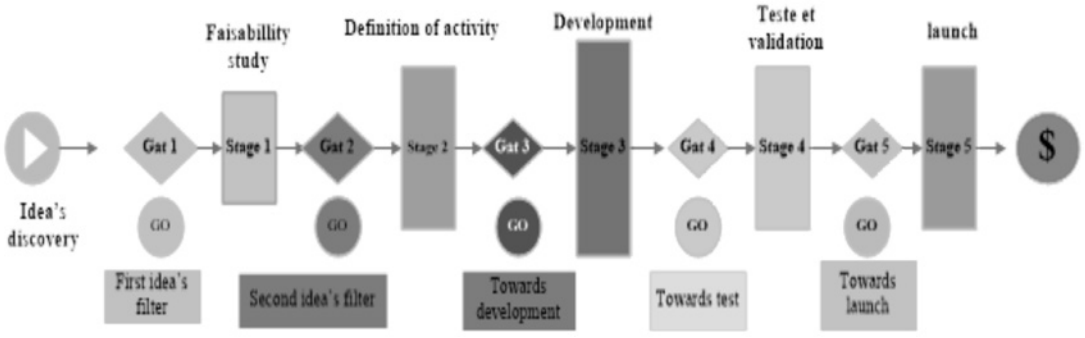

FIGURE 2: THE STAGES OF THE STAGE-GATE SYSTEM PROCESS
SOURCE: COOPER (1990, P. 45)

This process is divided into five distinct stages, referred to as „stages" which are consecutive and include:

| 1. The first phase of preliminary evaluation: technical study, commercial feasibility, and market attractiveness.
| 2. The second phase of definition: study of project attractiveness before the development phase.
| 3. The third phase of development: involves product development alongside various marketing test plans, and financial analysis.
| 4. The fourth phase: encompasses all product viability tests, including product concept, production process, customer acceptance, and project economic aspects.
| 5. The fifth phase: commercialization of the product, which involves implementing the launch marketing plan and operational plan.

These stages are separated by „gates", which represent decision-making phases based on evaluation meetings concerning:

| Economic feasibility („profitability and overall investment cost").
| Technical feasibility (quality and production).
| Commercial feasibility and team management.

Consistent with this approach, innovative packaging (labelled in Braille) has great impact on attitude and purchase intention of the visually impaired consumers in Algeria (Sahel et al. 2022), proving product features are not limited to functionalities but extend toward perceptual/accessibility aspects.

4 Methodology ——— This study employs a qualitative explanatory approach through an in-depth case study. The research was conducted within a major agro-food company located in Algeria, from January 2022 to October 2023. For reasons of confidentiality, the company remains anonymous. Also, Laoudj, Krim and Bouchetara (2024) investigated how artisans working in the clusters of Constantine and Batna activate factors namely technology, talent and tolerance to engage in innovative activity into the production of their craft goods. Their results show that also in more conventional industries, stakeholders still see a need for product innovation, which is obtained by regional collaboration.

4.1 The research phases ——— The study follows a longitudinal process divided into four distinct phases:

| 1. First period (January to March 2022): Non-directive interviews were conducted with the directors of Purchasing and Supply, Production, and Supply Chain. Additionally, working sessions lasting 2 to 3 hours were held with the marketing product manager to gain insights into the concept of the new product.
| 2. Second period (April to August 2022): This period focused on the development and testing of the recipe for the new product.
| 3. Third period (September to November 2022): Testing of the product, including the recipe and packaging, was carried out.
| 4. Fourth period (December 2022 to February 15, 2023): This period involved the launch of production and the beginning of commercialization.

4.2 Data collection and processing method ——— To gather the data required for our research, we employed a triangulation of methods, including an interview guide, participatory observation, and analysis of internal company documents.

The interview guide is structured around three main axes: the first axis addresses perceptions (motivations and barriers) regarding the integration of creativity; the second axis focuses on the creativity tools and methods implemented within the organization; and the third axis examines the contribution of these methods and tools to the development of innovative products.

Participatory observation was conducted using an observation grid that encompasses the phases of the product innovation process according to the Stage-Gate System model. Finally, we analyzed internal company documents, including the recipe creation and modification flowchart, design briefs (R&D), and prototype briefs and macro planning for research and development (R&D).

For data processing, we relied on both content analysis of the interviews and process analysis.

To model creativity, we drew inspiration from both the theoretical model of innovation, the „Stage-Gate System" developed by Cooper (1990), and the graphical method, SADT (Ross 1977) (Figure 3).

4.3 The structured analysis and design technique (SADT) ——— SADT is a modelling method that involves functional analysis from a high level („A-0") down to more specific and detailed levels („Aijk"). It is suitable for modelling activities and information flows in the form of an activity diagram, which transforms raw input data into output data. Activities are subject to control instructions (company's strategic objectives) while leveraging the potential of the activity support (creativity methods and tools).

5 Results and discussion ——— Results analysis enabled us to model the creativity process for company „X" by following the steps involved in he creation of the new product „Y". We have termed this proposed creativity process the „micro model".

5.1 The creativity approach followed by company „X" ——— Regarding creativity within company „X", we observed that the concept of creativity is often conflated with that of innovation.

5.1.1 Creativity within company „X“ ——— According to the Marketing Product Manager, „...creativity to me is the same as innovation“. For the Director and Research and Development Engineer, „creativity involves external monitoring, benchmarking, and an internal idea box for the development of new products“. The Marketing and Sales Director describes creativity as „the development of new ideas“. In contrast, the Quality Director defines creativity as „both the development and creation of new ideas, as well as the resolution of problems in a creative manner“.

Additionally, we observed that managers within company „X,“ specifically the Director of Research and Development and the Quality Director, are aware of the importance of integrating creativity into the new product development process. Since the company has shifted towards an innovation orientation, new operational modes have been adopted, and some are beginning to be formalized. However, a structured creativity process has not yet been established within company „X“. We noted a divergence in the perception and interpretation of creativity and innovation within the studied company. Some interviewed leaders view them as similar, while others see them as complementary. Despite this difference, the company's leaders agree on the importance of creativity in generating new ideas and transforming them into innovative products.

5.2 Prototype of the creativity model involved in product innovation at company „X“ ——— The simulated model of the creativity process, based on the SADT method, aligns with the stages of the CPS process. We have added a fourth stage, observed during our participatory observation, which is the solution development phase for product „Y“.

Figure 3, labelled „Level A0“, illustrates the main function of the creativity process in developing a new product „Y“. The activity supports include the various functions within company „X“, the phases of the overall product innovation process, and the creativity tools and methods utilized during the innovation phases. The control data consists of the company's objectives.

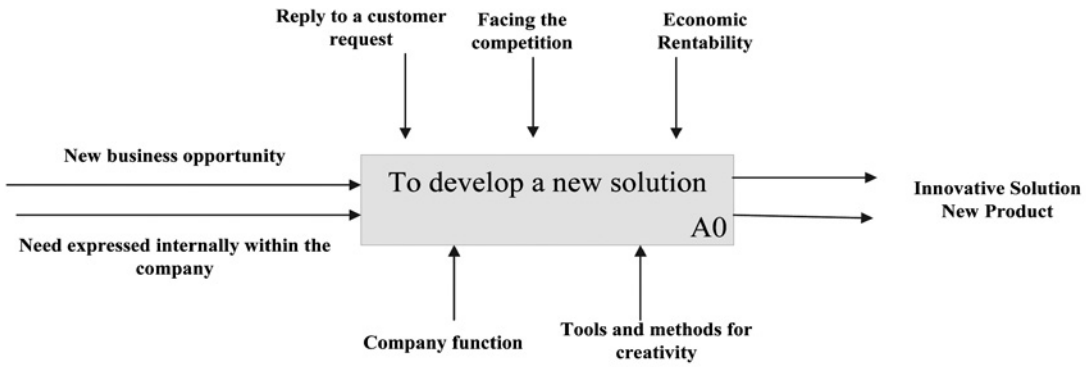

FIGURE 3: REPRESENTATION OF THE MAIN FUNCTION OF THE CREATIVITY PROCESS.
SOURCE: AUTHORS

We structured the stages of the creativity process for company „X“ (Figure 4) after cross-referencing the results from the interview analysis and the monitoring of the development stages of the new product „Y“.

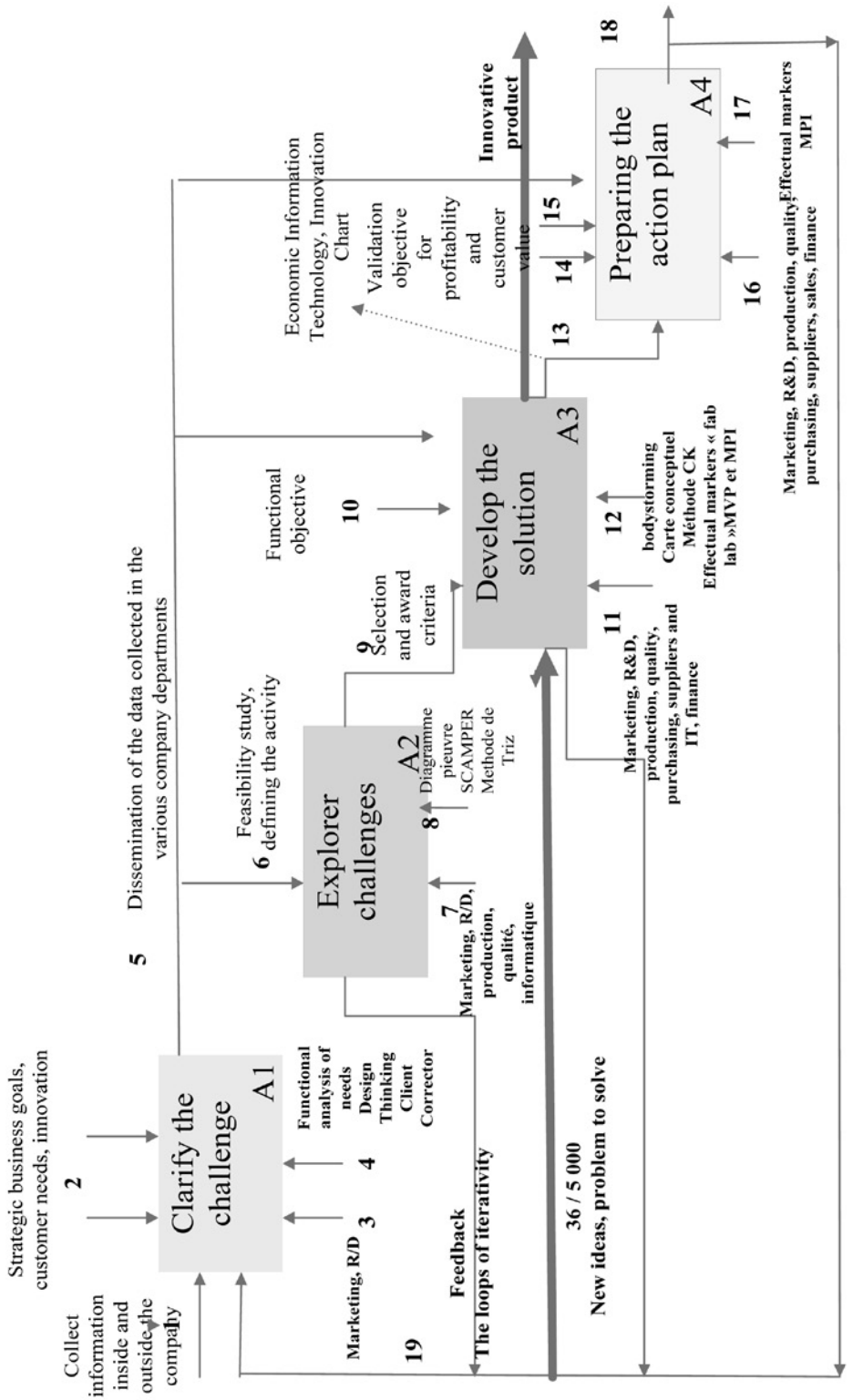

FIGURE 4: MICRO MODEL OF THE CREATIVITY PROCESS APPLIED TO COMPANY „X“
SOURCE: AUTHORS

| A1. Clarify the challenge: This phase is divided into three steps:
  | A11. Identify the need: Company „X“ aims to create novelty to enhance its brand image, expand its product range, optimize its raw materials, improve the profitability of a production line, and achieve competitive differentiation through the development of product „Y“. To address this, the company „X“ has undertaken the following:
  | i. Collection of external information: This includes monitoring (political, economic, social, cultural, technological, competitive, legal, and environmental) and market analysis reports from the company.
  | ii. Conducting meetings between the general manager and various directors of the company that aim to translate blocking points into new challenges. This information is disseminated and communicated to different functions within the company.
  | A12. Data gathering: At company „X“, the marketing department conducts research related to the objectives set by the general management. It relies on market studies conducted by external agencies to identify influences and trends in the target market, as well as ideas from the company’s internal idea box. The collected data is considered as sources of creativity.
  | A13. Formulate the challenge: The collected data is consolidated by the marketing team to formulate the problem to be addressed in the idea generation workshop. The report is prepared by the product manager and validated by the marketing director. Idea Generation Workshop: This is a collective creativity method managed and facilitated by the marketing team. Based on brainstorming techniques, the workshop is organized as follows:

Participants are divided into four (4) heterogeneous groups of six (6) employees from different functions within company „X“ (marketing, research and development, quality, production, supply chain, sales, and purchasing) for a duration of 1.5 hours. The agenda is the problem to be solved, formulated as a „marketing insight“. From this insight, groups propose three to four ideas, which are then subjected to a vote to select the top three ideas.

The methods used include: brainstorming and SCAMPER, based on divergence, followed by voting on convergent criteria. These methods help translate the „marketing insight“ into new proposals.

The analysis of the idea discovery phase for the new product „Y“ enabled us to model the first phase of the creativity process based on the creativity tools and methods applied by company „X“ and inspired by experiences from companies in the same sector. We proposed integrating new methods, including crowdsourcing (as applied by the Algerian agro-food company Hamoud Boualem), design thinking (as implemented by the leading Algerian dairy company Soummam), and artificial intelligence (as used by the major Algerian dairy company Tchin-Lait). We also supplemented this model with functional analysis methods (e.g., the „Horned Beast“ and „Octopus Diagram“) to better articulate the various functions of the new product „Y“.

| A2. Exploration phase of selected ideas. The three selected ideas are outgoing data listed in the idea generation workshop report. Actions are taken to explore the selected idea that could potentially solve the insight. Creativity methods applied include:
  | Divergence phase: Discovery matrix, morphology matrix.
  | Convergence phase: SWOT innovation matrix, lateral thinking (questions, paradoxes, provocations, operations).

During this phase, the product manager develops a project design brief for the new product „Y“. The brief is created collaboratively between the marketing product manager and project stakeholders. The decision to develop product „Y“ is made by the validation committee (CODEV) after appropriate technical, financial, and commercial evaluations aligned with the company's expectations and market needs.

| A3. Develop the solution. Following the validation of the new product „Y“ project, it is translated into a product concept. The design and validation of the product „Y“ recipe are carried out collaboratively between marketing and research and development. The creation of the prototype (design, packaging) for product „Y“ results from this stage. Creativity tools used include: TRIZ method, conceptual maps, C.K. method, effectual markers „fablab“, MVP, and MPI.

| A4. Prepare the action plan. This step has not yet been analyzed in detail as the development phase is not yet complete.

6 Discussion of results ——— The results from observing the new product development process and creativity, along with the content analysis of interviews conducted with managers at the Algerian company „X“, have provided insight into the literature related to our issue, which reveals a divergence in the description of the process applied by the company.

Our findings indicate that the creativity process integrated into new product development is generally conducted in a sequential manner. Contrary to theoretical results, some stages are carried out simultaneously with feedback loops and bidirectional arrows. At the observed company, there are interactions between different functions marketing, research and development, production, and quality control that require iterations between product development and testing.

However, we observed a nonlinear path for the three stages: „expression of need“, „idea generation“, and „recipe development“. This is explained by the need to develop new products that align with both the company's strategic perspectives and the dynamic market trends and evolution. Furthermore, this collaboration ensures that customer needs are integrated throughout the new product process, which is in line with the company's overall strategy, including having a dedicated chair in each meeting room for a representative customer (whose presence is symbolic). It is noted that Fratričová, Überwimmer and Füreder (2018) and Gotteland and Haon (2011) indicated that interactive collaboration among development teams contributes to their performance.

The advantage of the Stage-Gate System (SGS) combined with CPS lies in the sequential nature of creativity. Our results contradict the notion that large companies formulate and structure the creativity process formally. The observed company only formalizes the development phase through the „creation and modification of the rec-

ipe“ procedure, while other phases are conducted informally. Beyond describing the new product development process, this case study allowed us to identify the tools and methods of creativity. We highlighted the contribution of each creativity tool and method at each phase of the SGS process.

The results do not confirm the conclusions of Chang and Taylor (2016) and Goglio-Primard et al. (2020), which state that involving customers throughout the new product development process enhances financial performance and accelerates time to market. Our observations indicate that customer involvement occurs only during the testing phase of the recipe and concept. Regarding the study of customer needs, it is carried out by an external market research agency at the company's request. Beyond process description, the content analysis of interviews revealed a contradiction in managers' discourse concerning the importance of project costs versus customer needs. This situation leads to marketing myopia, despite the company’s commitment to total quality.

Therefore, we propose modeling the development and creativity process to enable company „X“ to develop a new product that provides solutions for target customers. The proposed model highlights the relationship between innovation and creativity through the integration of divergent and convergent creativity tools at each stage of the SGS within company „X“. This integration ensures that customer needs are incorporated at different phases of the new product development process. Combining agile creativity methods (such as design thinking) with industrial engineering methods (such as functional need analysis) will facilitate faster time to market and reduce commercial failure. Iterative loops ensure the reliability and adaptation of the new product’s value proposition to the expectations of users and stakeholders within the studied company.

Moreover, based on the results of Cohard et al. (2020) and Fratričová, Überwimmer and Füreder (2018) we recommend that managers of large companies integrate agile creativity methods within the new product development process. Specifically, adopting a co-creation approach through open innovation practices like crowdsourcing for emerging innovative ideas and the Design Thinking process for developing rapid and effective innovative solutions (Dampérat et al. 2019). Additionally, the results of Cooper (2016 2018) encourage industrial companies to adopt a hybrid SGS process. But as Sahel et al. (2022) observe, even a significant innovation such as Braille packaging is limited in regard to perception, cost, and acceptability. This aligns with the restrictions that we identified in our case study firm to the formal implementation of tools for creativity.

7 Conclusion ——— This study contributes to a better understanding of the creativity process within product innovation by modelling the interaction between creative methods and structured development processes. The proposed framework, based on SADT and CPS integration, offers practical value for companies aiming to institutionalize creativity and align it with their innovation strategies. While the findings are promising, further validation and refinement are necessary to address limitations and improve the model’s robustness and transferability.

Theoretical contribution ——— The research results reveal that utilizing creativity tools and methods at different stages of innovation facilitates the integration of customer needs and expectations throughout the development process. These methods and tools foster better cooperation among the project team, which enhances productivity and increases stakeholder motivation in the innovation project, thereby improving the overall creative potential within the company.

Methodological contribution ——— Through the exploratory study, we observed that managers are aware of the importance of creativity in identifying consumer needs, developing new innovative ideas, and guiding the innovation process. However, structurally, it remains informal. Consequently, decisions made during development often lack a holistic perspective, impacting investment costs and project value. As a result, the company sometimes faces situations where the integration of or consultation with a stakeholder in the development project is overlooked. This underscores the relevance of modeling the creativity process associated with product innovation.

Managerial contribution ——— Implementing the proposed creativity model allows for the identification of cause-and-effect relationships between decisions made at each „gate“ and their impact on the „stages“ through an iterative loop system. This model demonstrates the value of combining industrial engineering methods, such as functional need analysis, with agile creativity methods to develop commercially successful innovations.

Research perspectives ——— This study opens avenues for future research that will enrich the investigation conducted by expanding the sample size. A quantitative approach would be valuable to test and validate the process generated by our study. Additionally, simulating this process through an integrated software solution could improve decision-making during the development of new products.

Finally, our study has limitations related to the qualitative nature of the collected data. We lack quantifiable data to measure the contribution of each identified tool to the performance of emerging ideas.

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Kľúčové slová | Key Words ——— creativity, innovation, product development, agro-food industry, SADT model, creative problem solving | *kreativita, inovácie, vývoj produktov, agropotravinársky priemysel, model SADT, kreatívne riešenie problémov*

JEL klasifikácia | *JEL Classification* ——— M31, O31

Résumé ——— *Od nápadov k inováciám: Model založený na kreativite pre vývoj nových produktov v alžírskom agropotravinárskom priemysle*

Tento príspevok skúma proces tvorivosti v rámci inovácií produktov v kontexte alžírskej agropotravinárskej spoločnosti. Na základe štruktúrovanej analýzy a techniky návrhu (SADT) a modelu kreatívneho riešenia problémov (CPS) výskum navrhuje rámec pre modelovanie tvorivosti v priebehu celého inovačného procesu. Pomocou kvalitatívneho prístupu štúdia odhaľuje, ako nástroje a metódy tvorivosti prispievajú k návrhu inovatívnych produktov a integrácii potrieb zákazníkov. Výskum zdôrazňuje dôležitosť interdisciplinárnej spolupráce a poukazuje na dynamickú interakciu medzi kreativitou a inováciami. Zistenia naznačujú, že štruktúrované modelovanie zlepšuje internú koordináciu a podporuje efektívnejšie rozhodovanie pri vývoji nových produktov. Tento príspevok prispieva k teoretickému pochopeniu aj manažérskym postupom tým, že ponúka replikovateľný model inovácií založených na kreativite.

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B2B MARKET SATISFACTION AND LOYALTY ASSESSMENT WITH AN EMPHASIS ON THE PROVISION OF TECHNOLOGICAL SOLUTIONS

This paper aims to present the results of customer satisfaction and loyalty research in the B2B market, focusing on the provision of technological services by a selected innovative company. Customer loyalty is the ultimate goal of all customer relationship management (CRM) efforts. For their evaluation, both loyalty and satisfaction need to be tracked and measured. One of the instruments for measuring loyalty is the Net Promoter Score, which we have employed in our research. Customer satisfaction is usually measured using a customer satisfaction index. This research draws on the European Customer Satisfaction Index (ECSI) using seven variables or factors affecting satisfaction (image, expectations, perceived product quality, perceived value, complaints), cumulative customer satisfaction, and the consequence of satisfaction – customer loyalty. The research results demonstrate that, in order to achieve a high level of satisfaction and loyalty in the B2B market, it is important to regularly assess customer needs, monitor competition, and continuously improve products and complementary services. Customer satisfaction in the B2B market is primarily affected by trust in the business partner, communication, professionalism, product quality, and the terms of delivery. In addition, loyalty as the ultimate level of customer relationship is determined by an excellent customer experience and additional values within the extended product, all of which can significantly distinguish the company from its market competitors. This study addresses the gap in B2B market satisfaction research with a particular focus on the technology industry.

1 Introduction ——— Following tremendous technological advances in the past decade, a variety of digital communication tools are available which enable organisations to engage with their customers in a more effective, tailored, and customized manner (Wenzler, Sakshi and Schmidthaler 2019). The customer is a key business factor for any organisation, irrespective of whether it is in a B2C or B2B market. If the organisation is fully committed to its customers and its products are of sufficient quality, the customers will be satisfied and loyal. Such customers provide positive reviews, make recurrent purchases, or repeatedly use services, and tend to recommend the particular business or company. Customer satisfaction is built on the relationship between a company and its customers, making the management and cultivation of this relationship vitally important (Suoniemi et al. 2022). However, in some situations, a very loyal customer can become a loss maker rather than a source of profit for the company, as described by Kumar and Reinartz (2012). Such a customer may, for example, repeatedly call the customer service line with inquiries or constantly look for the best price of a product, making use of every discount and special offer. It is essential that the different types of customers are first identified and specific strategies are subsequently developed to interact with each of them. It is part of the business strategy to develop better relationships with profitable customers, and to find and attract new customers with profit potential. A business may also pursue strategies towards non-profit customers that could result in the termination of the relationship. All these approaches are summarized under the term „Customer Relationship Management“ (CRM) (Kumar and Reinartz 2012).

On the one hand, CRM is a specialized technological tool that allows companies to capture, store, access, share, and analyse large amounts of customer data. On the other hand, CRM is a business philosophy to be shared across the company. The potential benefits of CRM include increased customer loyalty, improved marketing effectiveness, better customer service and support, and lower costs due to increased efficiency (Suoniemi et al. 2022). The concept of customer value is central to CRM as it allows the company to measure and optimize its marketing efforts by integrating customer value into the core of its decision-making processes (Kumar and Reinartz 2012).

In the current environment, customer relationships have a wide scope (Šrédl et al. 2013). Malhotra and Agarwal (2020, p. 2) provide the different areas included in customer relationships. Quality relationship marketing – defined as the process of identifying, developing, maintaining, and, if necessary, terminating customer contact – can be called the cornerstone of customer relationship management. Its objective is to create mutual value for both the customer and the business. Essential relationship characteristics include quality, satisfaction, loyalty, and reliability (Malhotra and Agarwal 2020; Severová et al. 2021). However, a distinction must be made between the B2C market and the B2B market, the latter one not being addressed in research as often.

Satisfaction progresses from dedication to loyalty. Satisfied customers have their expectations fulfilled by consuming the products. Dedicated customers tend to return. Loyal customers are satisfied, return, and share their positive experience, i.e., spread positive references. As customer loyalty is the desired outcome of all CRM efforts, it should be measured. One of the instruments for measuring loyalty is a metric known as the Net Promoter Score.

The Net Promoter Score (NPS) assesses both customer loyalty and customer experience. The NPS measures the customer's willingness to recommend a product, brand, or business to his/her community (Kozel, Mynářová and Svobodová 2011).

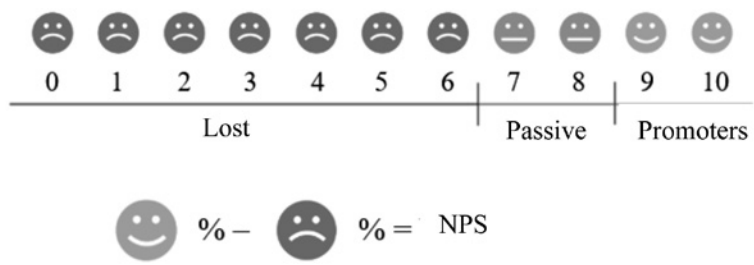

FIGURE 1: NET PROMOTER SCORE
SOURCE: AUTHORS BASED ON TEAMSUPPORT (2023)

The NPS classifies customers into three groups as shown in figure 1. Nenadál (2016) discusses customer types from the company perspective, whereas Kozel, Mynářová and Svobodová (2011) address customer types from a customer perspective, suggesting that the following three groups of customers exist:

- Promoters/Enthusiasts – (9-10 score) – active customers/loyal supporters who recommend a product, brand or company to others – generate growth.
- Passively satisfied/Passive – (7-8 score) – satisfied customers who recommend products without enthusiasm – likely to use competitor offers.
- Lost/Opponents – (0-6 score) – dissatisfied customers who are likely to switch to a competitor and do some damage to the brand.

In using the NPS for our research, we adopted the approach of Klimin, Tikhonov and Trykov (2017), who discussed the application of the NPS method in the B2B market. Hence, our research focuses on customer satisfaction and loyalty in the B2B market. Customer satisfaction is usually measured with the help of an index that covers a variety of factors. This research draws on the European Customer Satisfaction Index (ECSI) consisting of seven variables or factors affecting satisfaction (image, expectations, perceived product quality, perceived value, complaints), cumulative customer satisfaction, and the consequence of satisfaction – customer loyalty (Kozel, Mynářová and Svobodová 2011). Following their research results, Askariazad and Babakhani (2015) confirm that the ECSI has sufficient power in explaining loyalty in the B2B context.

Moreover, Sales-Vivo, Gil-Saura, and Gallarza (2021) argue that the quality of the customer-seller relationship in the B2B market is also influenced by the possibility of product co-creation. An article titled „The influence of service quality on customer satisfaction and loyalty in B2B technology service industry", published by Huyan, Lee, and Chen (2019), inspired the authors of the submitted study. Huyan, Lee, and Chen (2019) aimed to determine the ways in which service quality and brand awareness affect customer satisfaction and loyalty in the B2B technology services industry. The authors state that the majority of studies in this field relate to B2C situations, such as the hospitality industry (Hyan, Lee and Chen 2019). Our research thus addresses the gap in B2B market satisfaction research with a particular focus on the technology industry.

2 Methodology ——— The topic of our research is to determine the satisfaction of JOBka Services, s. r. o. customers. JOBka Services, s. r. o. is the provider of a mobile application known as JOBka. It helps the application users to have relevant information concerning their company always at their fingertips, whether they are at home, at work, or on the move. The mobile application incorporates important company documents and contacts, and makes it possible to arrange a carpool or order a meal. The company operates in the B2B market. The primary objective of the satisfaction survey is to collect information from the company's customers regarding the quality of customer service and its impact on company performance. The purpose of the research is to find out how customers perceive the services provided by JOBka Services, s. r. o.

The research is conducted using a questionnaire survey over a web interface (CAWI). The questionnaire was prepared in Microsoft Forms. As a questionnaire is the fastest way to collect both quantitative and qualitative data, it was utilized in this research. Our questionnaire combines unstructured, semi-structured, and structured parts (Eger and Egerová 2022).

Spearman's rank correlation coefficient is a statistical measure used to express the strength and direction of a monotonic relationship between two variables. This coefficient is applicable to variables that are not normally distributed and may not be related in a linear way, but rather may be driven by other types of dependencies (Hindls 2007).

Spearman's rank correlation coefficient ranges between -1 and 1, where:

- 1 indicates a perfect increasing monotonic correlation between the variables.
- -1 indicates a perfect decreasing monotonic correlation between the variables.
- 0 indicates no monotonic correlation between the variables.

The calculation of the Spearman correlation coefficient involves converting the values of the variables into ranks (ordinal numbers) and then calculating the Pearson correlation coefficient for these ranks.

In addition, the NPS is established to assess customer loyalty. The NPS value is calculated as the difference between the percentage of promoters/supporters and the percentage of the lost/opponents. The value can range from -100 to +100. An NPS greater than 0 is considered good. If the NPS is greater than 50, it is perceived as excellent (Kozel, Mynářová and Svobodová 2011).

The target group of this research consists of the existing JOBka Services, s. r. o. customers, including manufacturing, logistic and trading companies with some previous customer experience with JOBka Services, s. r. o. The set was randomly selected by the customer service department and comprises 60 client companies, including their employees (in-house application administrators and users).

Three hypotheses are established for the research:

- H 1: There is a relationship between the application ratings and user loyalty.
- H 2: There is a relationship between the impact on company performance and the loyalty of the company representative.
- H 3: There is a relationship between meeting customer expectations and customer loyalty.

As previously mentioned, the questions in the questionnaire were inspired by the ECSI. The questionnaire includes both closed-ended and open-ended questions. Closed-ended questions comprise multiple-choice questions, as well as Likert-scale type questions with numerical ratings, either stand-alone or in the form of matrix questions. Open-ended questions complement closed-ended questions by providing a verbal assessment. There are two versions of the questionnaire – one for companies (application administrators) and one for company employees. In total, the questionnaire for companies includes 14 questions, whereas the questionnaire for employees (users) contains 12 questions. As employees only come into contact with the application, the questions intended for company representatives (focusing on the perceived value, expectations and the impact of the application on the performance of the company) are irrelevant for them.

The questionnaires were developed Microsoft Forms and were emailed to customers (companies) after the completion of the piloting and pre-survey phase. The end users were able to access the questionnaire directly in the JOBka application by using a specifically designated URL link.

Data collection was carried out in March 2023. The potential respondents consisted of 60 companies and their employees. The questionnaire took approximately 4 minutes for both groups to complete. The data obtained was narrowed down to exclude the results of questionnaires submitted by respondents who declined to have their opinions and assessments processed. The question regarding the likelihood of providing a recommendation was used to determine the level of customer loyalty (NPS).

The three hypotheses established at the beginning of the survey were tested with the help of the software STATISTICA, an analytical data processing tool. The non-parametric Spearman's rank correlation coefficient was used to confirm or reject the hypotheses as the variables being studied were rated on a Likert scale, i.e., on an ordinal level of measurement.

3 Research results ——— In total, 29 application administrators (companies) participated in the survey, resulting in a usable sample of 28 respondents. 202 end users in companies filled in the questionnaire, yielding a usable sample of 183 respondents.

3.1 Results related to questions for the company's application administrators ——— The questions intended for the companies/application administrators concerned their expectations, perceived value, and the quality of JOBka Services, s. r. o. products and services. These were questions rated on a five-point Likert scale or questions graded on a 1-5 scale, „as in school". Respondents unable to respond to a question could select the „N" option as an answer.

Customer expectations ——— The respondents used a 5-point scale to indicate whether the JOBka application met their expectations (completely met – completely failed to meet). The JOBka application completely met the expectations of half of the respondents, i.e., 14 of them. The remaining half rated the application between „met" and „failed-to-meet", with the substantial majority (39% = 11 respondents) indicating that the application met their expectations. Two respondents reported that their expectations were not met.

Impact on performance ——— Respondents used a 5-point Likert scale to indicate the JOBka application's impact on component performance factors (significantly positive impact – significantly negative impact). The efficiency/performance factors included cost, time, employee satisfaction, and employee turnover/employment rate. The application has no effect on increased employee turnover or the employment rate, as indicated by 19 respondents. The second aspect not affected by the JOBka application, according to 14 respondents, is the cost. It has a positive impact on employee satisfaction and time efficiency. In terms of employee satisfaction, 93% (26) of respondents acknowledge its positive impact, with the majority of respondents (18 administrators) considering the application to be positively influential. The positive impact with respect to time efficiency is indicated by 86% (24) of respondents, with 14 of these perceiving the product as having a significant positive impact. Two administrators report that it has a negative impact on costs, and one on time efficiency and employee turnover.

3.2 Results related to questions for in-company end users ——— The questions for employees relate to the quality of the company's products and services. These are matrix-type questions, with respondents rating factors or components of the topic being addressed in each question. The end-users rated these questions on a 1 to 5 scale. Respondents unwilling or unable to respond to a question could select the „N" option as an answer.

Mobile application ——— The respondents individually assessed the main parameters of the application, namely appearance, arrangement, speed, content, and functionality of the application modules. Respondents unwilling to respond to a question could select the „Don't want to rate" option as an answer. 174 users rated the module arrangement and functionality, 177 users rated the content, and 179 users rated the speed.

For a graphical representation of the assessment of individual aspects of the application, see Figure 2.

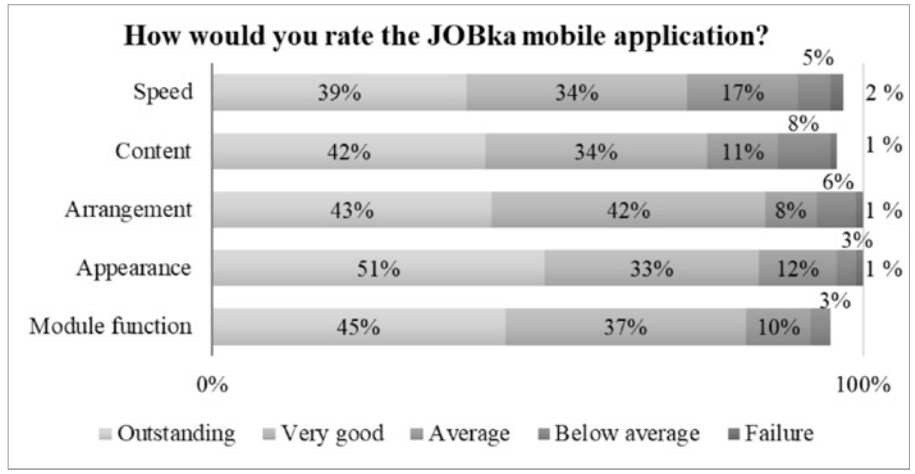

FIGURE 2: GRAPHICAL REPRESENTATION OF THE JOBKA MOBILE APP ASSESSMENT
SOURCE: AUTHORS

As the figure shows, all aspects were rated predominantly positively, with scores of „outstanding" and „very good". The aspects rated as failure included speed (4 respondents) and content, arrangement as well as appearance (2 respondents each).

3.3 Results of identical or related questions for both groups of respondents ——— Identical questions for company application administrators and end users concerned the frequency of use of the application and the likelihood of recommending JOBka Services, s. r. o.

Frequency of use of the JOBka application ——— Both groups of respondents indicated the frequency of use of the JOBka application. For a graphical representation of the results related to the frequency of use see Figure 3.

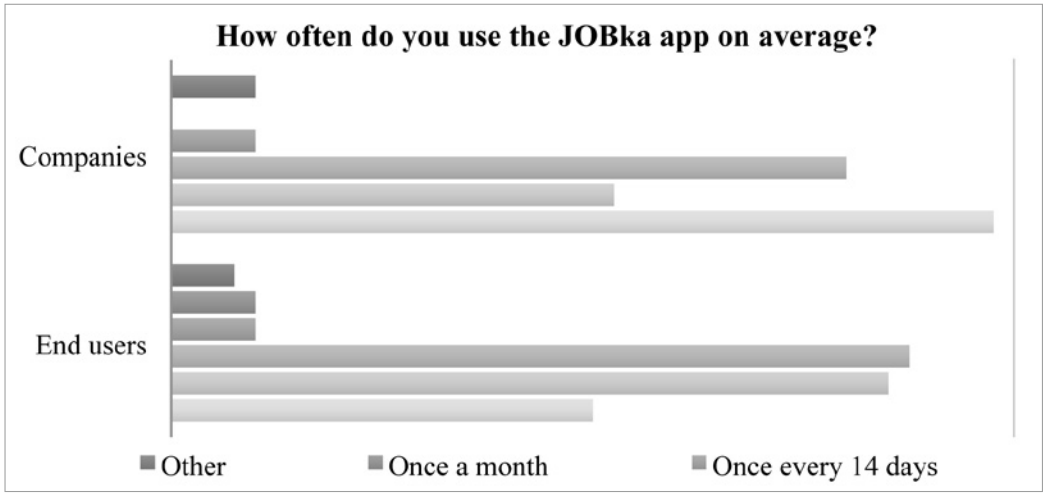

FIGURE 3: GRAPHICAL REPRESENTATION OF THE RESULTS RELATED TO THE FREQUENCY OF USE
SOURCE: AUTHORS

As the graph shows, companies used the app the most (on a daily basis). These are major companies with more than 500 employees. Conversely, the end-users mostly selected the 1-2 times a week option. A total of 162 employees (89%) visit the app at least once a week. 6 employees use the application once every six months or rarely.

Customer loyalty ——— Customer loyalty was measured using the NPS. Both company representatives and end-users rated the likelihood of recommending the company to their community. They had an 11-point scale at their disposal, where 0 = not at all likely and 10 = very likely.

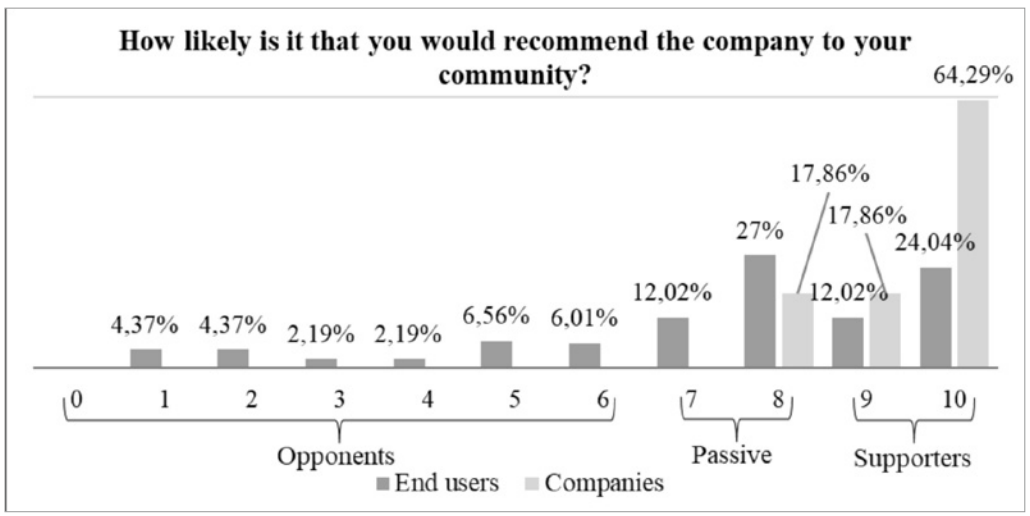

FIGURE 4: GRAPHICAL REPRESENTATION OF THE RESULTS RELATED TO THE LIKELIHOOD OF RECOMMENDATION
SOURCE: AUTHORS

As Figure 4 shows, end-users are represented in all groups, whereas company representatives are only part of the passive and supporters groups. The number of opponents among the end users is 47 (25.69%). Passive customers comprise the largest group, amounting to 38.25% (70 respondents). The supporters account for 36.07% (66 employees).

The results for company representatives indicate a substantial likelihood of recommendation. 82.14% of them (23 respondents) qualify as supporters. The remaining 17.86% of respondents, i.e., five companies, are passive customers.

3.4 NPS calculation ——— As noted above, the NPS value can be calculated as the difference between the proportion of supporters and the proportion of opponents, as shown in Table 1.

Net Promoter Score	Company end-users		Companies (application administrators)	
Supporters	66	36.07%	23	82.14%
Opponents	47	25.68%	0	0%
NPS	10.39		82.14	

TABLE 1: NPS CALCULATION
SOURCE: AUTHORS

The NPS for JOBka Services, s. r. o. is 10.39 and 82.14. The overall value of 10.39, which is essentially a good score, is based on the likelihood of recommendation by the end-user. The outstanding score of 82.14 describes the likelihood of recommendation by companies. It is made up of supporters only.

3.5 Assessment of research hypotheses ——— The research includes three proposed hypotheses about the relationship between variables based on the European model of customer satisfaction and variables concerning the effectiveness of the customer's business. The variables are: the assessment of the mobile application, the product impact on customer business efficiency, employee attitude, and the loyalty assessment. The hypotheses will be confirmed or rejected on the basis of the data provided by the respondents in the questionnaire survey.

The associations between the variables are investigated using Spearman's correlation coefficient, which helps determine the relationship between ordinal variables.

H1: There is a relationship between the application ratings and user loyalty.

The hypothesis was tested using data obtained from the application end-users. In particular, the answers to the question about the mobile application assessment, and the question concerning the level of customer loyalty, were used.

Variables (N = 183)	Appearance x Loyalty	Arrangement x Loyalty	Content x Loyalty	Speed x Loyalty	Module functionality x Loyalty
Spearman's ρ	0.474879	0.340932	0.316380	0.346963	0.148442
t(N-2)	7.259627	4.879095	4.486953	4.977096	2.019462
p-value	0.000000	0.000000	0.000000	0.000000	0.000000

TABLE 2: RELATIONSHIP BETWEEN THE APPLICATION RATINGS AND USER LOYALTY
SOURCE: AUTHORS

Table 2 shows the relationship between the variables. Spearman's ρ determining the relationship between loyalty and individual variables (appearance, arrangement, content, and speed) indicates a moderate increasing monotonic correlation between them. The correlation between loyalty and module functionality, where ρ came out just under 0.15, is low. Based on the p-values of less than 0.05 for all correlations, H1 can be fully confirmed.

Contingency table 3 shows that supporters most frequently rated all components of the mobile application as „outstanding". The sum of the individual factors varies as some respondents did not rate the respective components.

How would you rate the mobile application?	Opponents (0-6)	Passive (7-8)	Supporters (9-10)	Total
Outstanding	13	34	46	93
Very good	13	29	19	61
Average	18	4	0	22
Below average	3	2	0	5
Failure	0	2	0	2
Appearance total	**47**	**71**	**65**	**183**
Outstanding	10	24	44	78
Very good	15	41	21	77
Average	13	2	0	15
Below average	9	2	0	11
Failure	0	2	0	2
Arrangement total	**47**	**71**	**65**	**183**
Outstanding	8	19	44	71
Very good	8	34	21	63
Average	18	14	0	32
Below average	9	0	0	9
Failure	2	2	0	4
Speed total	**45**	**69**	**65**	**179**
Outstanding	8	20	49	77
Very good	10	39	14	63
Average	13	6	2	21
Below average	12	2	0	14
Failure	2	0	0	2
Content total	**45**	**67**	**65**	**177**
Outstanding	8	29	46	83
Very good	16	32	19	67
Average	12	6	0	18
Below average	4	2	0	6
Failure	0	0	0	0
Module functionality total	**40**	**69**	**65**	**174**

TABLE 3: FREQUENCY OF RELATIONSHIP BETWEEN THE APPLICATION RATINGS AND USER LOYALTY
SOURCE: AUTHORS

H2: There is a relationship between the impact on company performance and the loyalty of the company representative.

The hypothesis was evaluated using data obtained from the application administrators. In this case, the answers to the question concerning the impact on company performance, and the answers to the question about loyalty, were used.
Based on the calculations of the Spearman coefficient in table 4, the associations between loyalty and cost and loyalty and employee satisfaction are virtually nonexistent as the values are close to 0. The Spearman's ρ values for the variables of loyalty, time, and employee turnover indicate a very small association between them. All four correlations are insignificant, as $p > 0.05$. Therefore, H2 is rejected. There is no relationship between the impact on company performance and the loyalty of the company representative.

Variables (N = 28)	Cost x Loyalty	Time x Loyalty	Satisfaction x Loyalty	Turnover x Loyalty
Spearman's ρ	0.005543	0.134286	- 0.040042	0.126597
t(N-2)	0.028264	0.690987	- 0.204338	0.650756
p-value	0.977668	0.495697	0.839681	0.520914

TABLE 4: RELATIONSHIP BETWEEN THE IMPACT ON COMPANY PERFORMANCE AND THE LOYALTY OF THE COMPANY REPRESENTATIVE
SOURCE: AUTHORS

H3: There is a relationship between meeting customer expectations and customer loyalty.

The hypothesis was tested using questions from the application administrator questionnaires. The data is based on the answers to the question „Has the JOBka application met your expectations?“ and the question concerning loyalty. As can be seen in table 5, the association between loyalty and meeting expectations is insignificant, with $p > 0.05$. Thus, H3 is rejected, There is no relationship between meeting expectations and customer loyalty.

Variables (N = 28)	Meeting expectations x Loyalty
Spearman's ρ	- 0.11206
t(N-2)	- 0.57501
p-value	0.57023

TABLE 5: THE RELATIONSHIP BETWEEN MEETING EXPECTATIONS AND CUSTOMER LOYALTY
SOURCE: AUTHORS

4 Discussion and implications ——— In most cases, the questions were assessed positively. The JOBka application fully met the companies' expectations 50% of the time. Only two respondents indicated that their expectations were not met. The mobile application has a mostly positive to significantly positive impact on employee satisfaction and time efficiency. It does not have an impact on employee turnover and company costs in particular.

Company employees gave more negative ratings than company application administrators. This may be due to the fact that the end users are not in direct contact with JOBka Services, s. r. o. and can only voice their complaints through reviews in the App Store, Play Store or within the My JOBka World module. Or they communicate their complaints to their employer's application administrator and wait for the complaints to be forwarded to the consultants. The company's application administrators can directly contact the customer service department by phone or email, and receive more attention from the customer service department.

Customer loyalty also contributes to a positive assessment of the company. Company representatives have shown to be very loyal customers, with the NPS value amounting to 82.14 (23 supporters, 5 passive, and 0 opponents). Given the limited surveyed sample (60 firms), with almost half of them responding, the NPS value is based on only 18% of all the company's client firms. The NPS related to end users is significantly lower at 10.39. The number of loyal customers is 66. The smallest group is the group of opponents (47). However, this represents more than a quarter of the employees, and unless passive customers (comprising the largest group of 70 employees) are included in the NPS calculation, the NPS value is low.

The next step was to test the hypotheses. Only hypothesis 1 demonstrated the existence of a relationship, which concerned the association between customer evaluation of the mobile application and customer loyalty. In this case, only individual features of the application were evaluated. Appearance, overview, content and speed represent a moderate association relative to loyalty. The correlation between module functionality and loyalty is low to moderate. Hypothesis 2 is rejected. There is no relationship between customer loyalty and the impact on the company's performance. Hypothesis 3 is rejected, too. The relationship between loyalty and meeting customer expectations cannot be confirmed.

Most of the respondents were satisfied or rated the product and services favourably. However, the results show that the company received worse ratings from end-users in companies. As mentioned above, employees are unable to contact the customer service centre directly, which may be the main reason for the lower level of satisfaction. The company should focus more on the users, for example, by conducting regular satisfaction surveys that would include mostly open-ended questions concerning the application's issues and allow the users to share suggestions for improvements and innovations, enabling them to participate in product development. Alternatively, an in-application module could provide mobile and electronic contact to a consultant assigned to the company, or this issue could be handled by a call centre that would be available to end users. Based on extensive research involving a total of 1,692 respondents, Gansser, Bossow-Thies and Krol (2021) demonstrate that trust in a supplier is key to developing and maintaining a long-term relationship. JOBka should continue building trust, both with application administrators and individual users through direct means of communication.

Kebab (2025) states that two key factors – „perceived usefulness and perceived ease of use“ – directly influence an individual's intention to use a given new technology. So, it is precisely these two characteristics that JOBka should focus on when marketing the application to end users.

Guo and Wang (2015) provide research-based managerial implications for B2B enterprises regarding strategies for market focus implementation related to successful customer relationship management. They identify competitor focus as a factor that exerts a stronger impact on customer satisfaction than customer focus. Consequently, we recommend that JOBka keeps assessing its competitors and clearly differentiates itself to its customers, which has a demonstrably positive impact on customer satisfaction.

In the future, this research can be expanded to include other B2B sectors in order to validate the present findings in different industries. It is also advisable to assess the impact of moderating variables. This research can provide guidance to other technology and/or service providers in the B2B market on how to assess customer satisfaction and loyalty.

5 Conclusion ——— Satisfaction and loyalty in the B2B market are key to the success of any business. This refers to the way companies maintain and strengthen their relationships with their customers, such as other businesses, organisations or institutions. Attracting and retaining satisfied and loyal customers can have a significant impact on the long-term growth and stability of a business. Customer satisfaction in the B2B market is primarily affected by trust in the business partner, communication, professionalism, product quality, and the terms of delivery. In addition, loyalty as the ultimate level of customer relationship is determined by an excellent customer experience, and additional value within the extended product, all of which can significantly distinguish the company from its market competitors. In order to achieve a high level of satisfaction and loyalty in the B2B market, it is important to regularly assess customer needs, monitor competition, and continuously improve products

and complementary services. It is equally beneficial to create personalised experiences and be flexible in accommodating individual client requirements. Investing in developing customer relationships and strengthening existing ones is key to sustaining long-term success in the B2B market.

The study examines customer satisfaction and loyalty in the B2B market, focusing on a technology company, JOBka Services,, s. r. o., which offers a mobile communication application. The research employs the NPS and the ECSI to assess customer relationships. Using questionnaires sent to 60 client companies and their employees, the study analyzed satisfaction, perceived value, service quality, and loyalty. Findings show that company representatives generally report high satisfaction and loyalty (NPS = 82.14), while end-users are more critical (NPS = 10.39). Factors such as trust, communication, product quality, and service personalization significantly influence satisfaction in the B2B context. Among the three hypotheses tested, only the one linking app rating with user loyalty was confirmed. The study concludes that B2B customer loyalty hinges on continuous product improvement, responsive service, and personalized client engagement. The study recommends expanding similar research across other industries for broader insights.

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Kľúčové slová | Key Words ——— B2B market, client requirements, customer loyalty, customer relationship management, customer satisfaction, European Customer Satisfaction Index, technological services | *B2B trh, požadavky klientů, loajalita zákazníků, řízení vztahů se zákazníky, spokojenost zákazníků, Evropský index spokojenosti zákazníků, technologické služby*

JEL klasifikácia | *JEL Classification* ——— M31, L86, D22

Résumé ——— ***Hodnocení spokojenosti a loajality na trhu B2B se zaměřením na poskytování technologických řešení***

Tento článek si klade za cíl představit výsledky výzkumu spokojenosti a loajality zákazníků na trhu B2B se zaměřením na poskytování technologických služeb ve vztahu k vybrané inovativní společnosti. Loajalita zákazníků je vrcholem všech aktivit v oblasti řízení vztahů se zákazníky (CRM). Jak loajalitu, tak spokojenost je třeba sledovat a měřit, aby bylo možné je vyhodnotit. Jedním z nástrojů pro měření loajality je metrika známá jako Net Promoter Score, kterou jsme použili v našem výzkumu. Spokojenost zákazníků se obvykle měří pomocí indexu spokojenosti zákazníků. Tento výzkum vychází z Evropského indexu spokojenosti zákazníků (ECSI), který je určen sedmi hypotetickými proměnnými či faktory ovlivňujícími spokojenost (image, očekávání, vnímaná kvalita produktu, vnímaná hodnota, reklamace), kumulativní spokojeností zákazníků a důsledkem spokojenosti – loajalitou zákazníků. Jak ukazují výsledky výzkumu, pro dosažení vysoké úrovně spokojenosti a loajality na trhu B2B je důležité pravidelně posuzovat potřeby zákazníků, sledovat konkurenci a neustále zlepšovat produkty a doplňkové služby. Spokojenost zákazníků na trhu B2B je především ovlivněna důvěrou v obchodního partnera, komunikací, profesionalitou, kvalitou produktu a dodacími podmínkami. Kromě toho je loajalita jako konečná úroveň vztahu se zákazníkem určena vynikajícím zákaznickým zážitkem, věrností a doplňkovými hodnotami v rámci rozšířeného produktu, což může společnost výrazně odlišit od jejích konkurentů na trhu. Tento výzkum se zaměřuje na mezeru ve výzkumu spokojenosti na trhu B2B, a to zejména v oblasti technologického průmyslu.

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NEW TRENDS OF MARKETING COMMUNICATION IN THE DIGITAL ERA OF TOURISM: TERRITORIAL DISPARITIES AND CURRENT CHALLENGES

Based on the theoretical context and analytical research, the study aimed to identify the level of use of digital marketing communication tools in the context of urban tourism development in the Slovak Republic, and to analyze possible barriers and disparities in their implementation in practice. The results of statistical hypothesis testing show that there is a statistically significant correlation between the level of use of digital marketing tools and the existence of barriers to the implementation of digital marketing tools in the development of tourism in the municipality. There is also a statistically significant correlation between the level of existence of barriers to the use of online communication tools and the approved budget for tourism. There are also significant disparities between the level of implementation of online marketing communication tools in the context of tourism development in local self-governments. According to respondents, the reason is insufficient financial resources for local self-governments, marketing skills of tourism workers, but also the level of use of new digital trends, such as artificial intelligence. In conclusion, it can be stated that the benefit of the processing of the presented study is the analysis of the implementation of digital marketing communication in terms of supporting the development of local tourism, supported by statistical and mathematical calculations of the level of their use in practice.

1 Introduction ——— Travel is constantly changing and developing dramatically, especially with the introduction of new technologies. From artificial intelligence, which personalizes visitors' experiences, to advanced applications for planning trips in some of the Slovak cities. That is why, even in the context of the growing use of information technology and geo-economic competition of European cities, the issue of more efficient and effective implementation of digital marketing tools in the context of local governments is increasingly coming to the forefront of scientific research. The main goal is to build their competitiveness in the field of tourism (Černá and Ližbetinová 2024). Municipalities are the pillars of tourism, because they provide a certain environment for visitors, and they also ensure the management and development of public spaces that are intended for tourist activities. Cities, as administrative and territorial units in European countries, have the opportunity to use many elements to achieve increased tourism development in the form of introducing an integrated approach to solving existing problems in their territory (Morrison 2013). The aim of the study is to identify the level of use of digital marketing communication tools in the context of the development of urban tourism in the Slovak Republic, and to analyze possible barriers and disparities in their implementation in practice. With the intention of putting theoretical insights into practice, the analytical part of the work defines the significance of digitalization for the field of tourism and the possibilities of using digital communication tools in the selected municipalities, which is followed by a descriptive analysis of primary data in the field of used online marketing communication tools and statistical verification of two established hypotheses.

2 Theoretical basis of the studied issue ——— The development of electronic business (e-Business) as the implementation of business processes, carried out using electronic information technology and systems, is undoubtedly related to the development of e-Tourism. The implementation of the purchase of services in tourism/choice of destination by consumers is carried out through electronic information technologies (Černá and Ližbetinová 2024). E-Tourism represents the use of information and communication technology within tourism as the implementation of the purchase of tourism services/choice of destination by consumers and therefore the use of electronic information technology, destination selection, search for accommodation facilities, reservations, payments, etc. The purpose of the research is to present a theoretical view and opinions of the professional community on the tasks and importance of implementing forms of online marketing communication in terms of building an effective tourist potential of local self-governments in Slovakia (Kumar et al. 2025).

Before defining the online marketing communication tools used in the tourism of the territory, it is necessary to realize the importance of digitalization of marketing and communication activities in the conditions of the territorial self-government (Kebab 2025). Digital marketing communication represents the way in which the local self-government communicates and builds a relationship with its customers. It is about clear and understandable communication towards the customer, as well as building the customer's opinion about the company (Gascó-Hernández and Torres-Corones 2009). Thanks to the online data that the local self-government has at its disposal (customer profiles, history of their transactions), it can more easily approach market segmentation and thus offer more personalized products, build a relationship with the public (residents and visitors) and motivate them to visit again (Lukáč and Halmo 2018).

One of the most striking new trends in tourism is digitalization (online reservations, flight tickets, accommodation, experiences) (Sutresno and Singgalen 2023). The proof is the fact that up to 60% of tourists prefer online reservations over traditional methods. This is mainly about convenience for customers and creating an agenda for entrepreneurs for innovative improvement of the customer experience. Information technologies are specific in regional tourism for their personalization and offering „tailor-made experiences“ (Daszkiewicz and Pukas 2016). Thanks to artificial intelligence, the creation of individual itineraries (preferences, interests and previous trips of customers) is the driving force for increasing customer satisfaction and optimizing costs for local self-governments in the field of tourism. It is the combination of digitalization and territory marketing that creates space for a complex ecosystem (data analysis, customer psychology and technology integration), i.e.

the use of advanced analytical tools (AI and Big data), for collecting and analyzing a large amount of information about your customers, adapting the advertising campaign and offers various options according to the preferences and needs of the target group (Sammy, Robinson and Oriande 2017).

Artificial intelligence is also used through Chatbots. It is a chat robot, the technology conducts a dialogue with people. They provide quick answers to travelers' questions, respond to the most common questions. The importance is in customer support and assistance with ordering/booking tickets, obtaining information about a given area, tips for trips and visiting tourist sites, etc. It can also be a personal assistant who suggests itineraries based on user preferences (Vangelov 2022). It is clear that 75% of young travelers use mobile applications to plan and book their trips, which creates a market for startups and innovative companies. The fundamental group of communication tools examined in the analytical part are the activities of local self-governments associated with communication in the digital space (Adinugraha 2022; Diedrich 2018).

According to the authors Castro, Silvia and Duarte (2017, p. 87), „digital marketing is a relevant channel for promoting the territory, with the website being the center of the entire digital marketing strategy, as it gathers all the information about the given region." However, the use of the website by municipalities itself is not the subject of the research. The research focuses on the implementation of new digital trends placed on city websites, such as Chatbots, virtual tours, online shopping/reservations, SEO search, Google Analytics 4, heat mapping, as well as the use of GoogleAds, Google Ranking, CRM (Customer Relationship Management), CMS (Content Marketing System) (Almeida, Santana and Moreno-Gil 2017). In addition to websites, local self-governments can also use other tools to increase effective online marketing communication. One of them is mobile marketing, which uses the functions of modern technologies, such as location services to obtain information about frequently visited places within the territory, mobile applications, digital regional/city maps, etc. Another effective tool is the creation and regular recording of podcasts published either on the website or on social networks (Fernández Cueria et al. 2022).

Another studied form of marketing communication is social media. They have changed the communication environment and have clearly influenced the online marketing communication of local self-governments, for which they are becoming one of the most common daily communication tools. Ryan et al. (2017, p. 121) state that „social networks are an umbrella term for web-based software and services that allow users to associate online and exchange information, discuss, communicate and participate in any form of social interaction". According to the authors Szromnik (2016), social media can be classified as any site that allows social interaction, while the study examines social networks: Facebook, Twitter, Whatsapp, Instagram, MySpace and LinkedIn; blogs, video blogs and microblogs (Twitter); discussion forums (Yahoo and Answers) and shared multimedia (YouTube) (Gburová 2017; Kočišová and Štarchoň 2023). Thanks to social media, local self-government representatives can communicate in various ways (status, video, reels - short videos, photos, invitations to events, online broadcasts, updates, news, etc.), and they generate new content that the public recommends, shares, checks and evaluates products/services, discusses current events and engages in hobbies and interests within the territory. Cooperation with macro and micro influencers is also becoming a trend (Gburová 2023; Reľovská and Štrbová 2021).

In connection with the analysis of the use of digital marketing communication in the tourism of the territory, the subject of the questionnaire survey within the framework is also the identification of barriers to its implementation. In the professional literature, we encounter several opinions on the reasons for the failure of the implementation of digital marketing activities in the tourism of the territory. The first aspect is the fact that there are a lot of disparities between local self-governments in the quality or absence of the development of a marketing/communication strategy for the territory, or their copying and repetition in individual periods (Halmo 2018). It may also be due to insufficient use of innovations within the framework of digitalization, lack of measurement and statistical analysis, inability to demonstrate return on investment in online marketing, lack of practice/experience of tourism workers with digitalization, as well as inadequate and insufficient approved budget reserved for the area of online marketing and communication activities of the local self-government (Gburová, Lukáč and Matušíková 2014).

Regional tourism organizations themselves obtain funds in various ways. One of them is subsidies from the Ministry of Tourism and Sports of the Slovak Republic. These are distributed based on a model related to the selected „accommodation tax". Organizations can obtain funds depending on how much accommodation tax was collected in their territory. The conditions for drawing subsidies from the state are firmly established. They are most often used for marketing activities, development of tourist products, infrastructure, strategy creation and organization of events. Another form is membership contributions from members (cities, municipalities, private tourism companies) who pay membership contributions. These contributions are a significant part of the budget and serve for current activities (operation or projects) (Dorázs 2023).

A significant part of the financing is own revenues, for example from the operation of tourist information centers, from the mediation of services (e.g. tours, guide services), the sale of advertising space, or from the sale of products, souvenirs, etc. Organizations also obtain funds through non-refundable financial contributions (grants). Organizations often apply for grants from domestic and foreign sources (e.g. The European Union) aimed at implementing projects in the field of tourism (Act No. 91/2010 Coll. on the Support of Tourism). Since there are 39 regional tourism organizations operating in the Slovak Republic, not all of them list the financial resources spent on marketing communication in their annual reports. Therefore, it is not possible to compare or analyze individual data based on secondary data.

In conclusion of the theoretical part, it can be stated that the use of marketing in the context of e-Tourism supports the promotion of parts of the destination that are less attractive, increases the evenness of use of the destination and its surroundings during and outside the seasons, thus creating sustainable tourism. It also involves preparing the visitor for a stay in the destination: transport, weather, cultural customs, ethics, possible visualization (virtual tour of the place and cameras that allow viewing certain attractions online) (Beresecká 2019).

3 Research methodology ——— The scientific study focuses on the analysis of the use of digital marketing communication tools in the conditions of local self-government. The purpose of the study is to define the online marketing communication of the surveyed local self-governments in effort to effectively increase their tourism potential and identify implementation disparities that occur in practice. The main

objective of the study is to identify the level of use of digital marketing communication tools in the context of urban e-Tourism in the conditions of the Slovak Republic, and to analyze possible barriers and disparities in their implementation. After defining the main objective, we set two research questions, which are followed by two hypotheses. We will statistically verify them in the third chapter.

The first research question is about the current factors that affect the level of use of digital marketing tools in the conditions of the studied local self-governments. In order to verify the established research question, the individual answers of the respondents will be numerically expressed on a statistical scale from 1 to 5. Verification of the established first hypothesis helps to further clarify the causes of the different use of digital marketing tools and at the same time presents a comparison of the statistical significance of the studied variables in comparison with other variables in the data matrix.

Research Question 1: What factors influence the level of use of digital marketing tools in the local self-government?

Hypothesis H1: There is a statistically significant relationship between the level of use of digital marketing tools and the size of the local self-government (by population).

The second research question examines the level of influence of current barriers in the implementation of online marketing communication tools in the studied local self-governments. We assume that the amount of financial resources that municipalities, cities and RTO have at their disposal to the greatest extent influence the above-mentioned implementation. Similarly, the statistical measurement of the second hypothesis will present the statistical significance of other variables – barriers.

Research Question 2: What is the level of influence of existing barriers in the implementation of online marketing communication tools in the local self-governments?

Hypothesis H2: There is a statistically significant relationship between the level of barriers in the implementation of marketing communication of the territory and the approved financial budget for the development of e-Tourism in the selected local self-government.

Object of research ——— The object of research is 141 local self-governments (cities) in the territory of the Slovak Republic. The choice of the object of research is influenced by the factor of homogeneity of local self-governments from the point of view of their institutional organization. Each local self-government, according to Act No. 91/2010 Coll. on the promotion of tourism, establishes a regional/county tourism organization at the local or regional level for activities related to the promotion and marketing of the given regional territory.

Selection of respondents ——— The basic set consists of a group of respondents, i.e. leaders in the field of tourism and marketing communication in local self-government in the conditions of the Slovak Republic. The research sample is selected by purposive sampling. These are managers/specialists working at the city office or in the OOCR, who are responsible for tourism management and related marketing and communication activities in the cities. Regional organizations are focused on supporting the activities of their members in the creation and implementation of concepts, assist in the creation of marketing and promotion of tourism, support the protection and preservation of natural and cultural heritage, and implement tourism development concepts. The organizations are also established with the aim of supporting and creating conditions for the development of tourism and protecting the interests of their members. They are established by at least five municipalities, whereas the total number of overnight visitors in accommodation facilities of these municipalities must reach at least 100,000 in the previous calendar year.

$$n = \frac{(z^2 \text{ x } p \text{ x } (1-p)) + e^2}{e^2 + z^2 \times p \times \frac{(1-p)}{344}}$$

FORMULA 1: CALCULATING THE RESEARCH SAMPLE SIZE
SOURCE: MELUŠOVÁ (2021)

Thanks to the above formula, we calculated the size of the research sample required to conduct a questionnaire survey. The population size (N) is 344 respondents. According to the calculation, a sample size of 193 respondents is required in the field of tourism.

Data collection ——— When collecting primary information, a qualitative survey technique is used in the form of a questionnaire survey in the period May – August 2025. The above technique serves to determine the level of use of digital marketing communication tools in local self-government, as well as to examine the digital skills of local tourism providers and to identify existing barriers and disparities in the implementation of digital marketing communication in the field of tourism. In order to address a larger number of respondents (local tourism providers), the survey is conducted using an online questionnaire. When processing individual responses from respondents and verifying the established hypotheses, the correlation analysis method is applied for quantitative evaluation of the obtained data using the statistical software IBM SPSS Statistics and Microsoft Excel software. Individual responses of respondents are coded within a data matrix created in Microsoft Excel software and for statistical measurement in the statistical software IBM SPSS Statistics.

As part of the interpretation of the research results and verification of all hypotheses, correlation and regression analysis is used. To determine the dependence test, statistical testing of the Pearson test will be used, according to which it is possible to determine the strength and type of observed dependencies between the researched phenomena. To define the correlatio2n relationship of variables, the correlation coefficient expressing the degree of linear dependence of the two researched variables will be used. Cohen interpreted the correlation coefficient as follows: a value in the interval 0.0-0.1 shows a trivial correlation; 0.1-0.29 a small correlation; 0.3-0.49 a medium correlation; 0.5-0.69 a large correlation; 0.7-0.89 a very large correlation and 0.9-1.0 an almost perfect one. However, it should be noted that a minus value represents an inverse proportionality (from -1 to 0), while a plus value represents a direct proportionality (from 0 to 1). In order to maintain the reliability of the correlation analysis performed, a value of 0.5 will be set. This is a regression analysis that provides a numerical verification of the statistical significance of the dependence of the two variables under investigation (Budíková and Železňáková 2018).

4 Analysis of the implementation of digital marketing in the context of tourism development of the studied municipalities ——— The fourth chapter presents the results of the analytical part in the context of the evaluation and interpretation of the questionnaire survey results. 205 respondents participated in the survey. The obtained primary data are presented in a graphical representation with a similar numerical expression. The second part of the third chapter shows the statistical verification of two established hypotheses. The statistical software IBM SPSS Statistics and Microsoft Excel were used to obtain the results.

4.1 Results of the survey ——— The analytical part evaluates the number of years of service and the number of years of experience in the field of tourism of respondents in individual local self-governments. In the questionnaire, respondents indicated the numerical value of the number of years of service, which were subsequently classified into three groups. In total, 55 respondents indicated the first group of years of service (0-4), 96 respondents have been working in their job for five to nine years, and 54 respondents have been working in their position for more than 9 years. Respondents also answered which category according to size (number of inhabitants) the local self-government in which they work belongs. 23 respondents work in a local self-government with less than 4,999 inhabitants, 52 respondents in a local self-government with 5,000 to 9,999 inhabitants, 59 respondents in a local self-government with 10,000 to 19,999 inhabitants, and 71 respondents in a local self-government with over 20,000 inhabitants.

In Figure 1, it is possible to see the level of digital skills within the work activities of the respondents (Hatňaková 2020). In the questionnaire survey, the respondents assigned levels from 1 to 5 in scale questions (where 1 means the least used, 5 the most used), which were averaged into the resulting numerical value according to the size of the local self-governments.

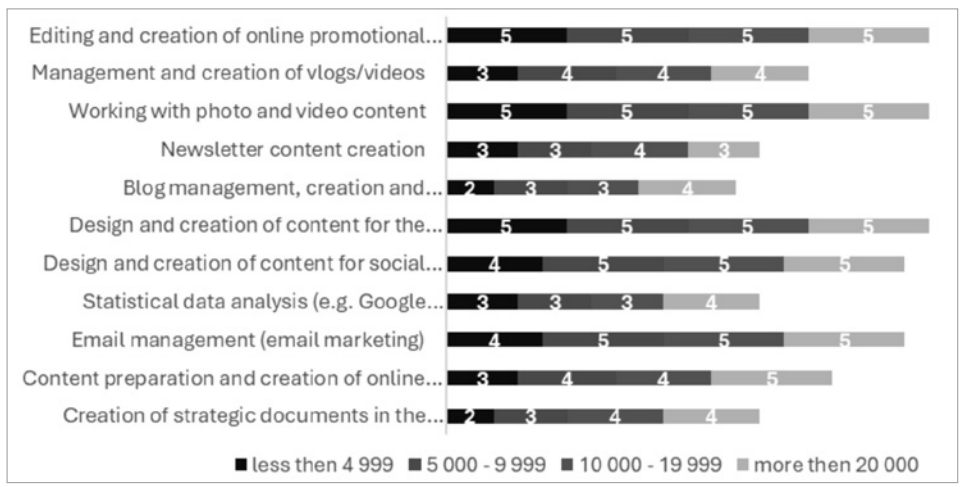

FIGURE 1: LEVEL OF DIGITAL SKILLS WITHIN THE WORK ACTIVITIES OF RESPONDENTS
SOURCE: AUTHOR

The respondents' statements in Figure 2 illustrate the level of use of digital tools in the context of supporting tourism development in the surveyed municipalities. Respondents stated that Microsoft Office tools, content marketing (CRM) tools, as well as the use of SEO optimization in connection with the website are the most implemented.

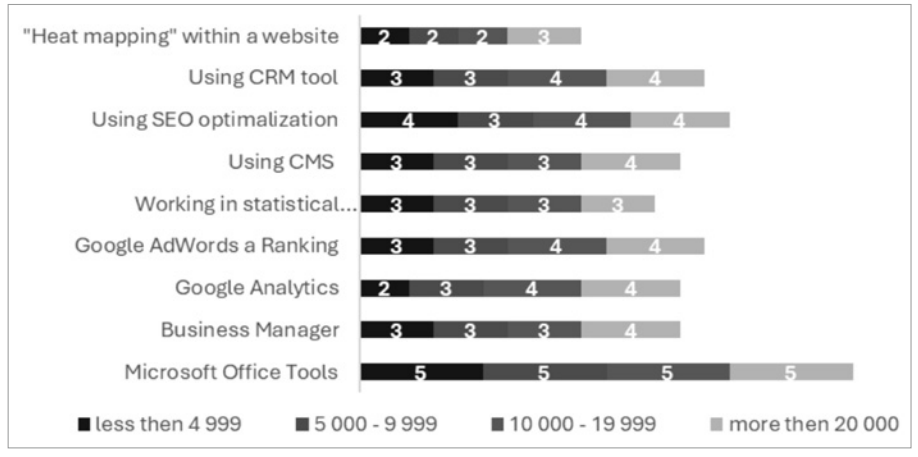

FIGURE 2: LEVEL OF USE OF MARKETING DIGITAL TOOLS
SOURCE: AUTHOR

Figure 3 shows that there are significant disparities in the implementation of digital marketing tools by respondents in support of tourism development in the surveyed municipalities. It is clear that municipalities with over 20,000 inhabitants use digital tools to a greater extent, which require a higher level of digital skills from their users.

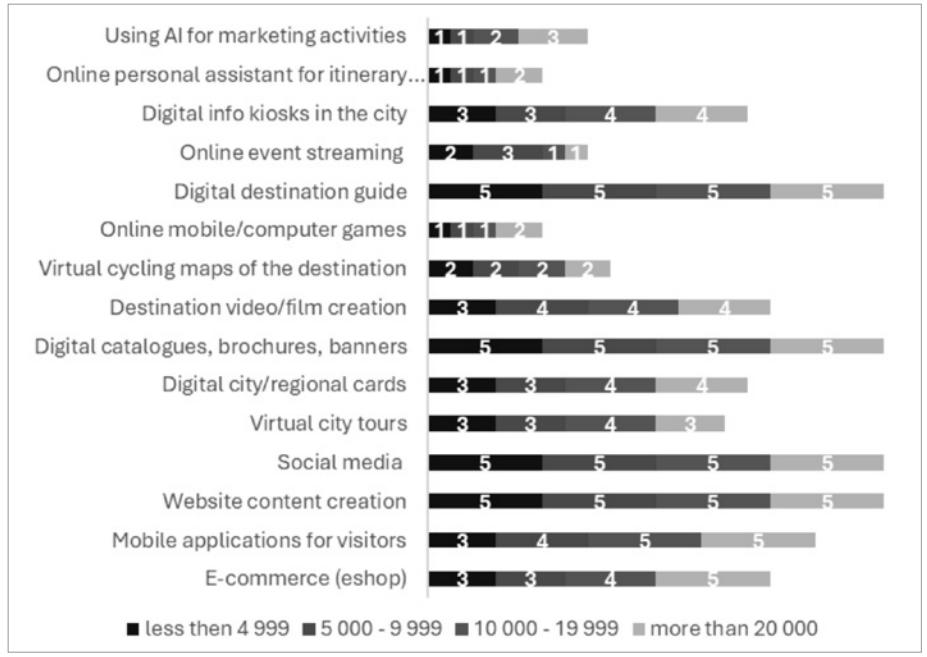

FIGURE 3: LEVEL OF USE OF DIGITAL MARKETING TOOLS
SOURCE: AUTHOR

From Figure 4 it is clear that the level of use of online communication tools with visitors in individual municipalities represents different results among respondents. Respondents mostly use the website, social networks such as Facebook and Instagram or e-mail communication for online communication with visitors. On the contrary, the least used are the social networks TikTok, X and Threads, as well as the creation of podcasts.

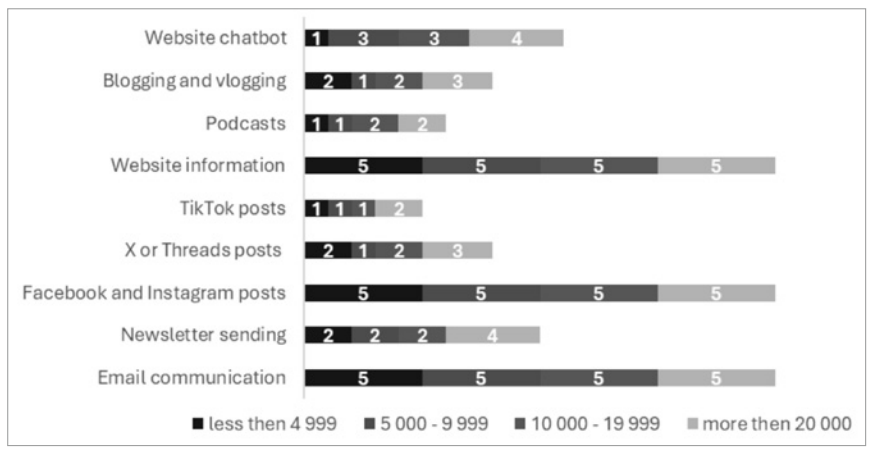

FIGURE 4: LEVEL OF USE OF ONLINE COMMUNICATION TOOLS
SOURCE: AUTHOR

According to Figure 5, the level of perception of barriers in the implementation of forms of digital tourism marketing by respondents is assessed.

FIGURE 5: LEVEL OF PERCEPTION OF BARRIERS IN IMPLEMENTING FORMS OF DIGITAL MARKETING
SOURCE: AUTHOR

The results of the questionnaire survey clearly show that the size of the municipality in terms of population has an impact not only on the marketing skills of respondents as carriers of online digital marketing in the conditions of local self-government, but also on the level of use of digital marketing communication tools. Respondents further state that the biggest barrier is considered to be insufficient financial resources approved in the city budget, as well as the absence of development of strategic documents related to the implementation of digital marketing communication, in order to promote their territory. The following part of the third chapter presents the results of statistical verification of two established hypotheses.

4.2 Testing of hypotheses ——— The second part of the analysis is a correlation analysis carried out in the statistical software IBM SPSS Statistics with the aim of verifying two established hypotheses and answering the research questions. Within the framework of research question 1: What factors influence the level of use of digital marketing tools in local self-government? variables „level of use of digital marketing tools“ and „existence of barriers to the implementation of digital marketing tools in the context of supporting tourism development“ are statistically analyzed through hypothesis H1. Table 1 shows the data matrix with the results of the correlation analysis of the investigated variables „level of use of digital marketing tools“ and „existence of barriers to the implementation of digital marketing tools“.

	Level of use of digital marketing tools	Existence of barriers to DMN	Digital marketing skills	Number of years of experience (tourism sector)	Number of years worked in a given position	Size of the municipality (number of inhabitants)
Level of use of digital marketing tools	1					
Existence of barriers to DMN	**0.793483**	1				
Digital marketing skills	0.705196	0.437285	1			
Number of years of experience (tourism sector)	0.585003	0.248489	0.743992	1		
Number of years worked in a given position	0.448869	0.143748	0.696203	0.128479	1	
Size of the municipality (number of inhabitants)	0.627105	0.743895	0.719047	0.327904	0.190478	1

TABLE 1: CORRELATION ANALYSIS DATA MATRIX – HYPOTHESIS H1
SOURCE: AUTHOR

The results in the correlation matrix (Table 1) show that there is a statistically significant relationship between the level of use of digital marketing tools and the existence of barriers to the implementation of digital marketing tools in the development of tourism in self-government. The result of the correlation analysis of the variables under study is the value of 0.793483 (Correlation coefficient – Pearson's „R“). This is a significant linear dependence. The strength of the relationship between the variables is represented by the coefficient of determination, which can be obtained after exponentiating „R“ under the equation R2 = 0.630. This means that the practical experience of employees of self-governing regional offices affects their marketing skills

by 63.00%. From the above, it follows that the first hypothesis was confirmed, because statistical significance represents a linear dependence. Hypothesis H1 was confirmed because the impact values of the investigated variables, resulting from the correlation analysis, reach a value in the range of 0.7 to 0.9 and this is a very large correlation.

Research question 2: What is the level of influence of existing barriers in the implementation of online marketing communication tools in the studied local self-governments? deals with the examination of barriers that influence the level of use of online marketing communication tools in the studied local self-governments in the context of tourism development. It will be examined through hypothesis H2. Within the framework of research question 2, the possible variables „level of barriers in the implementation of marketing communication of the territory" and „approved financial budget for the development of e-Tourism in the studied local self-government" are statistically analyzed through hypothesis H2. Table 2 shows a data matrix with the results of the correlation analysis of the studied variables.

	Use of marketing communication	Absence of strategic documents	Digital skills of employees	Approved budget (tourism sector)	Number of years of experience (tourism)	Absence of use of innovations
Use of marketing communication	1					
Absence of strategic documents	0.397461	1				
Digital skills of employees	0.637941	0.226747	1			
Approved budget (tourism sector)	**0.874285**	0.486361	0.115683	1		
Number of years of experience (tourism)	0.458942	0.335710	0.613605	0.095535	1	
Absence of use of innovations	0.686327	0.167842	0.763584	0.887346	0.268427	1

TABLE 2: DATA MATRIX OF CORRELATION ANALYSIS – HYPOTHESIS H2
SOURCE: AUTHOR

Based on the correlation analysis (Table 2), it can be stated that there is a statistically significant relationship between the level of existence of barriers in the use of online communication tools and the approved budget for the tourism sector. Their correlation coefficient shows the value R = 0.874285. The correlation coefficient (Pearson's „R") is calculated using the software IBM SPSS Statistics. The strength of the relationship between the variables is represented by the coefficient of determination, which can be obtained after exponentiating „R" under the equation R2 = 0.764. This means that the level of the existing barrier (approved budget for the tourism sector) affects the level of use of marketing communication tools in the context of e-Tourism development in the monitored territories by 76.40%. Hypothesis H2 was confirmed because the values of the influence of the investigated barrier on the level of use of marketing communication, resulting from the correlation analysis, reach a value in the range of 0.7 to 0.9 and this is a very large correlation. In conclusion of the third chapter of the study, it can be stated that both hypotheses were confirmed and there is a statistically significant connection between the variables.

5 Discussion: Theory vs. practice ——— Despite the fact that the studied territorial units are located in different competitive environments with different levels of digital marketing skills of respondents, the level of implementation of the digital communication mix and with different levels of perception of existing barriers, it is possible to propose a generally valid model of marketing management of the territory. For the development of e-Tourism of the studied self-governing units, it is necessary that they have a strategy defining all planned phases of the implementation of online marketing communication for a specified period. The concept of online marketing communication management should assume a wide range of target recipients which are, in addition to visitors, the city's permanent residents themselves, citizens living in the region, citizens commuting to the region/city for work (domestic and foreign) or education (secondary school and university students).

With foreign visitors as target groups, it is necessary to use online direct marketing activities as effectively as possible. It is appropriate to use artificial intelligence to optimize offers, introduce chatbots, launch mobile applications, etc. In order for the recommendations in terms of implementing the proposals to become effective in practice, it is necessary to define a working group participating in the creation of a communication strategy consisting of the public, private and non-profit sectors. It is necessary to define their position and tasks, maintain regular communication, systematically increase the level of marketing skills of actors and proceed according to the pre-determined phases of the online marketing communication management process. The result would be the removal of possible existing barriers, the development and subsequent implementation of a strategy. However, it is necessary to adapt the individual steps of the process to your conditions, the current competitive position of local self-governments and take into account your own financial, personnel and material and technical resources.

The study focused on the use and statistical analysis of the level of use of digital marketing communication tools in the development of tourism in local self-government reflects some limitations. The first of these is the absence of employees of municipal and city offices for the field of tourism. Most municipalities in Slovakia do not have sufficient financial resources to employ employees, whether for the field of tourism, culture, municipality, strategic manager, etc. For this reason, we can also perceive the individual answers of respondents regarding the development of tourism not entirely correctly. In most municipalities, activities related to digital marketing communication of the municipality are carried out by the mayor of the municipality himself, or by a worker authorized for this. Another limitation of the study is the available data that individual respondents in the tourism development sector have. As mentioned above, there are significant differences in the use of statistical analyses and tools for efficient and effective data collection related to website traffic, the use of individual social networks or the implementation of artificial intelligence.

An equally important limitation of obtaining relevant data is the uneven use of financial resources for digital marketing communication of activities of municipalities and cities related to the development of tourism in their territory. This creates space for further research activities aimed at identifying state financing of municipalities and cities, possibilities of obtaining non-recurring financial resources, or the financing of regional tourism organizations themselves. The activities of the aforementioned organizations encounter a significant problem, which is the imple-

mentation of the projects themselves, for example, financed from state subsidies, which cannot cross the borders of the territory in which the organizations carry out their activities.

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Kľúčové slová | Key Words ——— digital marketing communication, new trends of e-tourism, actors of local government, barriers of implementing digital marketing communications, local government financing | *digitálna marketingová komunikácia, nové trendy v e-turizme, aktéri miestnej samosprávy, bariéry implementácie digitálnej marketingovej komunikácie, financovanie miestnej samosprávy*

JEL klasifikácia | *JEL Classification* ——— C12, M31, M39

Résumé ——— ***Nové trendy marketingovej komunikácie v digitálnej ére turizmu: Územné disparity a aktuálne výzvy***

V súčasnosti možno sledovať zvyšujúci sa význam miestnych samospráv v otázke rozvoja turistického potenciálu svojho územia. Stávajú sa tak pilierom turizmu, pretože tvoria atraktívne prostredie pre návštevníkov, taktiež zabezpečujú správu a rozvoj verejných priestorov, ktoré sú nevyhnutné pre turistické aktivity. Mestá, ako správne a územné celky v európskych krajinách, majú možnosť využiť mnohé prvky k dosiahnutiu zvýšenia rozvoja turizmu v podobe zavedenia integrovaného prístupu k riešeniu existujúcich problémov na svojom území. Cieľom štúdie je identifikovať úroveň využívania digitálnych nástrojov marketingovej komunikácie v kontexte rozvoja mestského turizmu v podmienkach Slovenskej republiky, resp. analyzovať možné bariéry a disparity ich implementácie v praxi. S úmyslom premietnuť teoretický náhľad do praxe je v analytickej časti práce definovaný význam digitalizácie pre oblasť turizmu a možnosti využívania digitálnych komunikačných nástrojov v skúmaných samosprávach. Na ne nadväzuje deskriptívna analýza primárnych dát v oblasti využívaných nástrojov online marketingovej komunikácie a štatistické overenie dvoch stanovených hypotéz.

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BREAKING THE MICRO-AGENCY ASSESSMENT BOTTLENECK: EMBEDDED ANALYTICS FOR E-COMMERCE PORTFOLIO MANAGEMENT. PART I.

Micro-agencies specializing in WooCommerce services must manage many small client projects with limited resources, so profitability depends on maximizing throughput. This study conceptualizes the Micro-Agency Assessment Bottleneck (MAB) as the constraint in the initial client assessment phase, spanning data collection, cleaning, segmentation and reporting, that restricts agency capacity and delays value delivery. We evaluate ClientRank, a lightweight embedded analytics plugin for WooCommerce that automates this workflow by leveraging native transactional data and a standardized Recency, Frequency, Monetary (RFM) pipeline with K-means clustering. The tool was deployed and tested in a real-world micro-agency setting, with process metrics monitored before and after implementation. Results show a radical improvement in operational performance: Time-to-Assessment (TTA) is reduced by around 90% (from 13.5-24.5 to 1-2 days) and the client Dependency Index (DI) is effectively eliminated. These findings demonstrate how embedded analytics can break the assessment bottleneck, unlock latent agency capacity, and support new business models based on service-level agreements and throughput-oriented pricing. The study offers a replicable, low-friction design for micro-agencies seeking to scale e-commerce services while improving service quality and speed.

1 Introduction ——— Micro-agencies, small specialized firms that manage portfolios of numerous e-commerce clients, operate in environments where volume is high, margins are thin, and slack capacity is minimal (Nikunen et al. 2017). Their competitiveness depends on turning around small projects quickly and predictably, since each extra day before the first value-adding action dilutes margins across the book of work. Classic operations research shows that in such systems throughput is dominated by the most constrained stage; when capacity buffers are limited, delays at the constraint propagate and destabilize the schedule (Cagliano et al. 2001).

For micro-agencies, the first contact with a new client triggers a cascade of tasks: extracting data, cleaning them, running a baseline analysis, and drafting a brief. If that cascade is fragile or client dependent, end-to-end capacity stalls. Because micro-agencies often serve Small and Medium-sized Enterprises (SMEs) with heterogeneous data practices and limited internal expertise (Wymer and Regan 2005), they must complete onboarding frequently and reliably to survive. A systematic way to compress, standardize and de-risk the early assessment therefore matters for both project economics and business model viability.

We term this constraint the Micro-Agency Assessment Bottleneck (MAB): the recurrent, high-friction cluster of tasks required to assemble a strategic baseline before campaign or product work can proceed. In its manual form the MAB consists of three steps. First, the agency requests, receives and validates client files. Second, analysts perform exploratory data analysis with ad hoc tools and heuristics. Third, the team produces a preliminary report that is sufficiently standard to share and discuss. The first step is often the most fragile, since the agency clock runs while teams wait for a clean, complete export of transactions and customer records. This dependency injects variability and idle time, reduces throughput and makes staffing forecasts unreliable.

We capture these effects with two practitioner metrics. Time-to-Assessment (TTA) measures elapsed time from kick-off to delivery of the first assessment. The Dependency Index (DI) measures the share of that time lost while waiting for the client. From a Theory-of-Constraints perspective, the MAB is a service bottleneck: the most constrained stage sets the pace of delivery, and improvements elsewhere do not increase throughput unless the bottleneck is relieved (Reid and Cormier 2003).

Prior research offers pieces of this puzzle but rarely a provider side, operational view that micro-agencies can use to design their processes. Customer accounting clarifies why firms should measure value at customer or segment level and documents practices and obstacles related to using such information in decisions (Guilding and McManus 2002). Work on analytics adoption in SMEs highlights usability, data quality and resource constraints as major barriers and calls for lightweight solutions that minimize specialized skills and integration costs (Behl et al. 2019). In parallel, the RFM and clustering toolbox has proved effective and parsimonious for e-commerce segmentation, with elbow and silhouette methods providing practical model selection and validation (Tavakoli et al. 2018; Monalisa et al. 2019; Aslantaş et al. 2023).

However, three gaps remain. First, most studies examine client-side outcomes, such as what the merchant gains, rather than agency-side throughput, that is, what the supplier can deliver, how fast and how predictably. Second, metrics that capture the process economics of service delivery, like TTA and DI, are under-specified and seldom reported, which makes it hard to benchmark improvements or to design Service-Level Agreement (SLA) based offerings. Third, literature rarely presents embedded platform-native pipelines that eliminate the data hand-off by extracting, standardizing and segmenting data inside the e-commerce stack so that the agency can work without waiting for files.

This paper addresses these gaps with a real-world deployment of an embedded analytics plugin, ClientRank (clientrank.it 2025), that operates directly on WooCommerce. The design is intentionally lightweight and replicable for small teams. The plugin automates extraction from the store database, computes Recency, Frequency, Monetary (RFM) indicators, scales features, runs K-means clustering with elbow and silhouette diagnostics, and produces a compact reporting layer that summarizes trends and seasonality, device split, geographic concentration and a three cluster playbook. The same pipeline generates process evidence about the MAB through pre

and post maps of the assessment workflow and auditable timestamps for TTA and DI. The tool therefore combines a decision product for the client with a process instrumentation layer for the agency.

We frame the MAB as the pivotal constraint that keeps small, portfolio-driven e-commerce agencies from scaling and we operationalize it with TTA and DI, two metrics that can be computed from routine timestamps. Rather than proposing a heavyweight data science solution, we advance a lightweight embedded approach that runs where the data reside, standardizes extraction and RFM plus K-means segmentation and packages the outputs into a repeatable first week decision product. This provider side lens connects customer accounting concepts with the economics of service delivery and enables agencies to plan capacity, design SLA based offerings and iterate without bespoke data wrangling.

Accordingly, the study pursues three objectives: (1) to define and operationalize the MAB through TTA and DI metrics; (2) to evaluate the impact of an embedded analytics plugin on TTA and DI in a real micro-agency context; (3) to propose a replicable design pattern for embedded analytics that micro-agencies can adopt to standardize onboarding and scale e-commerce services.

These objectives are reflected in the following research questions:

• RQ1. How does an embedded analytics plugin that runs inside the e-commerce platform affect TTA and DI in a micro-agency setting?

• RQ2. To what extent can an embedded analytics pipeline turn ad hoc client onboarding into a predictable, time-boxed service that supports SLA-based and throughput-oriented business models?

Given the single-case design and process focus, the study does not test formal statistical hypotheses but addresses these questions through a pre-post comparison of process metrics and workflows.

2 Theoretical background ——— Our study draws on four complementary streams of literature: (1) the Theory of Constraints (TOC) applied to service operations, (2) the challenges of digital transformation and analytics adoption in SMEs, (3) the use of RFM analysis and clustering for e-commerce segmentation, and (4) customer accounting as a lens for customer level value assessment.

2.1 Theory of constraints in service operations ——— The TOC, originally developed by Goldratt (1984), explains how system performance is governed by its scarcest resource. TOC emphasizes identifying the primary bottleneck, subordinating other activities to it and then elevating its capacity as the main lever for improving throughput (Gupta and Boyd 2008). Although early applications focused on manufacturing, TOC has been extended to service operations, where bottlenecks often reside in knowledge work and information flows rather than in physical assets (Reid and Cormier 2003; Chakravorty and Atwater 2006; Bacelar-Silva et al. 2020). Recent work integrates TOC with digital transformation and dynamic capabilities, showing how constraints shape the value extracted from digital technologies (Hagan et al. 2024). In this perspective, the MAB is a knowledge intensive service bottleneck that limits the throughput of client assessments; breaking it allows micro-agencies to increase delivery capacity without proportional increases in resources.

2.2 SME digital transformation, embedded analytics, and adoption challenges ——— SMEs and micro-agencies face persistent obstacles in adopting digital technologies and analytics. While the potential benefits of digital transformation for competitiveness and innovation are well documented (Sagala and Őri 2024), smaller firms are constrained by limited financial resources, shortages of specialized skills and reduced absorptive capacity (Zamani et al. 2022). Evidence from emerging and transitional economies shows that even where public digital infrastructure is advancing, SME-level adoption can lag due to fragmented connectivity, financing gaps and skills mismatches, which questions the applicability of universal digital transformation models (Shima 2026). Case-based work on manufacturing firms highlights how adapting the marketing mix, strengthening digital presence and leveraging automation have become central to sustaining competitiveness (Kováříková et al. 2025).

These structural frictions on the client side compound the operational constraints of providers such as micro-agencies. Traditional business intelligence initiatives are often perceived by SMEs as too costly and complex, with long implementation cycles and high dependence on external experts (Sastararuji et al. 2022). Studies on human-AI collaboration in online marketing show how tools such as ChatGPT can alter perceived value and purchase intentions, reinforcing the need for accessible digital tools that integrate into existing workflows (Czuprak and Nemeth 2025). In response, recent research highlights embedded, real time analytics as a way to integrate analytical capabilities directly into operational processes and information systems, provided that organizations can identify suitable processes and value potential (Bender 2024; Iden and Bygstad 2024). For micro-agencies serving e-commerce clients, embedded analytics that run inside platforms such as WooCommerce can hide much of the technical complexity, reduce data hand offs and offer a more realistic path to analytics adoption. Our study positions the ClientRank plugin as such an embedded, lightweight solution that targets a specific bottleneck in the micro-agency workflow.

2.3 RFM and clustering for e-commerce segmentation ——— RFM analysis is a well-established, behavior-based approach for customer segmentation in the e-commerce domain. It summarizes customer purchase histories along three dimensions that are easy to compute and interpret: how recently a customer bought, how frequently they purchase and how much they spend (Christy et al. 2021; Alves Gomes and Meisen 2023). When combined with clustering algorithms such as K-means, RFM scores can be used to identify groups of customers with similar transactional patterns, supporting differentiated marketing actions including loyalty initiatives, cross selling campaigns and reactivation efforts (Tabianan et al. 2022; Wong et al. 2024). Elbow plots and silhouette scores provide practical diagnostics for choosing the number of clusters and validating segmentation quality.

For micro-agencies, the key advantage of RFM plus clustering is that it offers a standardized yet flexible template that can be applied across multiple client stores. A reusable segmentation pipeline reduces analyst discretion, increases comparability across projects and turns what is often treated as a bespoke analysis into a repeatable service component. In our study, this pipeline is implemented inside an embedded analytics plugin that runs on the client's e-commerce platform.

2.4 Customer accounting and customer level value assessment ——— Customer accounting shifts the unit of analysis from products to customers and emphasizes the importance of measuring customer profitability and managing the customer portfolio as a strategic asset (Guilding and McManus 2002). Not all customers contribute equally to profitability, and firms can create value by reallocating attention and resources across customer segments. Recent work calls for richer, data driven approaches to customer profitability analysis that combine revenue, cost and risk dimensions (Bordeleau 2025).

For agencies that support e-commerce SMEs, customer accounting principles translate into the ability to help clients understand which customer groups drive gross monetary value and which underperform relative to the resources they consume. Even when only gross monetary value is available, an RFM based segmentation can provide a foundation for more advanced profitability work. By delivering rapid, standardized customer insights, the agency can position itself as a strategic partner in value creation, while also building a data structure that is compatible with future extensions to net contribution analysis.

2.5 Research gap and positioning ——— Across these streams, several gaps remain that are directly relevant to micro-agencies. Most studies on analytics, customer accounting and digital transformation focus on client side outcomes, such as improved decision quality or firm performance, rather than on provider side throughput and capacity. The operational economics of service delivery for agencies, including how fast and how predictably they can assess new clients, are seldom measured or reported. The literature on SME analytics adoption and embedded analytics rarely describes platform native pipelines that run inside e-commerce systems and remove manual data hand offs between client and agency. There is also little work that defines and operationalizes process metrics such as TTA and DI for micro-agency assessment workflows.

This article addresses these gaps by framing the MAB as a TOC type constraint in service operations, by implementing an embedded analytics pipeline that runs directly on WooCommerce and by introducing a practitioner oriented measurement schema based on TTA and DI. Through a field deployment of the ClientRank plugin, we show how an embedded RFM plus clustering pipeline can both support customer level decision making and instrument the assessment process itself. These streams jointly inform our research design and the measures used in the empirical study.

END OF PART I.

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Kľúčové slová | Key Words ——— micro-agency, bottleneck analysis, theory of constraints, RFM segmentation, e-commerce, WooCommerce, time-to-assessment, dependency index | *mikroagentúra, analýza úzkych miest, teória obmedzení, segmentácia RFM, elektronický obchod, WooCommerce, čas potrebný na posúdenie, index závislosti*

JEL klasifikácia | *JEL Classification* ——— M31, L86, O33

Résumé ——— ***Prekonanie prekážky v podobe hodnotenia mikroagentúr: Integrovaná analytika pre správu portfólia elektronického obchodu. Časť I.***

Mikroagentúry špecializujúce sa na služby WooCommerce musia spravovať mnoho malých klientskych projektov s obmedzenými zdrojmi, takže ziskovosť závisí od maximalizácie priepustnosti. Tento príspevok vytvára koncept hodnotenia prekážok mikroagentúr (MAB) v podobe obmedzení, v počiatočnej fáze hodnotenia klienta, ktoré zahŕňa zber údajov, čistenie, segmentáciu a reporting, ktoré obmedzujú kapacitu agentúry a spomaľujú dodávanie hodnoty. V príspevku sa hodnotí ClientRank, ľahký integrovaný analytický plugin pre WooCommerce, ktorý automatizuje tento pracovný postup využívaním natívnych transakčných údajov a štandardizovaného prepojenia aktuálnosti, frekvencie a príjmov (RFM) s K-means zhlukovaním. Nástroj bol nasadený a otestovaný v reálnom prostredí mikroagentúry, pričom sa pred a po implementácii monitorovali metriky procesu. Výsledky ukazujú radikálne zlepšenie prevádzkovej výkonnosti: čas potrebný na posúdenie (TTA) sa skrátil približne o 90% (z 13,5-24,5 na 1-2 dni) a index závislosti klienta (DI) bol efektívne eliminovaný. Tieto zistenia demonštrujú, ako môže integrovaná analytika prekonať prekážku posudzovania, odhaliť skrytú kapacitu agentúry a podporiť nové obchodné modely založené na dohodách o úrovni služieb a cenách orientovaných na priepustnosť. Štúdia ponúka replikovateľný dizajn pre mikroagentúry, ktoré sa snažia rozšíriť služby elektronického obchodu a zároveň zlepšiť kvalitu a rýchlosť služieb.

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NEITHER BLEAK NOR STATIC FUTURE OF JOBS IN MARKETING AND SALES IN THE ERA OF TECHNOLOGICAL SHIFT

The global labor market is undergoing one of the most epochal transitions, driven by technological innovation, economic and geopolitical uncertainty, demographic change, and evolving consumer behavior. According to the Future of Jobs Report 2025 compiled by the World Economic Forum (WEF), nearly 170 million new jobs are projected to be created by 2030, even as 92 million positions are displaced, resulting in an expected net increase of 78 million jobs worldwide. These shifts underscore the dynamic future of work, including the field of marketing and sales, where roles and required skills are being reshaped by new digital tools, changing consumer behaviors, digital business models, and artificial intelligence (AI).

For more than a centennial period, marketing has been a core function in organizations: building brands, understanding consumers, and perpetuating demand. In the future, marketing roles will continue to evolve rather than vanish. For instance, jobs of Digital Marketing and Strategy Specialists are projected to experience growth, reflecting the ongoing importance of digital engagement and data-driven strategy in business models. Digital marketing professionals help organizations navigate a rapidly changing digital ecosystem blending analytics, creativity, and customer insights to reach audiences across diverse platforms.

In contrast, traditional Sales and Marketing Professionals have faced recent headwinds, with growth in this profession declining. WEF identifies the slower economic growth as a principal contributor to a decline across several job categories, including sales and marketing roles. Economic pressures lead some firms to reduce staff or streamline traditional functions in favor of digitalized or outsourced solutions. However, paradoxically, slower economic growth is also projected to drive growth in adjacent roles such as Sales Representatives and Business Development Professionals, particularly as firms (B2B-focused ones in particular) intend to capitalize on the human nature of (customer) relationships and pursue new levels of efficiency and novel avenues for revenue growth.

Despite fluctuations in specific job categories, marketing and media skills remain critically important across workforce. In the WEF's ranking of core skills for 2025, marketing and media skills appear among the top 20 skills employers consider essential. Notably, the top three skills identified in the report - analytical thinking, resilience, flexibility and agility, and leadership and social influence - reflect the types of abilities that marketing professionals have long cultivated. These skills support evidence-based decision-making, effective team management, and adaptive (fast) responses to change, all of which are essential for success in a marketing and/or sales career.

Beyond the ten fastest-growing skills, design and user experience, along with marketing and media skills, are also expected to gain importance, largely driven

by ongoing technological advancements. This trend reflects organizations' growing need to deliver seamless, engaging digital experiences and to better understand evolving consumer behavior in an increasingly online (business) environment. Marketing professionals who are capable to integrate creative storytelling with responsive, user-centered digital design will therefore be in high demand, particularly as customer and user experience become among the last remaining meaningful differentiators in highly competitive markets.

The WEF report also highlights the prominence of engagement skills, which include marketing and media, alongside service orientation and customer service. These skills are critical for building lasting relationships with customers and delivering value through meaningful interactions. In an era where customer expectations are rapidly evolving, engagement skills help professionals craft authentic brand experiences, navigate complex offerings, and strengthen loyalty - roles that automation alone cannot fulfill.

One of the most obvious and recently debated aspects of the future labor market is the impact of generative AI. On the one hand, AI tools can perform tasks traditionally done by marketers - from generating content, performing easy creative tasks, and optimizing ad campaigns to analyzing large datasets. This has led some to speculate that marketing and media skills could be partially substituted by generative AI in the near future. Indeed, certain routine or repetitive marketing tasks may be automated (as ever), prompting concern about job displacement.

On the other hand, AI also presents opportunities for marketing professionals to augment their work and to elevate its quality and effectiveness. By leveraging AI for deep customer insights, marketers can focus on higher-order tasks - strategic thinking, brand innovation, and human-centered storytelling - that are less susceptible to automation. In this sense, AI can be a powerful tool when combined with uniquely human skills such as empathy, creativity, and leadership. This hybrid approach is increasingly valued by employers who emphasize adaptability, curiosity, and continuous learning.

Marketing and sales professionals must continuously update their skills to stay relevant - whether that means mastering new digital platforms, understanding shifts in consumer psychology, or integrating emerging technologies. Moreover, multilingualism (as a proxy for multiculturalism) is highlighted in the report as an asset, particularly in de-globalized markets where cultural understanding and cross-border communication are crucial.

The future of jobs in marketing and sales is neither bleak nor static; rather, it is dynamic and multifaceted. Although some traditional roles may contract due to economic pressures or automation, new opportunities will arise in areas such as digital marketing, strategic roles, and customer experience management. Marketing and media skills remain essential not only within specific occupations but also as part of the broader set of transversal competencies increasingly valued by employers. Success in this evolving landscape will depend on adaptability, continuous learning, and the ability to combine human judgment with technological proficiency. Marketing professionals who embrace and develop these capabilities will be well positioned to thrive in the future world of work.

Résumé ——— ***Budoucnost pracovních pozic v marketingu a prodeji v době technologických změn: Ani bezútěšná, ani statická***

Budoucnost pracovních pozic v marketingu a prodeji v kontextu zásadních proměn globálního trhu práce je popisována v pravidelných zprávách Světového ekonomického fóra, které jsou publikovány pod názvem Future Jobs Report. Navzdory ekonomické nejistotě, digitalizaci a nástupu generativní umělé inteligence není výhled pro profesní uplatnění v marketingu a prodeji nijak pesimistický. Současná dynamická transformace trhu práce se projevuje mj. růstem počtu pracovních míst v oblasti digitálního marketingu a strategie a narůstajícím významem marketingových a mediálních dovedností jako klíčových přenositelných kompetencí. Narůstá role analytického myšlení, odolnosti, leadershipu, dovedností v oblasti zapojení zákazníků a schopností zaměřených na zákaznickou a uživatelskou zkušenost. Umělá inteligence potenciálně nahrazuje či usnadňuje rutinní činnosti, přičemž zároveň uvolňuje kapacitu pro činnosti s vyšší přidanou hodnotou a/nebo činnosti s nutným rozměrem mezilidské interakce.

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DICTIONARY OF USEFUL MARKETING TERMS o

outdoor advertising | *vonkajšia reklama* ——— Outdoor advertising, such as billboards, remains popular in urban areas. | *Vonkajšia reklama, ako napríklad billboardy, ostáva populárna v mestských oblastiach.*

outlet | *outlet, predajňa, výpredajové centrum* ——— The company opened a new outlet store to sell discounted products. | *Spoločnosť otvorila novú outletovú predajňu, v ktorej predáva zlacnené produkty.*

out-of-date | *zastaraný* ——— The website design looked out-of-date compared to their competitors. | *Dizajn webovej stránky pôsobil zastarane v porovnaní s ich konkurenciou.*

out of stock | *vypredaný* ——— The bestseller was out-of-stock just a few hours after launch. | *Bestseller bol vypredaný už niekoľko hodín po uvedení na trh.*

output | *výstup* ——— The team measured the creative output of the new advertising campaign. | *Tím meral kreatívny výstup novej reklamnej kampane.*

outsell | *predbehnúť v predaji* ——— The new smartphone managed to outsell all previous models in record time. | *Nový smartfón dokázal predbehnúť v predaji všetky predchádzajúce modely v rekordnom čase.*

overestimate | *nadhodnotiť* ——— Companies sometimes overestimate the impact of social media campaigns. | *Spoločnosti niekedy nadhodnotia vplyv kampaní na sociálnych sieťach.*

overspend | *míňať príliš veľa* ——— The brand began to overspend on influencer marketing without clear results. | *Značka začala míňať príliš veľa na influencer marketing bez jasných výsledkov.*

overview | *prehľad* ——— The manager presented an overview of the marketing strategy for the next year. | *Manažér predstavil prehľad marketingovej stratégie na nasledujúci rok.*

owner | *vlastník* ——— The store owner decided to rebrand to attract younger consumers. | *Vlastník obchodu sa rozhodol rebrandovať, aby prilákal mladších spotrebiteľov.*

ownership | *vlastníctvo* ——— Brand ownership often plays a key role in consumer trust. | *Vlastníctvo značky často zohráva kľúčovú úlohu v dôvere spotrebiteľov.*

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pack | *baliť, zabaliť* ——— She packed a small suitcase for her business trip. | *Na služobnú cestu si zbalila malý kufor.*

package | *balenie* ——— Attractive package design can increase sales significantly. | *Atraktívny dizajn balenia môže výrazne zvýšiť predaj.*

packaging | *balenie (dizajn, proces)* ——— Sustainable packaging is now a major trend in international marketing. | *Udržateľné balenie je dnes veľkým trendom v medzinárodnom marketingu.*

page | *strana, stránka* ——— The company improved its landing page to boost online conversions. | *Spoločnosť vylepšila svoju vstupnú stránku, aby zvýšila online konverzie.*

paid media | *platené médiá*
Paid media campaigns are effective for quick brand awareness. | *Kampane v platených médiách sú účinné pri rýchlom budovaní povedomia o značke.*

panel | *panel, panelová diskusia* ——— The agency organized a discussion panel of experts to talk about new advertising trends. | *Agentúra zorganizovala panelovú diskusiu odborníkov, aby hovorili o nových trendoch v reklame.*

paid | *zaplatený* ——— Paid advertising helps brands reach larger audiences quickly. | *Platená reklama pomáha značkám rýchlo osloviť väčšie publikum.*

pay | *platiť, zaplatiť* ——— Customers are willing to pay more for brands that offer sustainable products. | *Zákazníci sú ochotní zaplatiť viac za značky, ktoré ponúkajú udržateľné produkty.*

payment | *platba* ——— Offering multiple payment options can increase online sales. *Ponuka viacerých možností platby môže zvýšiť online predaj.*

pay-per-click (PPC) | *platba za kliknutie (PPC)* ——— Pay-per-click campaigns help brands reach highly targeted audiences. | *PPC kampane pomáhajú značkám osloviť presne zacielené publikum.*

pay rate | *platová/mzdová sadzba* ——— The pay rate for brand ambassadors depends on their experience and audience size. | *Platová sadzba pre ambasádorov značky závisí od ich skúseností a veľkosti publika.*

persona | *persóna, modelový zákazník* ——— Personas help marketers create more relevant messaging. | *Persóny pomáhajú marketérom vytvárať relevantnejšie správy.*

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