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Data-Driven Marketing

Exploring the Efficacy of Chat GPT: A Comparative Analysis of Brainstorming Performance between AI and Human Interaction

Afonso Filipe Figueiredo Godinho

Master Thesis

presented as partial requirement for obtaining a Master's Degree in Data-Driven Marketing

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Universidade Nova de Lisboa

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by

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Master Thesis presented as partial requirement for obtaining the Master's degree in Data-Driven Marketing, with a specialization in Digital Marketing and Analytics

Supervised by

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STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism, any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

Portugal, July 15th, 2025

DEDICATION

I want to dedicate this entire project, all this work, to those who always believed in me and pushed me to be my best self. This way, a road to become professional in the filed I love and have aspired to for years as opened. Many thanks to my parents for enabling me to pursue this path.

ACKNOWLEDGEMENTS

This thesis theme started out of pure curiosity — and with absolutely no clue of what I was doing. I had no background in AI besides the basic chatgpt, and honestly didn't even knew where to begin. I just knew I wanted to explore something that mixed creativity, people, and technology. The rest? I figured it out as I was going.

A huge thanks to Professor Guilherme Victorino — not just for being my advisor, but for being a real guide throughout this process. From day one, he supported me, challenged me, let me go off-track when I needed to, and pulled me back when it mattered. I truly couldn't have done this without his help (and patience). He let me be myself, even when that meant intense opinions or weird directions — and that made all the difference.

To the professionals and friends who took the time to be part of my research, thank you. You brought this work to life and reminded me that theory only matters when it connects with real people, even working with AI.

To my family and friends — thanks for putting up with the mood swings, the last-minute stress, and the non-stop talk about AI and "the thesis." You know who you are. I appreciate you more than I say.

That's it. It was messy, intense, confusing at times — but I learned more than I ever expected.

ABSTRACT

This work looks at how useful ChatGPT can be in generating ideas compared to people, focusing on real cases from the restaurant industry in Portugal's Oeste region. The approach was simple: collect ideas from both sides, AI and human, keep their source hidden, and ask participants to rate them based on originality, usefulness, and empathy. In general, human ideas were slightly more appreciated, mostly because of their emotional tone and awareness of context. Still, the AI held its ground — it produced clear, structured ideas quickly and without effort. It became clear that AI isn't here to replace people, but it can help, especially in the early stages of brainstorming when quantity and speed matter. The study shows that both sides have their strengths, and combining them might be the most effective approach. While the test was limited to one industry and format, the results raise good questions about how tools like ChatGPT can be used in practical creative processes, not as shortcuts, but as support. There's room to explore this further in other areas and with more interaction between human and machine. For now, what this research highlights is simple: AI can bring value to creativity, but it works best when people are still leading the process.

KEYWORDS

Generative AI; Brainstorming; Human-AI Collaboration; Cognitive Stimulation; Idea Generation

Sustainable Development Goals (SDG):

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1. INTRODUCTION

1.1 CONTEXT AND RELEVANCE

With the rise of GenAI and other generative artificial intelligences, more specifically language models like ChatGPT, developed by OpenAI, there has been a clear shift in the way all tasks are carried out in daily life — whether it's individuals or organizations generating ideas, brainstorming, or dealing with any kind of question.
Through these AIs, we are able to manage everything more efficiently, having access to much more updated, complex, and coherent content just a few clicks away. From large companies to individuals with simple tasks, it has been used by millions of users — from marketing and content creation to databases that support decision-making. Since its public launch in 2022, ChatGPT has quickly become one of the most used platforms in the world, showing the increasing use of this kind of tool based on artificial intelligence.

With AI being integrated into daily work and creative processes, ethical and fundamental questions arise about the origin of creativity and the role of humans in these types of creative operations. Previously seen as something human — as part of our emotional intelligence, personal traits, historical context, cultural experience, among countless other factors — creativity is now becoming increasingly automated and challenged by these tools.
As is the case with ChatGPT, these AIs offer an endless catalogue of options, stimuli, ideas, and perspectives, in exchange for minimal effort and almost no context input, making the whole process extremely easy, free, and fast.

While brainstorming is a traditional method of generating ideas, this tool changes that old way of creating. A practice that was once essential to several sectors is now being replaced by artificial intelligence, thanks to its richer and faster output.
But are all these ideas relevant? Do they make sense? And emotionally — do they even connect? Culturally, are they globally accepted or can they be misunderstood in some parts of the world? These are not only academic or business questions — they’re topics that can be discussed in many different contexts.

Still, replacing human ideas or complementing them with the help of artificial intelligence brings several ethical, emotional, and practical considerations.
Are the ideas and the originality of those ideas as strong as human ones? Do they carry the same cultural and emotional weight?

All of these points are relevant in many areas of discussion, whether academic, professional, or others.

1.2 RESEARCH PROBLEM

Even with the growing access to GenAI technologies, there are still several criticisms regarding its performance in real creative settings.
Although there are many articles highlighting its ability to generate ideas and content, ChatGPT still lacks enough studies that prove its effectiveness in brainstorming sessions when compared to human brainstorming, especially in specific scenarios across different sectors. Even less so in more specific contexts such as local industries, small businesses, or service-oriented sectors — areas where innovation and creativity have a strong impact but are sometimes limited.

Moreover, the existing research tends to focus on the technical capabilities of GenAI or even its theoretical implications, often neglecting the human perception of AI-generated ideas in practical contexts. The evaluation of ideas is rarely objective, as it’s influenced by factors such as context,

authenticity, the origin of the idea, or emotional appeal. It's essential to understand how people react to ideas created by humans or by artificial intelligence tools — this is crucial to assess the real creative potential of GenAI.

Through the studies and analysis in this thesis, we will investigate the comparative effectiveness between brainstorming ideas generated by humans and by AI — not only to understand which are more creative and innovative, but also to assess how much the hidden origin influences perception. This will help provide a deeper understanding of how humans and AI collaborate in creativity-driven brainstorming environments.

1.3 RESEARCH OBJECTIVES

In this thesis, we aim to explore the effectiveness of brainstorming between humans and brainstorming with artificial intelligence in a real-world context. We will investigate:

- Assessing the perception of creativity, originality, and overall acceptance of the ideas generated by ChatGPT compared to those generated by humans;
- Analyzing and identifying patterns in terms of emotional tone, segmentation, and thematic focus;
- Analyzing how participants react to anonymously presented ideas, whether they were created by humans or by AI;
- Seeking to contribute to the growing studies on collaboration between humans and artificial intelligence in creative problem-solving.

1.4 STRUCTURE OF THE THESIS

Following this introduction, Chapter 2 will present a relevant literature review, covering theories and studies on the topic, highlighting creativity, brainstorming methodologies, the rise of generative AI, and some recent research on collaboration between humans and artificial intelligence.
Chapters 3 and 4 will go into the methodology, detailing the data collection process and how the study was carried out.
In Chapter 5, the results will be presented, comparing the ideas generated by both sides — AI and humans — across different evaluation dimensions.
Finally, Chapter 6 will outline some of the study's limitations, suggestions for future research, and other relevant considerations.

2. LITERATURE REVIEW

2.1 HUMAN CREATIVITY AND BRAINSTORMING

Creativity is, and always has been, essential when it comes to innovation, especially in specific areas such as advertising, marketing, and entrepreneurship. According to Amabile (1996), creativity is influenced by intrinsic motivation, by specific processes related to creativity, and by skills relevant to the areas in question. In professional contexts, creativity is responsible for playing a strategic role in the differentiation of brands, in the advancement of innovations, and in responding to consumer needs.

As introduced by Osborn (1953), brainstorming has been an essential technique for stimulating creative production, more specifically in group settings. Its goal is to promote creative and divergent thinking, aiming to generate the highest possible number of ideas without immediate judgment. Despite its widespread use, common brainstorming presents numerous limitations, such as "production blocking," identified by Diehl and Stroebe (1987), being one of the main factors that influence idea generation when participants have to wait their turn to speak. Furthermore, phenomena such as "social loafing" (reduction of individual effort in a group setting) and "evaluation apprehension" (fear of negative judgment) also compromise the effectiveness of group brainstorming.

In creative industries, these limitations have led to other alternative forms, such as individual brainstorming, interactive digital whiteboards, and structured idea generation methodologies. Still, the human capacity for intuition, empathy, and interpretation in different contexts continues to be considered irreplaceable in creative problem-solving.

2.2 DESIGN THINKING AS A FRAMEWORK FOR CREATIVITY

Design Thinking emerged as more of a human-centered approach for innovation, and it also highlighted empathy, ideation, and iteration (Brown, 2009). It is structured into about five distinct phases. These are empathize, define, ideate, prototype, and test. This promotes a full comprehension of users. It does occur before the idea generation phase itself. Brainstorming does play a central role for the duration of the ideation stage in which the variety and volume of ideas become necessary.

Design Thinking, according to Plattner, Meinel, and Leifer (2011), provides balance for analytical thought and intuitive thought. Divergent thinking benefits the ideation phase via tools such as role-playing as well as analogy generation, including generative artificial intelligence more recently. Casquinha (2024) made an analysis of ChatGPT integration inside of advertising campaigns. That analysis focused upon the ideation process. Her findings showed the AI tool sped up the idea generation phase since it enabled more iterations in a short timeframe.

Catalán (2024) likewise studied Extreme Users along with Parallel Universes integration by GenAI into two Design Thinking techniques. ChatGPT offered alternatives that are broad and unconventional, she found, while human participants generated ideas within a richer emotional context. The results suggest Design Thinking framework can use GenAI as a stimulus using human perception.

2.2.1 The Design Thinking Stages

Figure 1. The five stages of Design Thinking. Source: American Marketing Association (2025).

The Design Thinking model (Plattner et al., 2011) is structured in five iterative as well as different phases:

- **Empathize:** A stage that focuses upon the comprehension of users' needs when you observe then directly involve yourself, stressing also the experiential with emotional dimensions of users since human perceptions remain quite important and relevant there.
- **Define**: Framed are user-centered problems. The perceptions that come from the previous stage are used in order to do this. This important step ensures ideation is based upon meaningful challenges.
- **Ideate**: Brainstorming occurs during this particular phase. Participants generate a number of ideas without any judgment and they focus upon quantity and also diversity. Here, generative AI tools like ChatGPT can be introduced to strengthen idea expansion.
- **Prototype:** It is about low-fidelity versions for potential solutions. Such versions get made when prototyping. Artificial intelligence can be very helpful with suggesting structures, descriptions, or example flows. Suggestions like that can lead to solutions that are helpful.
- **Test:** Improvements for use across various aspects of all the prototypes are sought through feedback collection from users. AI can help in the identification of trends in this feedback. However, it is still up to humans to interpret it.

2.2.2 Design Thinking Applications in Different Areas

Design Thinking has been applied across various fields. Business gains product innovation and service design from it and healthcare improves patient care strategies. Education promotes active learning methodologies as well. As stated in TDDM2308 (2024), Design Thinking is adaptable since it has the ability to focus on human needs in any industry.

By integrating ChatGPT participants were able to accelerate the ideation process while simultaneously using their contextual knowledge to filter viable strategies.

2.3 The Rise of Generative AI in Creative Processes

ChatGPT launched in 2022 with rapid expansion growing in appeal, so generative artificial intelligence applies more in tasks involving natural language generation, like content production, idea creation, with calculated planning. These tools use large language models like GPT-3.5 and GPT-4 for creating coherent texts in many situations.

Luther et al. (2024) investigated co-writing helped by artificial intelligence and found AI is more effective when people help also, instead of substituting them.

GenAI offers numerous advantages such as speed, high volume of ideas, and a great ability to break common mental patterns, which is very useful in the context of brainstorming. According to Bouschery et al. (2024), teams that used GenAI generated more innovative ideas than teams composed only of humans. However, Förster (2024) warned that many professionals in the innovation sector perceive AI-generated content as lacking emotional depth, originality, and cultural relevance.

Although artificial intelligence tools can mimic patterns and suggest logical continuities, they do not possess the experiential basis or emotional resonance that underpin much of human creativity. Thus, generative artificial intelligence proves to be more effective when used as an auxiliary tool, rather than as a standalone creative agent.

2.4 Human-AI Collaboration in Brainstorming

Emerging research suggests that people can optimally use generative AI in brainstorming not in order to replace but in order to collaborate. Memmert with Bittner (2024) conducted controlled experiments, which involved participants in brainstorming tasks. During the completion of these tasks, participants were exposed to certain AI-generated ideas. The results revealed that these participants explored with greater breadth for the reason that AI is able to help people overcome cognitive fixation or ideate down narrow paths.

The importance that is of co-creation over that of automation was stressed by Roman (2024). In her study, students' outputs in educational settings were richer and more diverse with AI as a brainstorming partner than when alone. However, should people overrely on AI, their motivation reduces also their thinking becomes superficial. Therefore, careful integration is what is needed.

Förster (2024) noted that AI works best when ad professionals customize and change initial machine-generated ideas via interviews. Originality of human authorship is retained in the symbiosis to provide better productivity.

2.5 AI as a Cognitive Stimulator: Benefits and Limitations

AI is offering rapid outputs that are diverse. This is known to stimulate ideation from a cognitive point of perspective. Althuizen as well as Reichel (2016) defined such systems as cognitive stimulation tools. These tools do support idea fluency as they do enable the generation of many ideas and transform them via reworking and refining. AI for this role helps users bypass cognitive inertia, especially when brainstorming begins.

However, context determines these benefits. According to Memmert et al. (2024), task framing matters because it affects how people value AI-generated ideas. Ratings from participants proved far lower when ideas came from machines, as opposed to when the origin was hidden. That users may unconsciously devalue AI content is suggested, even when objectively creative.

Ideas' homogenization is a source of concern too. AI trained on large-scale datasets may replicate mainstream patterns if cultural specificity or niche perceptions are limited. While GenAI is a powerful stimulus, human collaborators should critically filter together with contextualize its outputs.

2.6 Research Gaps and Theoretical Integration

There have been important advances occurring in the comprehension of human-AI collaboration even though research gaps still do persist. The research so far targeted big companies or schools because they create an absence of real use inside small firms or area startups where new ideas are key yet funds are scarce. Additionally, there are few studies that have evaluated AI-generated ideas with real-time human participants within a naturalistic setting, as this thesis attempts to do.

Bouschery et al. (2024) urged that there be more research done into ideation's hybrid models, mainly into the ones with local grounding. This call places stress on context-specific research. Memmert and Tavanapour (2023) stressed that understanding perception alongside engaging participants matters in mixed teams. The ability of AI to stimulate idea quantity is supported by the literature, yet the questions about the quality, the usability, and the emotional resonance of ideas remain.

Integrated, the above literature reveals human-AI collaboration can overcome limitations of customary brainstorming effectively. Effective collaboration uses Design Thinking structured frameworks. However, we must maintain human control, with emotional perception, also contextual alignment. These actions remain important for us to unlock the full potential of AI in creativity-driven tasks.

2.7 Generative AI in Idea Generation

They simulate language with reasoning using probabilistic models. AI systems of the generative type are designed for the specific purpose of supporting tasks that are creative. With the appropriate prompting, ChatGPT-like tools can generate diverse ideas across a wide range of domains in a quick manner. More and more industries use this capability for activities such as product design, marketing strategy, content planning, and also education.

Catalán (2024) showed ChatGPT might give unusual links as ideas are formed. These associations are often able to be overlooked in customary group sessions. Generative AI helps surmount creative blocks according to Bouschery et al. (2024). Thinking laterally also can be stimulated, they found. It is an important asset to use in early-stage ideation due to its potential for cross-domain idea transfer.

GenAI's flexibility is stressed by studies. It adapts with different creativity tasks when prompt specificity changes. According to Memmert and Bittner (2024), less constrained prompts result in more divergent ideas. Yet, suggestions that are contextually relevant come from prompts more structured. GenAI has dual capability. This versatility increases its utility within brainstorming scenarios.

Luther et al. (2024) also note that AI may function as a consistency tool because it makes sure ideation fits tone, audience, or brand language when trainers train or tuners fine-tune it using custom datasets. These properties make for it to be more attractive for use in fields such as advertising and campaign development.

2.8 Advantages of AI in Brainstorming

AI speeds up, scales, and makes objective the brainstorming process for users. Because it has no fatigue, bias, or social dynamic constraints, it may generate ideas and keep energy levels up. AI-generated ideas,

as shown in Memmert and Bittner (2024), covered a broader semantic range that often included concepts missed by human groups because of groupthink or fixation.

AI also provides round-the-clock access plus flexible use across languages and subjects making AI very scalable. This increases creative output frequency then reduces costs in commercial settings. AI can also be integrated into databases or into trend analysis tools so that it enables more real-time contextual perceptions during ideation sessions.

Its ability for replicating best practices across domains is another important advantage. AI, as an instance, when trained on product strategies or successful campaigns, can suggest frameworks or similar patterns to apply to new contexts. This is not a replacement for originality. Rather, it founds a base, and then innovation emerges rapidly from it.

Additionally, AI's neutral stance means that it can ideally partner during brainstorms in team dynamics as power imbalance or hierarchy might obstruct open idea generation. It allows access to suggestions for everyone. Each team member can then explore without any fear of judgment.

2.9 Advantages of Humans in Brainstorming

Emotional intelligence, cultural subtlety, contextual awareness, and ethical reasoning are brought to the creative process by humans. Brand storytelling, together with socially sensitive messaging, plus user-centered design are especially important, just as Förster (2024) and Roman (2024) highlight.

Human ideators can draw upon empathy, personal experience, and tacit knowledge to develop ideas that have strong emotional resonance. They readily understand cues AI cannot know and can conform to involved social dynamics and immediate responses too. Also, people judge practicality and connect thoughts to planned or brand-based aims. AI lacks the ability of fully grasping those things without humans guiding it.

Humans in multidisciplinary environments can contribute through interpreting ideas' cultural and ethical implications which are dimensions where AI tends to underperform due to the lack of experiential knowledge. Human ideators possess these qualities that ensure responsibility, diversity, and depth in creative problem-solving.

2.10 Advantages of Human and AI Collaboration in Brainstorming

AI combines both speed with novelty and also human depth with refinement to make a synergistic environment for creativity. Luther et al. (2024) state hybrid brainstorming improves the ideas' quantity and originality while ensuring contextual relevance.

This collaboration allows humans to select ideas, refine ideas, and calibrate emotions, as the AI provides stimulus and volume. Casquinha (2024) found professionals used ChatGPT within advertising workflows since they appreciated its role accelerating iterations without replacing human creativity.

Cyclical exchanges are often involved within the most effective hybrid approaches—AI—generated content is iteratively refined by humans and used as a base for suggestions. Concepts are calculated then developed through human perception where AI volume supports early ideation, mirroring collaborative design thinking sprints. Such an integration does reduce the time that it takes for one to innovate. It does also maintain such human-centric integrity.

2.11 Comparative Analyses between 2.8, 2.9, and 2.10 in Efficiency, Speed, and Outcome Differences

When compared directly, each method presents unique trade-offs:

Efficiency: AI alone is the most efficient in producing large numbers of ideas quickly, while human-AI teams are more efficient in reaching high-quality ideas faster due to immediate filtering and contextual refinement.

Speed: AI leads in speed of ideation. However, speed does not equate to usefulness—many outputs require human curation. Human sessions are slower but more deliberate.

Outcomes: Human-only sessions result in emotionally resonant, brand-aligned ideas. AI-only sessions produce wider idea ranges but lack nuance. Human-AI collaboration balances novelty with strategic alignment, often producing the most actionable and impactful ideas (Memmert & Bittner, 2024; Förster, 2024).

Comparing these indicates effectiveness can differ given context, objective, and available resources. Hybrid models can offer up a balance between both creativity and feasibility. However, their adoption is increasing in the most practical of terms.

2.12 ChatGPT's Limitations

While ChatGPT is quite an influential tool, the limitations of it for ideation must be acknowledged. The AI has struggles with both empathy and emotional subtlety. True originality is in addition a battle in itself, as noted in TDDM2308 (2024). It might produce patterns found in data used for training to make typical bland suggestions.

Additionally, the tool sometimes fabricates facts (a phenomenon known as "hallucination") and cannot access context-specific or real-time information except when explicitly provided. These constraints make it less reliable now. It is not able to perform the tasks that do need sensitive or current input. In many professional applications, some ethical concerns can arise. Those worries involve user over-reliance and biases in data used to train.

AI-generated content lacks intent. It fails also to understand things, a key limitation. Even though it is not based upon any genuine creative thought, or upon intentional reasoning, the output may appear to be logical and coherent. AI may engage in battle in the time when the task is calling for originality that is anchored deeply in empathy or social relevance if it is going to meet expectations.

Researchers and practitioners support hybrid workflows plus human-centered oversight to reduce these limitations in all AI-assisted creative tasks.

2.13 ChatGPT Integration in Design Thinking

ChatGPT's integration in the Design Thinking framework has seen increased interest. ChatGPT is now within that framework. In the TDDM2308 thesis, researchers employed ChatGPT since they generated ideas for building prototypes. Many of the alternative concepts that are based upon simple prompts did successfully support divergent thinking.

However, the research highlighted as well that critical human filtering is important. Participants succeeded most when ChatGPT outputs were used as inspiration alone. For lack of contextual

intelligence, the AI accelerated how many ideas there were, which reinforced that humans must interpret them, notably when testing and refining.

2.14 Emotional Perception of AI-Generated Ideas

As recent studies indicate, AI-generated content can mimic emotional expressions convincingly, but humans do not always perceive these expressions in the way intended. Lomas et al. (2024) assessed how well models like DALL·E generate emotions according to how users interpret them, and the assessment revealed meaningful discrepancies depending on emotion type and model version. The AI can do simulation of emotion in visual form or textual form. However, its emotional depth along with subtlety often lack when compared to human-created content.

Mehta and Buntain (2024) found generative models defaulted likewise to negative emotional cues such as sadness, fear, or anger when prompts seemed positive or neutral. Careful calibration of emotional tone for audience expectations is needed so this tendency sparks worries within communication and branding. These findings stress that it is vital for humans to go on refining AI-generated ideas to ensure their emotional authenticity and appropriateness.

2.15 Trust and Credibility in Human vs. AI Content

Trust remains a complex issue when audiences engage in AI-generated content. Long et al. (2024) conducted an experimental study, also it showed that when participants were informed that content had been created by AI, their trust levels declined—particularly in domains requiring empathy or human judgment. Outputs labeled as machine-generated were rated as less credible even when quite similar.

The “AI trust paradox” describes how AI responses can create an illusion of trustworthiness through high fluency and coherence. The content it presents may in fact be inaccurate, however. This paradox is risky since overconfidence in the information that AI generated happens. Overconfidence can bypass important evaluation by humans.

In order to address this challenge, one should label AI contributions in a transparent way and actively educate users on AI capabilities and their boundaries. Organizations should also validate any process which involves AI-driven ideation, especially in high-stakes or in public-facing contexts.

2.16 Cognitive Load and Information Overload with AI

AI tools like ChatGPT produce content at speed increasing productivity while they can cognitively overload users. Lanham (2025) found users are often overwhelmed by excessive details within unfiltered AI-generated presentations impairing comprehension, retention, and decision-making.

This event connects with cognitive load theory. The quantity of an idea does not always equate itself to its usefulness, especially for brainstorming sessions. An abundance of ideas makes decisions tiring so users cannot assess rank or combine thoughts well.

AI outputs should be structured into clear categories, idea volume per session should be limited, and human judgment should refine and filter content for minimal overload, research suggests. Teams can derive benefit from AI in its productivity in doing of the same, with there being no loss of clarity or cognitive bandwidth.

3. METHODOLOGY

3.1 Introduction

The methodology chapter outlines the research design that was used for answering the central research questions as well as for evaluating AI versus human-generated content effectiveness in brainstorming contexts. Research objectives, the nature of the problem, and data type for valid perceptions guided methods selection.

Academic research can be approached by using methodological models that depend on the research aim. The aim might be about describing phenomena, about exploring meanings, or about testing hypotheses (Creswell, 2014). The researcher must choose from a combination of quantitative, qualitative, or mixed-method approaches. The methodological framework selected in this chapter is explained as well as its relevance justifying the research goals.

3.1.1 Quantitative Research

Quantitative research is grounded in a positivist philosophy and aims for generalizing of results from a sample to a population and for quantifying data (Bryman, 2016). It uses the numerical data in order to examine relationships between different variables and to test various hypotheses. The product of this examination includes reproducible and objective results. Controlled variables comparison demanding studies driven by hypothesis will find it quite appropriate.

Structured questionnaires eased a quantitative approach within this study. Per Hill and Hill (2008), surveys effectively capture public perception and behaviour on a wide scale especially when comparing responses across distinct experimental conditions. In this instance, respondents evaluated anonymous ideas that were generated by either humans or AI as well as provided numerical ratings that covered originality, feasibility, and emotional appeal.

Key methods of quantitative research include:

- **Surveys as well as questionnaires**: Administered through closed-ended answer options allow for standardized data collection ideal for statistical comparisons. This thesis used a Likert-scale questionnaire toward a specific purpose. To collect idea evaluations was the aim.
- **Controlled experiments:** These isolate effects from one or more independent variables. The manipulation for this study involved showing to the participants different types of ideas. Ideas that were AI-generated and human-generated were shown under such similar conditions.
- **Analysis of Big Data:** This method statistically studies large datasets to extract trends and patterns at scale using market or consumer behaviour analysis, though this thesis does not use it.

3.1.2 Qualitative Research

Qualitative research seeks deep, context-specific understandings for cognitive and social phenomena. Interpretivist models inform it furthermore it often focuses on meanings, motivations, and perceptions irreducible to numerical values (Denzin & Lincoln, 2011).

Although they are perceptions, qualitative perceptions that were found in the previous literature inform this thesis which is mainly quantitative. In related studies like Roman, 2024 plus Casquinha, 2024, qualitative techniques interpreted data in a rich way and also designed experiments.

Common qualitative methods include:

- **Interviews:** Using one-on-one or semi-structured interviews, researchers probe participant values, reasoning, and perspectives deeply. Unexpected perceptions are uncovered too as experimental findings being complemented by their wide use.

- **Focus Groups:** Capture discussions that are group-based. Groups let researchers grasp shared views with ease. They are especially effective for both marketing along with communication research. Emotional or cultural factors have the potential to influence ideation in those specific fields.
- **Case Studies:** These will provide analysis that is contextualized and detailed of interventions or of situations often used in innovation and in business research to evaluate decision-making or design processes in real-world scenarios.

None of these techniques had been directly applied within this thesis. Their frameworks did inform the way results were interpreted though, particularly concerning emotional responses to ideas.

3.1.3 Mixed-Methods Research

Research of mixed methods combines both quantitative and qualitative approaches within a single study. It therefore provides contextual depth in conjunction with numerical precision. It is particularly effective when it captures complex social or cognitive phenomena like creativity and ideation, where subjective judgments often intersect structured evaluation (Creswell & Plano Clark, 2017).

This thesis integrates elements from both traditions, yet it does not adopt a full mixed-methods design. Quantitative methods captured and analysed idea evaluations since qualitative reasoning directed the design and interpretation phases. For example, idea generation involved creative inputs from AI and also from humans and it was contextualized using the Design Thinking framework—a qualitative model of innovation (Brown, 2009)—though it was evaluated through Likert-scale ratings.

3.2.1 Review of Methodologies in Similar Studies

To contextualize the methodological approach of this thesis, the following table presents a review of recent academic studies and theses that explored the intersection of AI, creativity, and brainstorming. These works validate the mixed-methods and experimental framework used in the current research.

Author(s) and Year	Objective	Methodology	Conclusion
Song et al. (2024)	To evaluate how AI vs. human-created advertising	Experimental design comparing	AI can replace human designers in some contexts;

	influences tourist intention.	creator types and message framing.	matching the message to the creator improves effectiveness.
Park et al. (2024)	To assess perceptions of AI vs. human content on Instagram.	Survey with 43 participants and post-experiment interviews.	Participants struggled to distinguish AI from human accounts; AI perceived as equally attractive.
Memmert & Bittner (2024)	To test how AI-human collaboration affects brainstorming.	Controlled experiments comparing traditional and AI-assisted brainstorming.	AI broadens idea exploration and increases creativity.
Habsy et al. (2024)	To explore the use of brainstorming in school guidance.	Descriptive qualitative study and literature review.	Brainstorming fosters creativity and participation in educational contexts.
Dajal et al. (2024)	To test the effect of brainstorming on student performance in mathematics.	Quasi-experimental design with pre- and post-tests.	Brainstorming significantly improved learning outcomes.
Casquinha (2024)	To study the integration of ChatGPT in creative campaigns using Design Thinking.	Mixed-methods: idea generation, interviews, and feedback loops.	ChatGPT improved idea volume and iteration but required human filtering.
Catalán (2024)	To analyze ChatGPT in ideation methods (Extreme Users, Parallel Universes).	Experimental use of ChatGPT in creative techniques.	AI provided unconventional ideas, humans added emotional depth.

3.2.2 Methodology Selection for This Study

Figure 2 – Methodological framework of the study

For this study, a mixed-methods research design was selected as the most appropriate methodological approach, given the multifaceted nature of the research question: “How effective is ChatGPT against human brainstorming for local restaurant businesses in Portugal?” This decision was informed by the need to both explore and measure the perceived effectiveness of ideas generated by AI and by human participants within a localized, practical context.

Researchers could explore qualitative data using the mixed-methods strategy. Researchers did also analyze structured quantitative data with it. This dual perspective innovates research especially, where ideas have creative potential and someone considers their contextual relevance.

The approach followed three distinct but interrelated phases:

- **Initial Qualitative Phase:** This stage generated original ideas from only two sources: human participants as well as ChatGPT. The goal was collecting different inputs without showing the source's content. This step captures divergent thinking styles from each source. It does also provide the raw material in order to allow comparison.
- **Quantitative Assessment:** The second phase, also it involved the designing and distributing of a structured questionnaire. The questionnaire was composed mainly of closed-ended questions using Likert scales. Participants evaluated the creativity, the relevance, the feasibility, and the emotional appeal of the anonymized ideas. It let us compare how well ideas worked from AI plus human sources. It was factual and quantifiable. Statistical analysis was eased through the structured format standardization ensured.
- **Final Qualitative Analysis:** Respondents did also reflect upon innovation deficiencies that are in local Portuguese restaurant businesses, beyond numerical evaluations. Their comments and perceptions were examined thematically to contextualize the results and gain deeper understanding into the sector's challenges. This phase did also let people identify themes emerging that quantitative measures on their own might overlook.

or addressing idea generation's breadth plus user interpretation's depth, this combined methodology was selected. Recent scholarly advice is reflected too. Those recommendations involve studying generative AI within real-life business contexts (Casquinha, 2024; Catalán, 2024). It also fits what the Design Thinking model highlights: empathy and iteration; this lets the study gauge not just idea quantity and quality but also their resonance with local restaurant entrepreneurs' real needs.

Through numerical evaluation as well as through gained human understanding, this methodological design makes sure of a holistic analysis for ChatGPT's potential when it ideates and when comparing it with human creativity in small business settings.

3.3 Research Design

The design of this research followed a three-step process structured around creative business ideas' generation, evaluation, also analysis. These steps are described below:

1. **Generating Profit-Driven Ideas**
   Two sets consisting of five business ideas were developed through using ChatGPT. Another set, also with five ideas, was collected via a focus group of restaurant professionals (managers and workers). Ideas are planned for the innovation challenges. They wanted also to profit from those opportunities for some local restaurants in Portugal. All ideas had identifying information removed to prevent bias.
2. **Developing and Administering a Questionnaire**
   A structured questionnaire was developed so that it contained closed-ended items rated on a 1–10 Likert scale. Participants rated each idea on its emotional appeal, originality, feasibility, and potential influence on decisions. For unbiased assessment, participants importantly were not told about each idea's source (AI vs. human).
3. **Analysis and Comparison of Findings**
   After data collection, comparative techniques such as t-tests or mean difference analysis were the methods used to analyze the responses statistically. The goal was recognizing patterns in evaluation scores and also comparing AI's perceived effectiveness to ideas generated by humans. Optional open comments were used to contextualize participant feedback using thematic analysis.

This design structure provides both empirical data and qualitative context which are aligning with the principles for mixed-methods research. Thus, the thesis is able to assess both of the measurable and interpretive dimensions that relate to ideation effectiveness.

3.4 Qualitative Analysis: Why Do Restaurant Owners Struggle with Innovation?

A key addition to this research is an investigation into why restaurant owners often fail to introduce innovative ideas. Through a focus group with the same professionals, we will explore that topic and then investigate some tools and strategies to enhance creativity.

4. EMPIRICAL STUDY

4.1 Introduction

To assess the real-world potential and effectiveness of human brainstorming versus generative AI, we then conducted a practical session when we selected from Portugal a group comprising six professionals from within the hospitality sector. Participants who had diverse backgrounds came from restaurants and also cafés and even bars plus nightclubs. Participants were able to collaboratively generate ideas for improving business for local restaurants. The simulation's goal existed for creation of a creative ideation environment. They would later compare this qualitative input with AI-generated ideas for evaluating whether something has creativity, feasibility, also innovation in a contextualized, industry-informed setting.

The session was carefully structured so as to promote open discussion, also it maintained focus upon the research objective that it generated original, profit-driven ideas that local businesses could realistically implement. The participants were briefed with regard to the goals of the project and also the comparative nature of the study between AI and human ideation. I eased while guiding that session. I also ensured engagement, mutual respect, along with idea diversity.

4.2 Participants and Experience

Someone purposefully chose the six people using a non-probabilistic expert sampling method because of their direct, wide hospitality experience. A credible brainstorming environment, rich in context, was ensured. Business owners at this current time together with workers that are seasoned who come from hospitality contexts that are various were among those participants who were selected.

Below is a profile summary of the contributors:

- **Liliana** – Liliana worked in a pastry shop for 5 years so she brought perceptions from customer-facing daytime food service and dessert-focused operations.
- **Diego** – As for managing a dynamic hybrid space currently, Diego has 12 years of experience within restaurants and bars, functioning as a restaurant in the daytime and a nightclub at night.
- **Miguel** – Miguel has 11 years of experience with previously owning and establishing a café-bar. He shaped ideas through entrepreneurship and management expertise, and he runs a nightclub.
- **João** – Having experience across different venues, João worked in hospitality for 15 years. For close to the past 8 years, he has been a central team member within a popular local restaurant/bar, and that is something that offers a long-term operational perspective.
- **Erica** – Erica has been working in cafés, bars, and ice cream parlors. Erica has 5 years in experience. Her background, one that is multidimensional, enabled her to adapt all of her approaches during the ideation. She watched consumer trends with great focus as they changed.
- **António** – António is relatively new within the sector. Fresh unbiased input came from António's recent 6 months of restaurant experience representing emerging workers' voice.

The group showed itself as being a mix that was balanced with planned, operational, and service-oriented perspectives. It occurred inside the food and beverage sector.

4.3 Brainstorming Process

The brainstorming session occurred in what was an informal yet structured environment. The moderator introduced what was the study's purpose and its methodology. In the discussion, participants shared ideas with freedom and enthusiasm. Openness, along with non-judgment, as well as creativity, were stressed. The discussion was following a semi-structured format. Design Thinking ideation encouraged volume and diversity of ideas.

I moderated and encouraged participants to discuss issues as local restaurants come up with fresh ideas concerning marketing, service, customer experience, and product differentiation. People took some notes all through the session. Participants were also invited to build on top of each other's suggestions, and this resulted in a collaborative flow of concepts.

The session did produce a number of ideas. After the ideation period, the group collectively selected five concepts with the highest potential for real-world implementation. In this research, these selected ideas were later anonymized and used for comparison.

Participant ratings as well as feedback collected via the questionnaire will inform the following chapter's comparison between human-generated ideas and ChatGPT's.

4.4 Key Ideas Generated

Promotions & Sales Strategies

- Happy Hour during matches of major football clubs (Benfica, Sporting, Porto).
- Benfica matches: "Buy 1 beer, get 2" promotion.
- Matches of the three major clubs: Offer 1 aged cheese with the first 8 beers to encourage group consumption.
- 10 medium beers for €20 instead of €25, served in an ice bucket.
- **Weekly featured cocktail or spirit** to encourage sales.
- **Weekly cocktail promotion** to meet brand targets and reduce product waste.
- **Buy 2 cocktails, get 1 free house shot** (weekdays).
- **Meals over €40 for two people include 1 digestif** (Macieira).
- **Mini dish of the day** for those who eat less, saving **€1 per meal**.
- **Coffee + pastel de nata for €2** (instead of €2.20).
- **Buy 10 vianinhas, get 50% off 1 coffee**.

Menu Differentiation & Special Offers

- **Different menus for day and night:**
  - **Daytime:** Quick and basic service.
  - **Nighttime:** More refined and attentive service.
- **Special meal on the first Sunday of each month:**
  - If reserved by Friday, **includes 1 bottle of house wine**.
  - Unique dishes like **caldeirada, cataplana, seafood, or fish soup**.

Partnerships & Local Products

- **Highlight regional products** paired with desserts (e.g., **Petiz Gâteau with Lourinhã Aguardente**).
- **Collaborate with local businesses** (beverages, fruits, pastries).

Atmosphere & Experience

- **Continuous staff training** to improve service.
- **Create a positive work environment** to enhance team performance.
- **Advertise a giant TV/projector for football matches.**
- **Multiple TVs with different channels** to cater to all customers.

Audience Attraction & Expansion

- **Improve social media presence** to attract tourists and younger audiences.
- **Themed nights with giveaways** related to sponsored drink brands.
- **Family-friendly offers:** Engaging children ensures parents return.
- **Giant inflatable play area** to attract children.
- **€3 / 30-minute inflatable play pack + 1 coffee included.**
    - Likely additional purchases from accompanying adults.

4.5 Final Considerations

The human brainstorming session proved valuable and as effective results, since it generated relevant and practical business ideas tailored to the Portuguese restaurant sector. The diversity of professional experience among the participants improved the discussion; and this fostering created a collaborative environment where ideas emerged organically from real-world perceptions.

The session showed not only how experienced professionals create but also how groups interact for refining and building upon concepts. Ideas based upon comprehension of the customer, dynamics of the local market, and feasibility for operations were proposed with expertise of individual participants.

Five human-generated ideas were selected into the evaluation questionnaire to allow a fair comparison. This inclusion ensured an objective evaluation for AI-generated content. Novelty, practical relevance, with collective enthusiasm during the session determined these ideas' selection. Their inclusion during the survey phase permitted a strict, direct assessment of human creativity plus AI creativity inside business.

Participant feedback along with statistical analysis, with the results of this comparison, are presented in the following chapter.

1. **Advertising a giant TV/projector for major football matches** (Benfica, Sporting, Porto).
2. **A new weekly cocktail for €6**, providing variety and boosting sales.
3. **Benfica match promotion: "Buy 1 beer, get 2".**
4. **A special meal (caldeirada, cataplana, seafood and fish soup, or crab) on the first Sunday of each month.**
    - If reserved by Friday, the customer receives **a free bottle of house wine**.
5. **A giant inflatable play area in a supervised space for children, visible from the outdoor seating area.**

These selected ideas will be used to evaluate customer preferences and compare the effectiveness of human brainstorming versus AI-generated concepts.

4.6 AI-GENERATED BRAINSTORMING SESSION

Researchers adopted a structured approach for AI ideation to ensure objectivity and to maintain methodological consistency when they were comparing human and AI-generated ideas. The objective was to remove all human meddling as ideas formed. The team wanted for to obtain outputs that evaluators could assess independently on their very own merit.

A prompt that was carefully designed was created and then introduced to ChatGPT. This ensured that all of the ideas were generated just by the AI, without any refinement or selection or interpretation from the researcher. As a result of that, the content which has been produced is purely machine-generated, and this also offers up a clean basis for direct comparison with human-generated outputs in terms of creativity, relevance, emotional appeal, and feasibility.

The prompt used was:

"I am conducting a study on the effectiveness of human vs. AI brainstorming in the restaurant industry, specifically for cafés, bars, and restaurants at a local level. The goal is to generate innovative and feasible ideas to attract more customers, increase consumption, or reduce costs, always with the aim of increasing profitability. The target region is Portugal's Oeste, including Lourinhã, Peniche, and Torres Vedras, so the suggestions should consider the preferences and habits of this area.

Please suggest your top five specific ideas to achieve these objectives. The ideas should be concrete, practical, and innovative, focusing on promotional strategies, menu differentiation, customer experience, or cost optimization. Avoid generic suggestions and ensure that each idea has a clear rationale explaining how it benefits the establishment."

AI-GENERATED IDEAS

In response to this prompt, AI provided the following five specific ideas:

1. **Offering Local Products in Themed Menus**
   Objective: Attract customers interested in authentic and sustainable gastronomic experiences.
   Strategy: Create special menus based on local ingredients from the Oeste region, such as wines from Peniche, vegetables from Lourinhã, or fresh fish from Torres Vedras. These menus can rotate seasonally, encouraging repeat visits. Offering “tasting experiences” for groups or tourists can further enhance the establishment’s appeal.
2. **Themed Events with Local Culture**
   Objective: Increase customer loyalty and attract new audiences by leveraging local culture.
   Strategy: Organize events such as fado nights, live music with local artists, or themed dinners featuring traditional dishes from the region. The business can also tap into local tourism by hosting wine and cheese tastings, taking advantage of the tourism hotspots in the Oeste region, such as Praia da Areia Branca and the Sintra-Cascais Natural Park.
3. **Personalized Loyalty Programs**
   Objective: Increase visit frequency and encourage repeat spending.
   Strategy: Develop a digital loyalty program through an app or customer card, allowing customers to earn points with each visit or purchase. These points can be exchanged for discounts, exclusive products, or special offers like “free lunch after a set number of visits.” Customizing rewards based on customer preferences (e.g., offering coffee for morning regulars or wine for dinner guests) can further enhance engagement.
4. **Interactive Digital Menu with Personalized Recommendations**
   Objective: Enhance customer experience while optimizing cost management.
   Strategy: Implement digital menus (via tablets or QR codes) that provide an interactive experience with personalized suggestions based on customer preferences or purchase history.

These digital menus can also display information about local ingredients and pairing suggestions (such as wines or desserts), encouraging the purchase of premium or complementary products.

5. **Partnerships with Local Influencers for Exclusive Promotions**
   Objective: Increase local visibility and attract a younger, dynamic audience.
   Strategy: Establish collaborations with local influencers or micro-influencers with a significant audience in the Oeste region. They can promote exclusive deals for their followers, such as discounts, contests, or special events at the venue. The establishment could also organize "meet and greets" or exclusive experiences for the influencers' followers, creating a closer connection and fostering customer loyalty.

4.7 CONCLUSION

To ensure consistency with the methodological standards applied throughout this study, the prompt submitted to ChatGPT was deliberately specific because it guided the AI to generate a focused along with contextually relevant set of ideas for local restaurant businesses. The strategy ensured that all outputs reflected the project's clear scope without any subjective human interpretation or iterative refinement.

Generative AI tools such as ChatGPT allow extended dialogue plus progressive enhancement of ideas, yet human influence into the ideation process would arise if people engage in those interactions. Objectivity would weaken from a fair clean comparison to a human-generated brainstorming session.

Ideas produced by AI got selected for evaluation because only the initial prompt's first five got included. These were not able to be edited or to be filtered. Neither were these optimized in almost any way. This is an approach that preserves all of the integrity within the experimental design. That way, people can compare the AI-generated ideas fairly and transparently against ideas from human participants.

5. RESULTS AND DISCUSSION

5.1 – Survey Results and Participant Overview

This chapter presents the results from the survey done to assess the appeal and the effectiveness of business ideas that generative AI and humans made. For visits or consumption at restaurants, bars, and cafés—local hospitality establishments—the aim was assessing each idea's influence on consumer decisions.

Therefore, a questionnaire was structured, and it was given to people who live in or visit the Oeste region of Portugal often. The instrument included up to 10 ideas in total. Human professionals generated during a brainstorming session five ideas, and ChatGPT created also the other five ideas; they presented all of them anonymously in order to eliminate bias. The source for each idea was unknown to participants, which ensured an unbiased and impartial evaluation process.Each idea was rated on a **Likert scale from 1 to 10**, where:

- **1** indicated that the idea would have *no effect* on the respondent's decision to visit or consume;
- **10** indicated that the idea would play a *strong role* in encouraging a visit or purchase.

A total of **125 responses** were collected, of which:

- **116** were considered fully completed;
- **123** included partial data, most commonly missing the age field. These responses were still retained, as the missing demographic data did not compromise the core analysis;
- **104** respondents confirmed either living in or frequently visiting the Oeste region, validating the reach and relevance of the sample within the target population.

The survey randomized idea order to avoid response pattern bias because participant evaluations were therefore not influenced by order or positioning effects.

Hill and Hill (2008) argue sample sizes from 100 to 200 usually work well in early studies for finding trends and getting initial views, thus this respondent sample of 125 examines a firm base. In addition, the sample size is comparable to academic studies such as Casquinha (2024) and Catalán (2024), as well as those studies that employed samples from 90 to 150 participants in similar idea comparison experiments.

Therefore, the sample that was collected in this study is considered to be adequate and to be statistically relevant. It also provides both the breadth along with the depth necessary for a meaningful comparison between human and AI ideation in a localized business context.

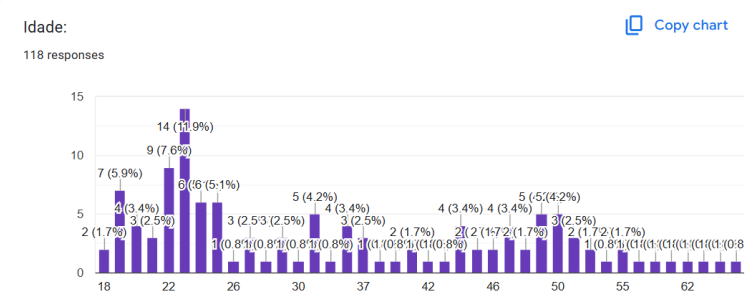

Figure 3 – Q1 – "Age:"

Figure 4 – Q2 – "Do you live or visit the West region?"

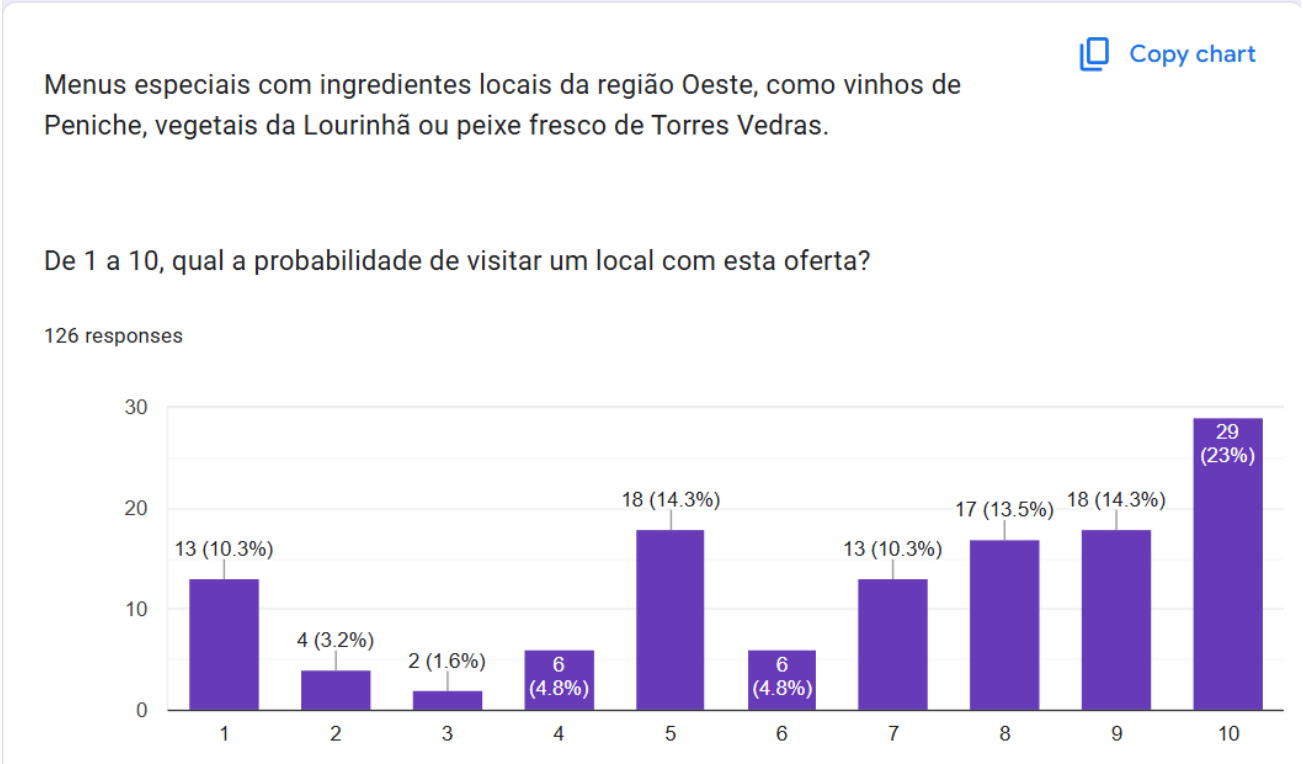

Figure 5 – Q3 – "Special Menus with local ingredients from the West region, such as wines from Peniche, vegetables from Lourinhã or fresh fish from Torres Vedras?"

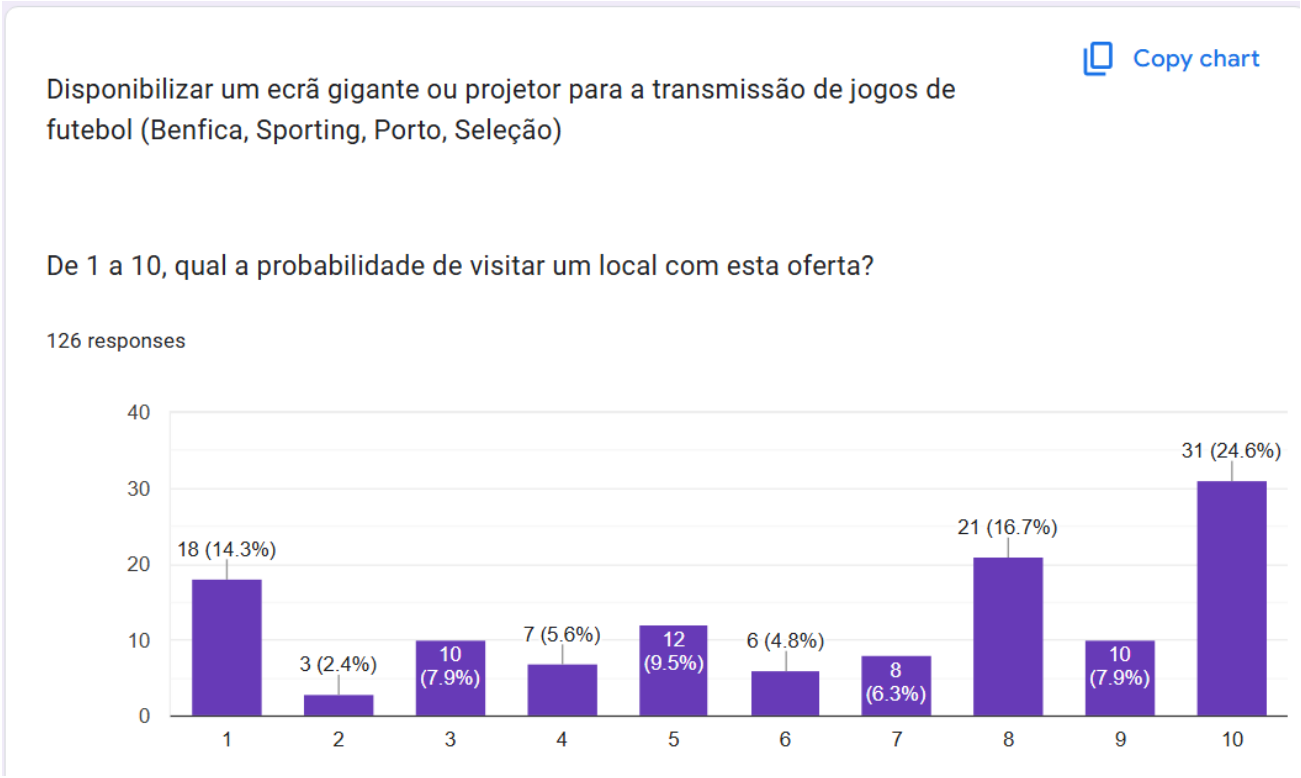

Figure 6 – Q4 – "Provide a giant screen or projector for broadcasting football matches(Benfica, Sporting, Porto, Seleção)

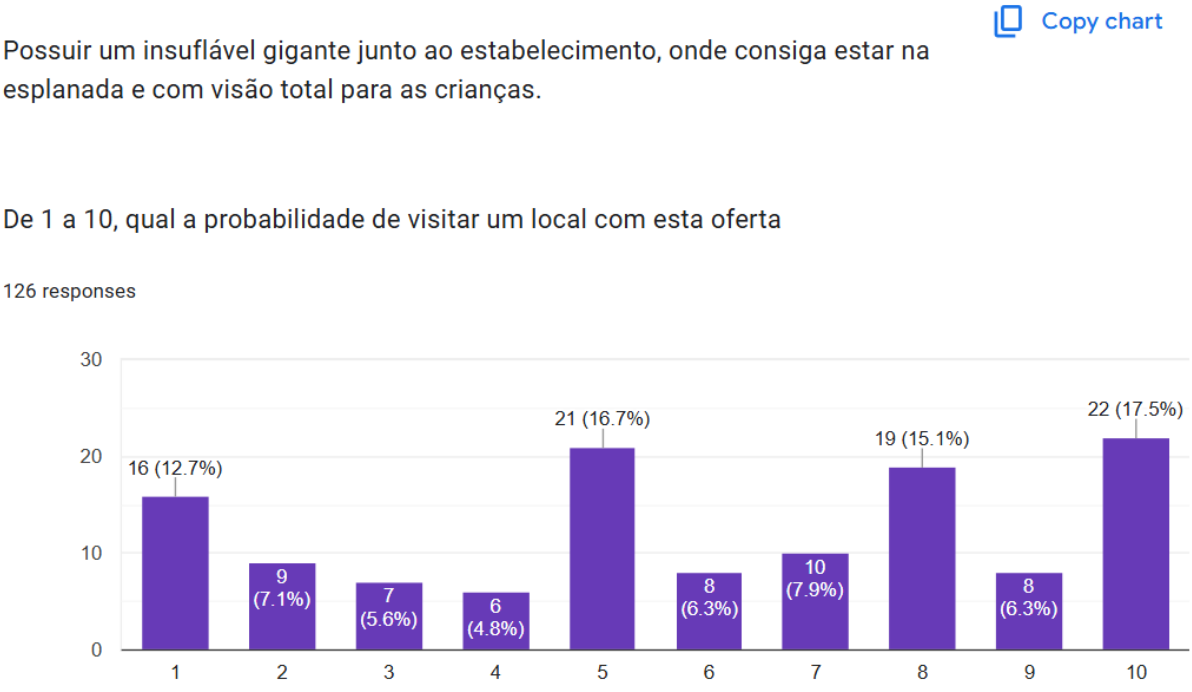

Figure 7 – Q5 – "Have a giant inflatable next to the estabilishment, where you can be on the terrace and have a full view of the children"

Copy chart

Organizar noites de fado, concertos com artistas locais com possibilidade de jantar pratos tradicionais portugueses.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

126 responses

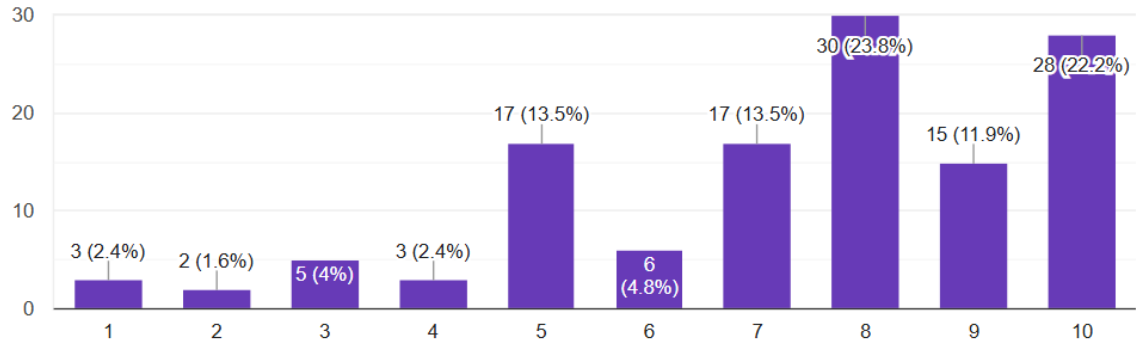

Figure 8 – Q6 – "Organize fado nights, concerts with local artists with the possibility of dining on traditional Portuguese dishes"

Copy chart

Criar um programa de fidelização digital (app ou cartão) onde os clientes acumulam pontos para trocar por descontos ou produtos exclusivos, como um almoço grátis após um número específico de visitas.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

126 responses

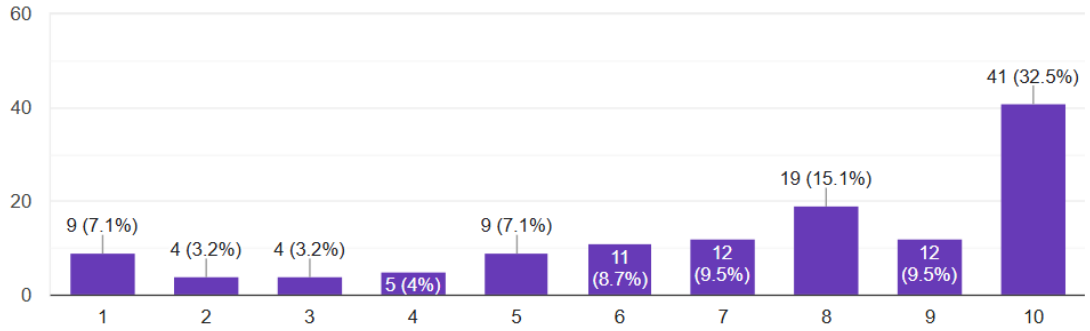

Figure 9 – Q7 – "Create a digital loyalty program (app or card) where customers accumulate points to exchange for discounts or exclusive products, such as free lunch after a specific number of visits."

Copy chart

Durante os jogos do Benfica, Sporting, Porto, ter uma promoção ativa de beber 2 imperiais pelo preço de 1.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

125 responses

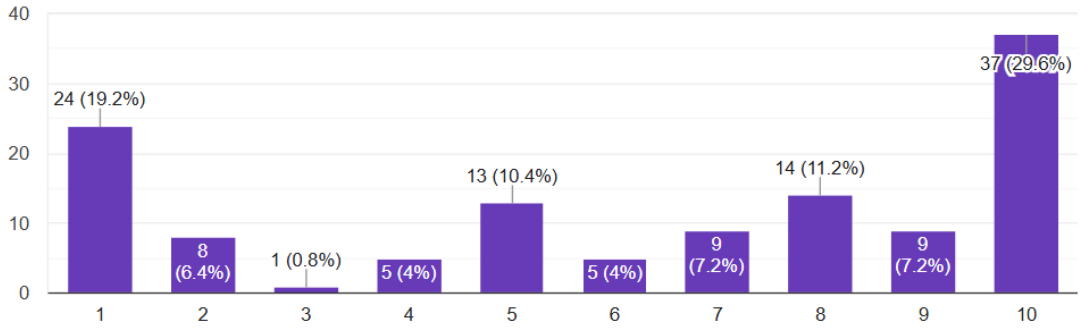

Figure 10 – Q8 – "During Benfica, Sporting and Porto games, there is an active promotion of drinking 2 beers for the price of 1."

Copy chart

Anunciar um cocktail diferente todas as semanas a um preço mais acessível.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta ou de gastar mais para usufruir dela?

126 responses

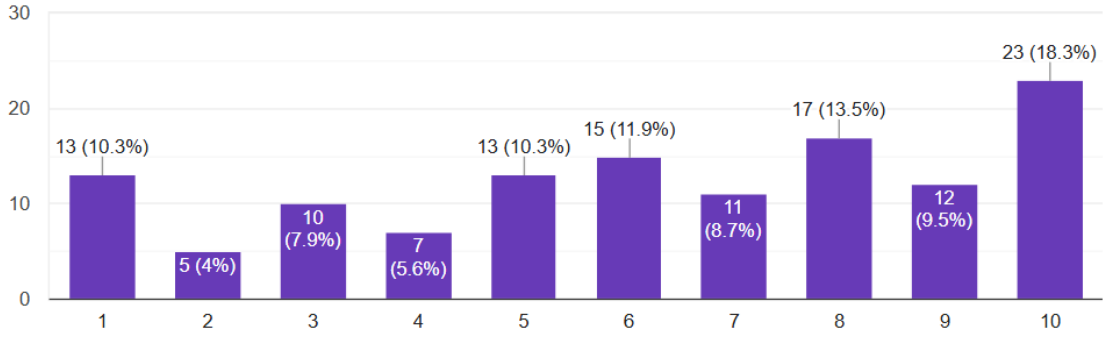

Figure 11 – Q9 – "Announce a different cocktail every week at a mre affordable price"

Copy chart

Parcerias com influenciadores da região Oeste para promover descontos exclusivos, sorteios ou eventos especiais.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

126 responses

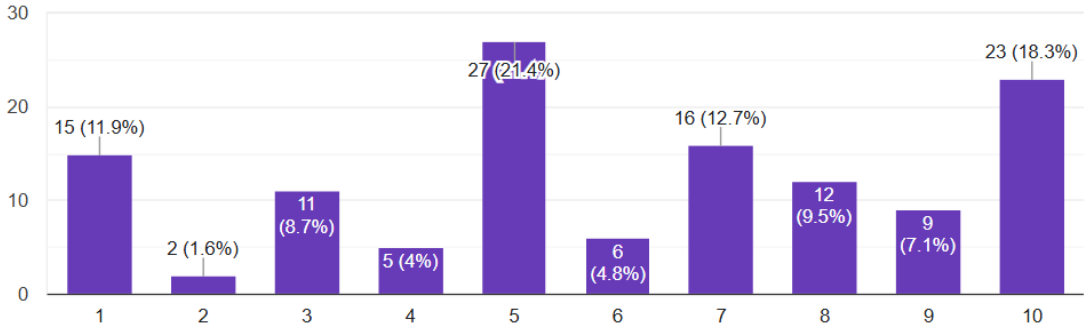

Figure 12 – Q10 – "Partnerships with influencers from the West region to promote exclusive discounts, sweepstakes, or special events"

Copy chart

Disponibilizar um prato especial (caldeirada, cataplana, sopa de peixe ou sapateira) no primeiro domingo de cada mês. Quem reservar até sexta-feira recebe uma garrafa de vinho da casa gratuitamente.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta

126 responses

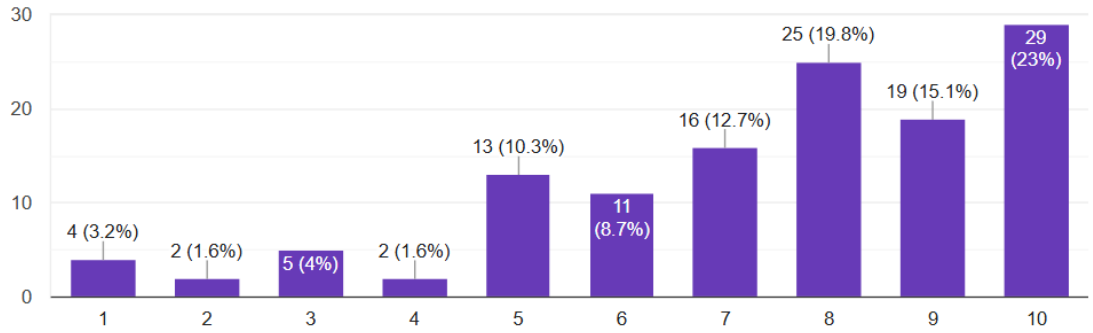

Figure 13 – Q11 – "Offer a special dish(Stew, Cataplana, Fish soup or Crab) on the first Sunday of every month. Those who book by Friday receive a free bottle of house wine"

Copy chart

Menus digitais acessíveis via tablet ou QR Code que sugerem produtos com base nas preferências do cliente ou no histórico de compras. Estes menus podem incluir informação sobre ingredientes locais e sugestões de harmonização (exemplo: vinhos ou sobremesas que combinam com a refeição escolhida)

De 1 a 10, qual a probabilidade de visitar um local com esta oferta

126 responses

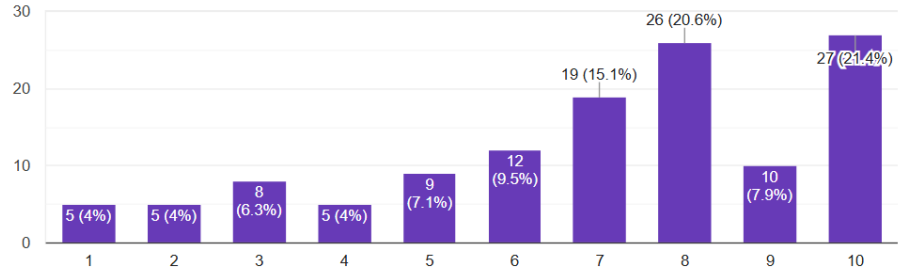

Figure 14 – Q12 – "Digital menus accessible via tablet or QR Code that suggest products based on customer preferences or purchase history. These menus can include information about local ingredients and pairing suggestions(e.g. wines or desserts that pair with the chosen meal)

AI SUGGESTIONS

Suggestion	Mode
Special menus with local ingredients from the Oeste region	10
Fado nights and concerts with traditional dinner	8
Digital loyalty program (app/card)	10
Partnerships with influencers from the Oeste region	5
Digital menus accessible via tablet or QR Code	10

Figure 15 – AI suggestions Mode Table

HUMAN SUGGESTIONS

Suggestion	Mode
Special dish on the first Sunday of each month with a complimentary wine	10
Giant screen for broadcasting football matches	10
Giant inflatable visible from the terrace	10
Promotion of 2 beers for the price of 1 during matches	10
Different cocktail every week at an affordable price	10

Figure 16 – Human suggestions Mode Table

AI VS HUMAN (FULL SCORES)

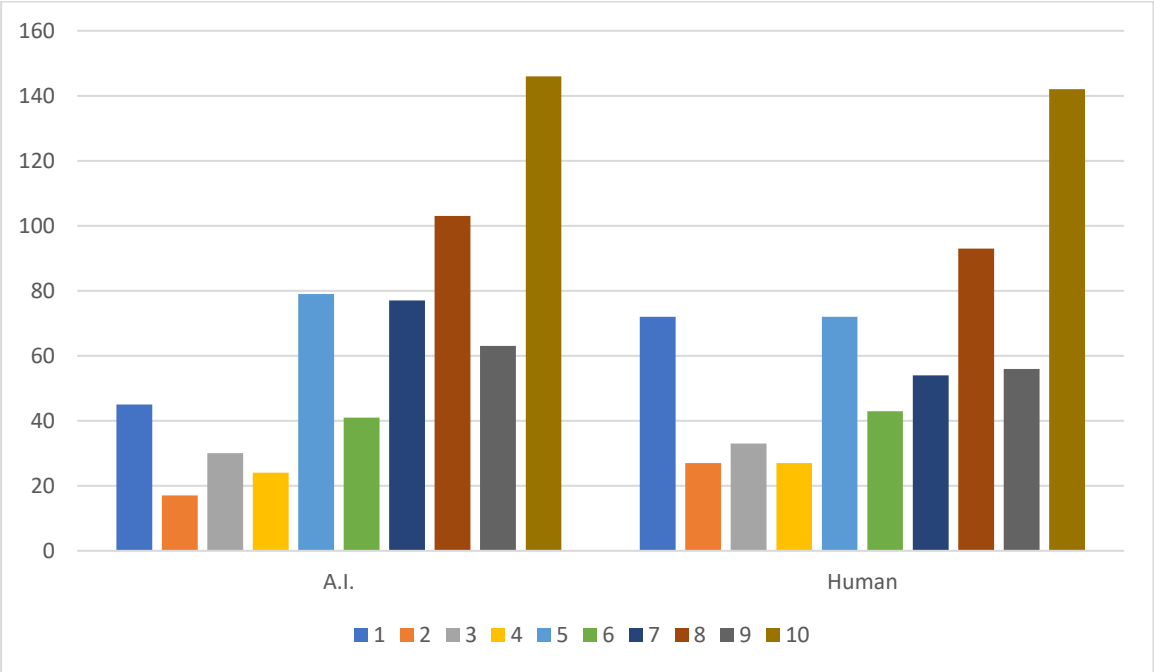

Figure 17 – Ai vs Human Full Scores Graph

5.2 QUANTITATIVE ANALYSIS OF QUESTIONNAIRE RESULTS

The primary goal of the questionnaire was to gauge the possible effect on choices made by consumers to go to or dine in hospitality places for each concept, whether AI- or human-derived. Participants rated the ten ideas (five from each source) through a Likert scale from 1 to 10 because 1 indicated no impact also 10 represented strong influence.

5.2.1 GENERAL PATTERNS AND SCORE DISTRIBUTION

Following a first rating distribution analysis, we found human and AI-generated ideas varied almost linearly along the scale. However, the AI ideas exhibited a pattern that was slightly more stable. Fewer extreme low ratings existed such as 1 or 2, also moderate to high values from 5 to 10 saw greater concentration. Among these, AI ideas scored 10, 8, as well as 5 most frequently, which suggests that respondents accepted them more broadly in addition to consistently.

By contrast, the human-generated ideas also showed frequent scores at 10, 8, and 5. The ideas varied to a greater degree, and humans rated those ideas as being low a greater number of times. Participant responses do reflect a higher level of polarization some ideas were strongly liked and yet others were more divisive. Nevertheless, the average score range between the two sets of ideas remained fairly comparable because no meaningful outliers distorted the data on either side.

5.2.2 Frequency of High Ratings

The two idea sets got a great deal of perfect grades (10) being one main likeness. Compelling concepts may arise from both human ideation approaches and AI. These concepts seem to be popular too. However, the AI-generated ideas tended to cluster more consistently around the high end on the scale, and human-generated ideas exhibited greater variability since some excelled and others underperformed slightly.

Human ideas are in fact more context-specific and quite planned, which also may explain now this variation. Restaurant operations familiarity or local trends familiarity determines if the ideas resonate strongly with participants or seem less relevant.

5.2.3 Statistical Trends and Interpretative Insights

Ideas generated by AI have a broader appeal from what is purely a numerical perspective. They have also more consistent mid-to-high ratings with fewer low-end scores. This reflects how they generally apply and sound neutral, which people often associate with AI-generated content. The responses suggest the performance of AI in the generating of universally acceptable ideas with a low risk of rejection.

Ideas by humans can be more polarizing. These ideas can also be found to be more impactful upon the other hand. Specific industry scenarios such as themed nights, local events, or sports promotions often rooted these ideas within stronger cultural or emotional responses either positively or negatively depending on the respondent's perspective.

AI excels in breadth, Catalán (2024) and Casquinha (2024) observed, but human ideators often deliver depth and context so this contrast reinforces their findings. Quantitative metrics do show comparable average scores. Ideas from humans possibly have greater figured capacity in focused uses or specific applications, especially if they are joined to advertising time, brand image, or yearly need.

5.2.4 Summary of Key Observations

- High ratings had been received for both idea sets especially in scores of 10, 8, and 5.
- **AI ideas did show a greater uniformity with fewer of the low ratings.**
- **Varied human ideas showed praise high for some, less impact for others.**
- Human ideas may carry some planned potential into more subtle contexts, while AI results can suggest a stronger consistency quantitatively.

5.3 Comparative Insights from Questionnaire Data

The results from this study revealed that both human and AI generate ideas capable of achieving high acceptance by consumers when evaluators consider restaurant innovation. AI-generated ideas showed more consistency plus wide appeal while human-generated ideas varied more yet could resonate deeper.

The average scores for each set of ideas suggest AI excels at generating universally agreeable content since it minimizes extreme ratings with polarizing responses occurring. Memmert and Bittner (2024) concluded AI-driven brainstorming improves idea exploration's breadth then supports high-volume ideation, aligning with these findings. In the present study then, AI ideas clustered at a point around higher median scores. Low values were assigned by relatively few respondents, which indicates a general acceptance across a diverse sample.

Ideas that were human-generated were characterized through more variation in the contrast. Some of the ideas received a particularly high number of ratings, but others scored much lower. This reflects upon the subtle nature of human ideation. This pattern was helped along by strong emotional or cultural context, often linked to audience segments or specific events (e.g., local traditions, sports events). According to Casquinha (2024), ideas generated by creative professionals were also often better aligned to calculated brand goals and emotionally resonant for specific audiences, even if they occasionally lacked the novelty or breadth that AI could offer at times.

Catalán (2024) supports the present findings because Catalán examined ChatGPT's ideation role with techniques like Parallel Universes and Extreme Users. AI could generate suggestions that are highly unconventional and also broad-reaching according to her work however human participants contributed ideas that were culturally sensitive plus often emotionally grounded. This duality did mirror itself in the current data set, in which human ideas ignited stronger reactions be they positive or negative in opposition to the moderate responses that AI content saw.

Notably, these idea sets received similar numbers of top ratings (score 10) despite distinctions, which reinforces that both sources can deliver impactful ideas. Research that aligns with this was found by Park et al. (2024) since participants frequently view AI content as likewise attractive to content by humans even when they do not know the source. However, their study highlighted too that people more consistently attributed trust and emotional depth to human creators. This perception likely influenced the greater variability in ratings for we observed here.

The findings of the study resonate with the conclusions from Song et al. (2024). Proper framing can make AI content match human content for effectiveness said their analysis. Improving reception hinged on matching message tone and context to audience expectations according to research they did a finding explaining targeted success for ideas human generated.

Overall, these results validate the use for AI and human brainstorming. That sort of use works well in creative firms. AI scales, speeds up, and also balances, while human ideation includes subtleties and emotions then specifies cultures and aligns strategies. These integrate since related works show and this thesis's patterns imply providing a model that seems most promising as future brainstorming processes develop.

6. CONCLUSIONS AND FUTURE RESEARCH

6.1 FINAL CONCLUSIONS

This research started with a simple question: can ChatGPT come up with ideas that are as good — or even better — than those created by humans? I choose to explore that in a real, practical context: the restaurant industry in the Oeste region of Portugal. Not only because it's an area I'm familiar with, but also because it's where creativity can directly impact small businesses that often struggle to innovate.

The selected restaurant along with the hospitality industry for this experiment, specifically local businesses in the Oeste region of Portugal, the research mainly intended to assess the dynamics then determine the advantages plus limitations of AI and human brainstorming in a controlled, comparative setting.

The research, through a mixed-methods approach combining qualitative ideation sessions and quantitative survey evaluation, intended to quantify perceived creativity, feasibility, and influence of ideas generated by AI and humans. Ideas with a strong appeal can be produced by both of the sources that the results demonstrated. Ideas that AI had generated were generally more consistent than before, so they did receive higher average scores now. These ideas also had less divisive reactions. By contrast, ideas that humans generated did vary more yet still occasionally peaked higher in both emotional and contextual relevance.

What was found with this study was that both humans and AI bring something valuable to the table, but in different ways. The ideas generated by ChatGPT were generally solid — well-structured, logical, and consistent. They weren't always surprising, but they made sense. Human ideas, on the other hand, were less predictable. Some were brilliant and clearly rooted in experience. Others maybe less polished, but they carried emotional weight or responded to very specific cultural contexts that AI simply couldn't grasp.

One of the most interesting parts of the process was seeing how people reacted to the ideas without knowing where they came from. It showed me that the origin of an idea really does matter — even if we don't consciously realise it. We tend to trust what feels more "human," especially in areas like food, hospitality, and local business. That emotional connection is hard to replicate.

That said, AI has its place. For someone stuck at the start of a creative process, ChatGPT can offer a quick boost of direction. It won't replace human insight, but it can help kickstart it. In contexts where time is limited or teams are small, it could be a useful tool to speed things up or explore options that might not have been considered otherwise.

Personally, this project made me reflect a lot on how we use technology in creative work. I don't think the goal should be to prove that AI is better or worse than us — but to understand how it fits in. Used well, it can make certain parts of the process faster or easier. But the final touch — the ability to read the room, feel the market, understand people — that still belongs to us.

In the end, I believe the most powerful brainstorming doesn't come from humans or AI alone, but from the combination of both. That's where the real potential lies — using the strengths of each side, without forgetting what makes human creativity unique.

6.2 RESEARCH LIMITATIONS

Despite the strengths of the study design, several limitations must be acknowledged:

- **Sector-Specific Context**: The hospitality industry tested brainstorming outputs as it applied as well as evaluated them. Though it based the study in practical use, it omits brainstorming's broad reach in industries.
- **Sample Scope**: Most survey participants were in Portugal's Oeste region. On account of this concentration, the more broad generalizability of those results was then limited.
- **Limited Number of Ideas**: Only five ideas from each source were evaluated. This small amount restricts the study of conceptual variety.
- **Single-Prompt AI Output**: AI results arose through one prompt per idea, without refining or iteratively co-creating, possibly constraining the tool's full creative potential.
- **Lack of Formal Qualitative Analysis**: Although open feedback had been collected, thematic analysis was still not performed.

6.3 Recommendations for Future Research

Although this study gave me solid insights into how humans and AI perform in brainstorming sessions, there's still plenty of ground to cover. A few ideas naturally came up during the process — either through gaps I noticed or questions that remained unanswered.

First, it would make sense to apply the same methodology in completely different industries. Restaurants made sense for this project because of my proximity to the sector, but brainstorming dynamics can vary a lot depending on the context. Fields like education, healthcare, entertainment, or marketing all rely heavily on creative thinking — and it would be interesting to see if AI plays the same role there, or if human input remains more dominant.

Another area worth exploring is how collaboration between humans and AI evolves when there's actual interaction. In this thesis, the AI was only prompted once, and its output was evaluated as-is. But real brainstorming is rarely that static. It involves conversation, reaction, and iteration. A future study could simulate a more realistic creative process, where humans and AI exchange ideas over several rounds. That would help test not just the quality of ideas, but how co-creation really works in practice.

It also became clear to me that numbers alone don't tell the full story. While I was able to gather useful data from the questionnaires, we didn't dive deeply into the emotional or cognitive side of things. Future research could benefit from using tools like biometric sensors or even simple observational techniques to better understand how people feel when exposed to ideas — not just how they rate them. The difference between something that's "liked" and something that actually connects is subtle, but important.

Another limitation of this study was the sample. Most participants were from the Oeste region, and many had some familiarity with the restaurant industry. That was useful for the context, but it limits how broadly the findings can be applied. A future version of this research could include a wider and more diverse group of respondents — across different regions, age groups, levels of education, and degrees of exposure to AI. That would definitely help spot patterns or biases that didn't show up here.

Finally, one thing I really wish I could have done was follow up on the actual implementation of the ideas. Knowing which ideas people prefer is one thing, but understanding whether those ideas actually work in practice is another. A longer-term study that tracks how AI- or human-generated ideas perform when used by real businesses — whether in terms of profit, customer satisfaction, or team engagement — would add a lot of value.

In short, this thesis opened up several new questions, not just about the effectiveness of AI in brainstorming, but also about how we measure creativity in the first place. Hopefully, it can serve as a stepping stone for more grounded and applied research in this space — especially research that brings human experience and technological potential into the same room.

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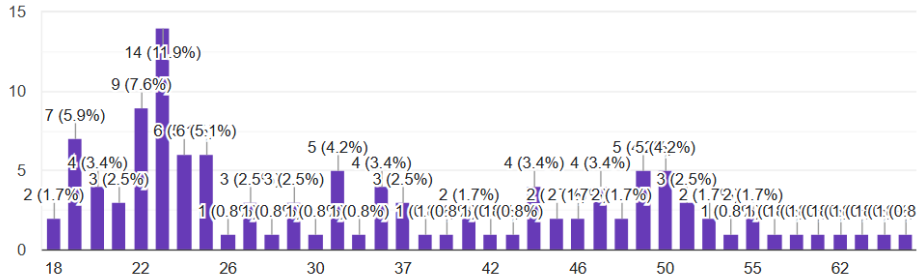
APPENDIX A

Idade:

Copy chart

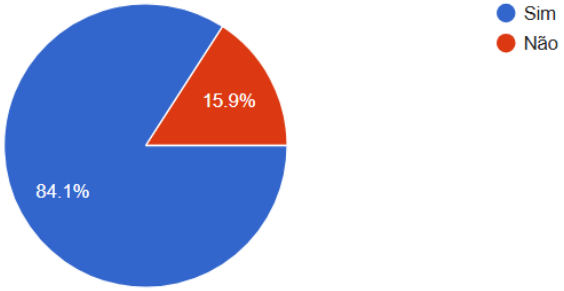
118 responses



Moras ou frequentas regularmente a região Oeste?

Copy chart

126 responses

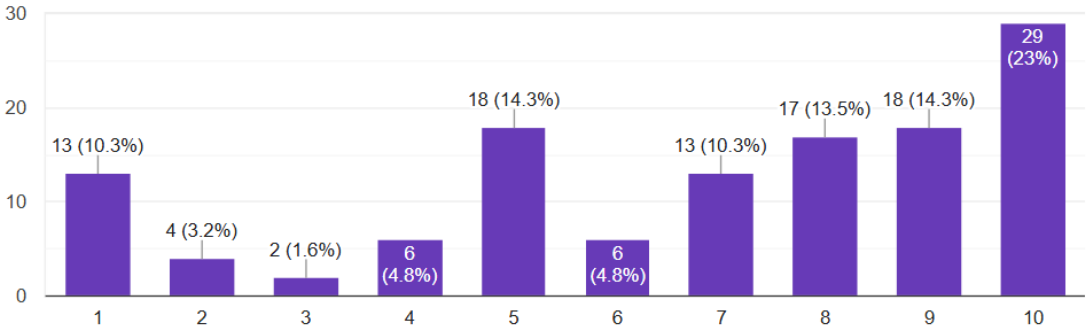


Copy chart

Menus especiais com ingredientes locais da região Oeste, como vinhos de Peniche, vegetais da Lourinhã ou peixe fresco de Torres Vedras.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

126 responses

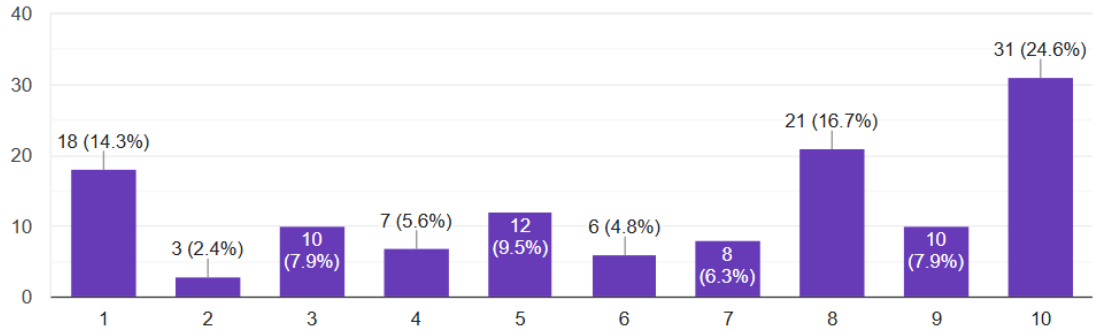


Copy chart

Disponibilizar um ecrã gigante ou projetor para a transmissão de jogos de futebol (Benfica, Sporting, Porto, Seleção)

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

126 responses

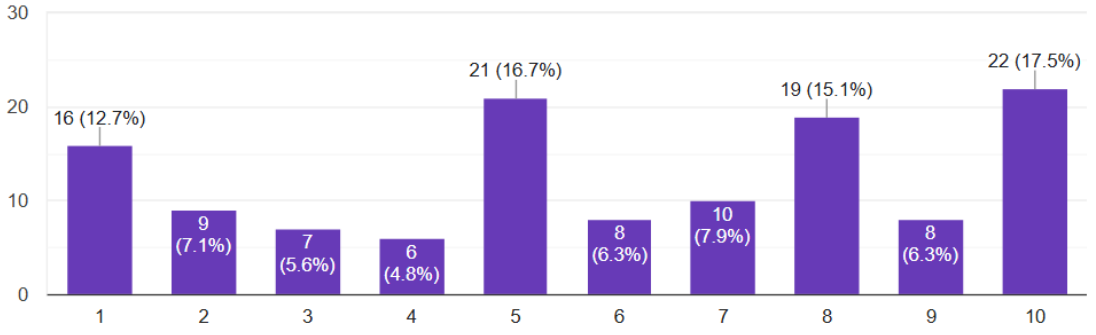


Copy chart

Possuir um insuflável gigante junto ao estabelecimento, onde consiga estar na esplanada e com visão total para as crianças.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta

126 responses



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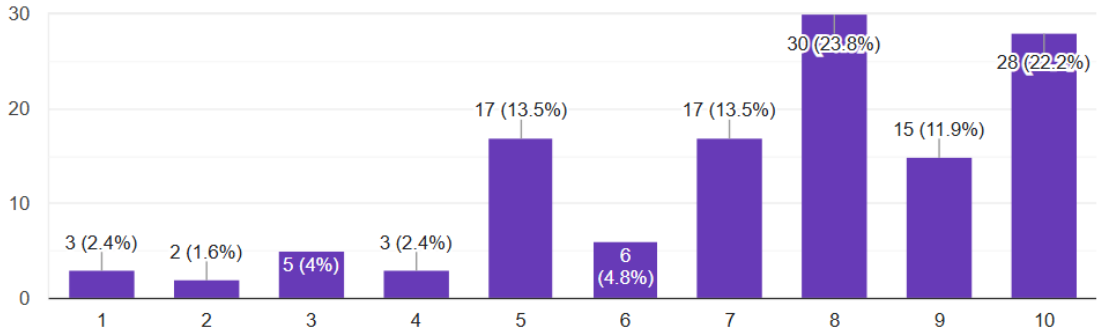
Organizar noites de fado, concertos com artistas locais com possibilidade de jantar pratos tradicionais portugueses.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

126 responses



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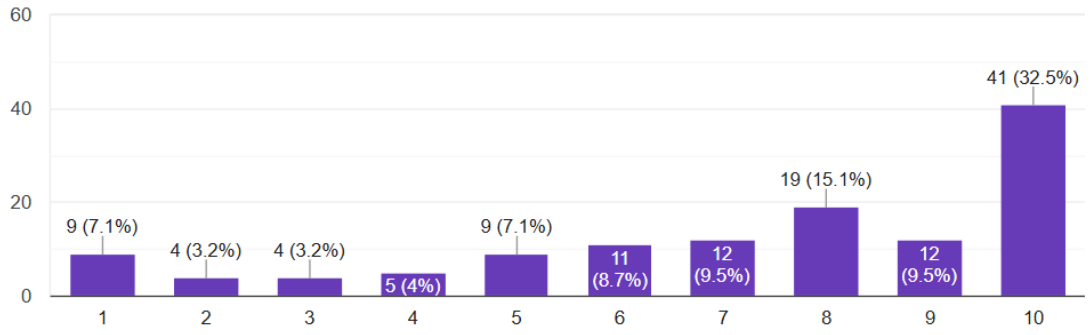
Criar um programa de fidelização digital (app ou cartão) onde os clientes acumulam pontos para trocar por descontos ou produtos exclusivos, como um almoço grátis após um número específico de visitas.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

126 responses

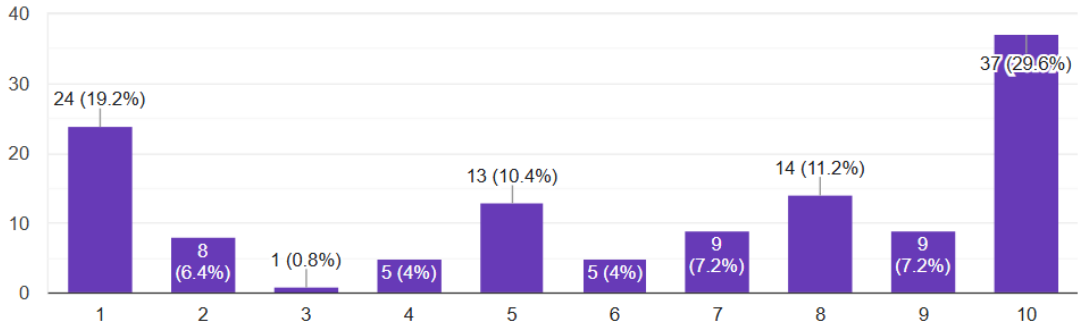


Copy chart

Durante os jogos do Benfica, Sporting, Porto, ter uma promoção ativa de beber 2 imperiais pelo preço de 1.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

125 responses



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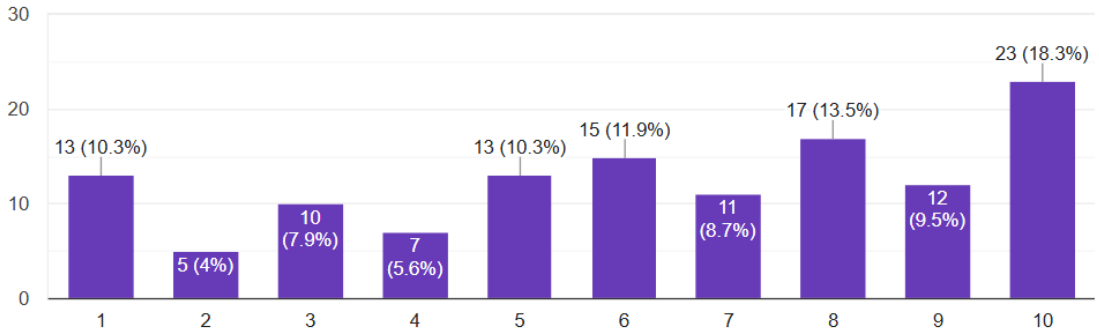
Anunciar um cocktail diferente todas as semanas a um preço mais acessível.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta ou de gastar mais para usufruir dela?

126 responses



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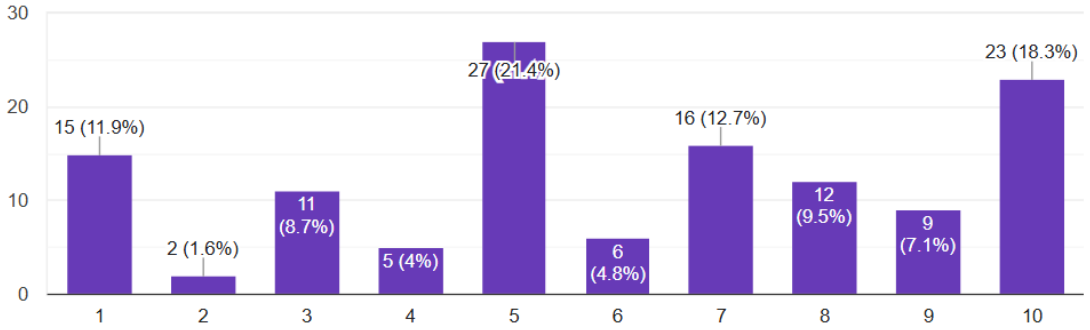
Parcerias com influenciadores da região Oeste para promover descontos exclusivos, sorteios ou eventos especiais.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta?

126 responses



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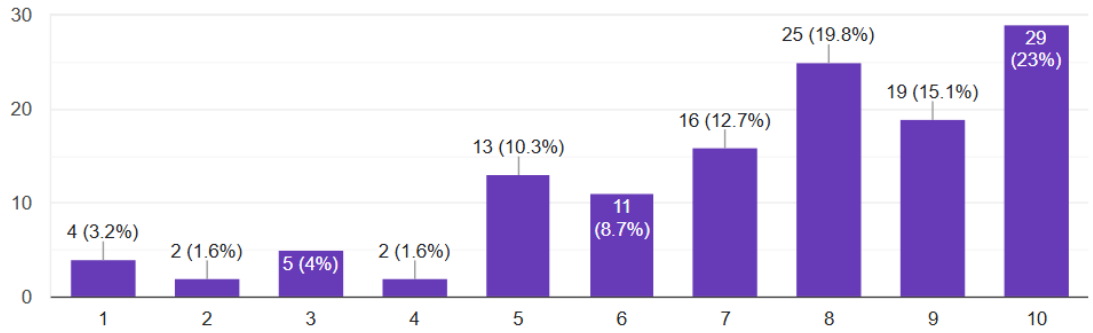
Disponibilizar um prato especial (caldeirada, cataplana, sopa de peixe ou sapateira) no primeiro domingo de cada mês. Quem reservar até sexta-feira recebe uma garrafa de vinho da casa gratuitamente.

De 1 a 10, qual a probabilidade de visitar um local com esta oferta

126 responses



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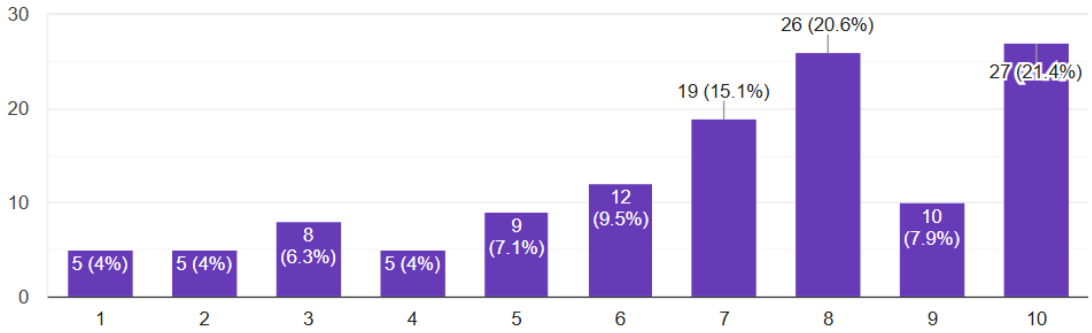
Menus digitais acessíveis via tablet ou QR Code que sugerem produtos com base nas preferências do cliente ou no histórico de compras. Estes menus podem incluir informação sobre ingredientes locais e sugestões de harmonização (exemplo: vinhos ou sobremesas que combinam com a refeição escolhida)

De 1 a 10, qual a probabilidade de visitar um local com esta oferta

126 responses



ANNEXES

NOVA Information Management School
Instituto Superior de Estatística e Gestão de Informação

Universidade Nova de Lisboa