Harnessing Open Strategy and AI for Customer-Driven Product Innovation

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ABSTRACT

This master's thesis explores the evolving role of open strategy, customer engagement, and artificial intelligence (AI) in driving innovation and enhancing product development in the camping and outdoor industry. As companies face increasing market complexity, integrating customer feedback through open strategy and using AI has become crucial. AI acts as a bridge between companies and customers, enabling dynamic co-creation processes where customers move from passive recipients to active contributors. The study examines whether AI-supported platforms and surveys represent a more meaningful way of involving customers in product development, ultimately fostering innovation. Using a mixed methods approach that includes expert interviews and consumer surveys, the study provides insights into the effectiveness of AI tools in capturing customer needs and translating them into actionable product improvements.

The results highlight that AI offers significant opportunities to enhance innovation, particularly in key areas such as streamlining communication, optimizing data analysis, and improving processing efficiency. However, successful implementation hinges on both internal acceptance within companies and on external acceptance by customers - this externals acceptance is examined in this thesis using the TAM model. This work offers valuable implications for industry practitioners and contributes to the academic discourse on co-creation, open innovation and the strategic integration of AI in product development.

Keywords: Open Strategy, AI, Customer Engagement, TAM Model, Dynamic Capabilities, AI tools, competitive advantage, Innovation, Value co-creation

Title: Harnessing Open Strategy and AI for Customer-Driven Product Innovation.

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RESUMO

Esta tese de mestrado explora o papel crescente da estratégia aberta, do envolvimento do cliente e da inteligência artificial (IA) na promoção da inovação e no aprimoramento do desenvolvimento de produtos no setor de campismo e atividades ao ar livre. Com o aumento da complexidade do mercado, integrar o feedback dos clientes por meio da estratégia aberta e do uso da IA tornou-se essencial. A IA atua como uma ponte entre empresas e clientes, facilitando processos dinâmicos de co-criação, transformando os clientes de receptores passivos em participantes ativos. O estudo investiga se as plataformas e inquéritos apoiados por IA constituem uma forma mais eficaz de envolver os clientes no desenvolvimento de produtos, incentivando a inovação. Utilizando uma abordagem mista, incluindo entrevistas com especialistas e inquéritos aos consumidores, o estudo analisa a eficácia das ferramentas de IA na identificação das necessidades dos clientes e sua tradução em melhorias tangíveis nos produtos.

Os resultados mostram que, embora a IA ofereça oportunidades importantes para impulsionar a inovação - especialmente em áreas como a simplificação da comunicação, otimização da análise de dados e melhoria da eficiência no processamento, a implementação bem-sucedida depende tanto da aceitação interna nas empresas quanto da aceitação externa pelos clientes. A aceitação externa é analisada nesta tese através do modelo TAM. Este trabalho oferece implicações valiosas para profissionais do setor e contribui para o debate acadêmico sobre co-criação, inovação aberta e integração estratégica da IA no desenvolvimento de produtos.

Palavras-chave: Estratégia aberta, IA, fidelização de clientes, modelo TAM, capacidades dinâmicas, ferramentas de IA, vantagem competitiva, inovação, Co-criação de valor

Título: Aproveitamento da estratégia aberta e da IA para a inovação de produtos orientados para o cliente.

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LIST OF ABBREVIATIONS

TAM	Technology Acceptance Mode
NPD	New Product Development
POUE	Perceived Ease of Use
PU	Perceived Use
SD	*Standard Deviation*
r	*correlations coefficient*
p	*P-value*

1. INTRODUCTION

1.1 Topic Presentation

In recent years, the way companies innovate and develop products has changed fundamentally. The opening up of strategy processes, known as "open strategy," makes it possible to better tailor products to the market's needs by incorporating customer feedback and preferences (Hautz, Seidl, & Whittington, 2017; Stadler et al., 2022). An extension of this development is artificial intelligence (AI), which serves as a link between companies and customers and significantly promotes dialogue and interaction (Perez-Vega et al., 2021).

AI-powered customer engagement are paving the way for a new era in product development. Customers are no longer passive recipients of products but active contributors. They can provide direct feedback, exchange ideas, and suggest improvements, which are then analysed by AI systems and integrated into product development. This dynamic co-creation process empowers customers to actively shape the products they use daily.

This master's thesis examines the dynamics and potential of open strategy in conjunction with AI-based customer engagement and shows how companies can use these approaches to drive innovation and achieve competitive advantages. It deals with the camping and outdoor gear industry, which is considered an important part of the consumer goods industry (Imarc, 2023).

1.2 Problem Statement

Increasing customer involvement in the product development through an open strategy represents a progressive response to changing market needs (Hautz, Seidl, & Whittington, 2017; Stadler et al., 2022). Despite artificial intelligence (AI) 's potential to intensify customer engagement, companies need help integrating and utilizing these technologies (Perez-Vega et al., 2021). While AI provides the opportunity to capture customer preferences more accurately and incorporate them into the development process, questions arise regarding the actual implementation and impact of AI-supported customer engagement tools on product development. This research focuses on identifying the influencing factors that determine the relationship between AI-enabled customer engagement and product development, including the willingness of customers to participate, the effectiveness of AI tools and the impact on the innovation. By exploring these critical issues, this master's thesis aims to deepen the

understanding of Open Strategy & AI for Customer-Driven Product Innovation and provide valuable insights for industry practitioners and academic researchers.

1.3 Research Question

How are companies using AI to integrate customers into open strategy product development?

1.4 Managerial and Academic Relevance

Integrating customer engagement through artificial intelligence (AI) in product development is highly relevant from a managerial and academic perspective. In an era where technology is redefining the game's rules in almost every economic sector, companies must understand and leverage the intricacies of AI-enabled customer integration to optimize innovation processes and strengthen competitive positioning. From a managerial perspective, this research gives executives a deeper understanding of how AI-enabled engagement can better capture customer needs and translate them into practical product innovation. The findings of this study can help decision-makers develop customer-centric strategies that fully utilize the potential of AI to increase the added value of products and thus achieve lasting customer retention and loyalty.

For academic research, investigating the interactions between AI, customer engagement, and product development offers the opportunity to deepen and broaden knowledge about AI-driven co-creative processes. The results provide valuable insights into open innovation and strategic management theories. Furthermore, the study contributes to developing new theoretical frameworks by illustrating how technological advances affect firm-customer interactions and value creation.

1.5 Dissertation Outline

The dissertation begins with a literature review on open strategy and the integration of customers into internal processes and their importance for companies focusing on the Outdoor & Camping Industry. It examines the latest approaches to customer integration and the role of AI in enhancing customer engagement and fostering innovative co-creation. The link between customer engagement, AI applications and the optimization of product development processes is then analyzed to assess the direct and indirect effects of AI use on value creation.

This is followed by an analysis of the Technology Acceptance Model and its significance for accepting and implementing AI tools in the context of co-creation, along with consideration of AI from the perspective of Dynamic Capabilities. The methodology outlines the research design, followed by discussions on the findings, limitations, and future research directions.

2. THEORETICAL BACKGROUND

The Literature Review analyzes the role of open innovation strategies and customer engagement in the product development process. In particular, the use of AI tools as a bridge will be examined. This provides an overview of relevant academic work on customer engagement and open strategy and the integration of AI into the co-creation process of product development. By looking at interrelationships between customer integration, AI application and customer-driven product development, the goal is to identify key findings and research trends. The literature section also seeks to understand how companies can refine innovation processes and strengthen competitiveness through AI-based customer engagement. It will illustrate how organizations can leverage dynamic capabilities to adapt agilely to rapidly changing market conditions driven by AI and customer integration and foster continuous innovation. The Technology Acceptance Model also serves as a management framework to derive assumptions about user's acceptance of AI technologies.

2.1 Evolution Open Strategy and Co-creation

2.1.1 Open Innovation Strategies

Open innovation is a decentralized approach to innovation based on the notion that relevant knowledge is widely distributed and companies cannot innovate effectively on their own. Chesbrough H. (2011) emphasizes two aspects of open innovation: the inclusion of external ideas and technologies "outside in" and the release of unused internal ideas and technologies for external use "inside out."

In recent years, companies have come to realize that this knowledge creation cannot only occur within the company. To expand the knowledge base, companies increasingly create knowledge with external players in the innovation process (Hoyer et al., 2010). Companies shift their focus from purely internal resource utilization and optimization to active external knowledge integration (Stadler et al., 2022). This strategic realignment can promote sustainable growth and create a competitive advantage (Chesbrough & Aplleyard, 2007).

The significance of an open strategy lies in its ability to integrate external ideas and resources into internal innovation processes, which leads to more innovation growth. In particular, the interaction between companies, external experts, partners, and customers plays a decisive role in open strategy. This aims to utilize knowledge from outside and promote collaboration across

company boundaries (Bogers et al., 2016). Integrating external knowledge from customer relationships enables companies to develop customer-centric innovations that meet market needs. Integrating customer feedback & knowledge into the innovation process helps companies develop relevant solutions tailored to their target group's needs and wishes. By opening up innovation processes to customers, companies can increase their ability to innovate while strengthening customer loyalty. This creates an open innovation ecosystem that enables developing products and services that reflect actual market requirements and generate closer customer loyalty (Foss & Saebi, 2014).

A case study is used to illustrate the implementation and challenges of an "Open Strategy" for a German speciality mechanical engineering company. The well-positioned company is facing new challenges from Chinese competitors who are developing equivalent products at more favourable prices and is considering an open strategy to remain competitive. The service area is to be expanded as a new part of the business model. External expertise is to be brought in, as internal mechanical engineers and managers have little knowledge of services. Despite the potential benefits of such a strategy, it meets with resistance within the company. A considerable segment of the conservative management team perceives external influences as risky and unwilling to give up control, even though the CEO initially supported the approach. Ultimately, the Open Strategy was not implemented due to internal reservations. This emphasises the need, especially for managers, but also other employees, to stand united behind a strategic realignment in order to ensure its success. This initially represents one of the greatest challenges of an implementation (Stadler et al., 2022).

Companies increasingly recognize the need to look beyond traditional company boundaries in a competitive environment characterized by rapid technological progress and fast-changing consumer needs. As a result, including external sources of innovation in processes is becoming increasingly relevant. Open innovation makes it possible to utilise the creative potential outside the company boundaries and integrate it into one's innovation processes (Foss & Saebi, 2014). The criticism mentioned above that the company wants to promote an open strategy jointly remains. Members of management or other relevant decision-makers who speak out against an open strategy threaten its successful implementation (Stadler et al., 2022).

2.1.1 Relevance for the Outdoor & Camping Indusrty

The outdoor and camping industry is a thriving sector encompassing a wide range of products and services to enhance outdoor experiences. This industry includes camping gear such as tents, sleeping bags, portable stoves, hiking equipment, clothing, and accessories designed for various outdoor activities. The market has grown significantly in recent years, driven by increasing consumer interest in outdoor recreation and adventure travel. Technological advancements have also played a crucial role, with innovations in Sustainability, lightweight materials, weather-resistant fabrics, and compact, multifunctional tools (Imarc, 2023).

In the consumer goods sector, especially in the outdoor and camping industry, fostering deeper consumer interactions is a key challenge. Brands must develop innovative strategies to retain customers and foster lasting loyalty effectively. This is particularly important in online retail and the consumer goods industry, where consumers are often less inclined to engage with brands. Conventional marketing tools are proving less and less successful in building customer loyalty, which is why companies increasingly rely on digital interaction to reach customers. Effective customer engagement is therefore crucial to increase loyalty and, more importantly, customer retention, which has a lasting impact on improving the company's value. By building such customer relationships, companies can receive valuable feedback that flows directly into product development. In addition, customer engagement promotes brand awareness and positive word of mouth, which supports and improves the company's perception and growth (Javornik & Mandelli , 2012).

2.1.3 Involving customers in the product development process

Intensive cooperation with customers to gain comprehensive insights and recognize potential needs is one of the key factors in developing new products and services (Gruner & Homburg, 2000). By creating shared value, all the involved shareholders and stakeholders collaborate in an integration process (Balaji & Roy, 2017). Winning customers through targeted communication and shared experiences can generate added value for all parties. This differs from only making products available (Vargo & Lush, 2016).

Customers can act as co-creators by providing ideas and feedback and being involved in the design and development process. This collaborative approach enables companies to understand the needs and preferences of customers better and develop innovative solutions

(Verleye , 2015). Stefan Lagrosen (2005) emphasizes the importance of cross-functional teams and customer involvement in product development. It is suggested that customers should be involved in the different phases of the product development process to maximize value for all parties involved. Many empirical studies have confirmed the positive impact of customer involvement through customer engagement and have identified it as a decisive factor for success (Poetz & Schreier, 2012; Chang & Taylor, 2015).

The customer engagement model has been a critical building block for innovative product development for years. The E-CKM approach presented by Su, Chen and Sha (2006) shows how companies can use information technologies such as web-based surveys and data mining to gain deep insights into the needs of their customers. By converting implicit customer knowledge into explicit knowledge, E-CKM enables targeted product development that proactively incorporates customer requirements.

This customer-centric approach minimises the risk of product development projects and promotes the market launch of new products by ensuring that they meet the actual needs of target customers (Su, Chen, & Sha, 2006)

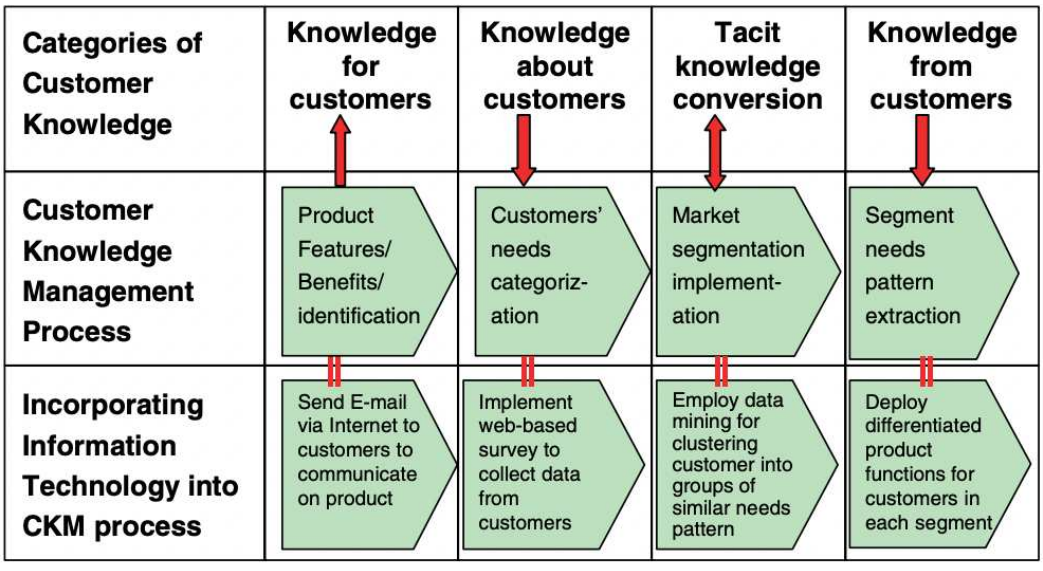

Figure 1: E-CKM Modell (Su, Chen, & Sha, 2006, July)

There are several ways to involve customers in product development. For example, customers can be involved as decision-makers or designers, allowing them to actively participate in product development, submit their designs, or provide feedback on existing ideas (Liu,

Moultrie, & Ye, 2019). Companies such as LEGO, for example, have created a platform where customers can submit design proposals and vote on designs submitted by others (Lego, 2024). This customer involvement is increasingly taking place online, making it possible to reach a wide range of customers and efficiently collect and evaluate their contributions (Liu, Moultrie, & Ye, 2019).

A common problem is data processing, where manual analyses and conversions are often long-term, complicated and very time-consuming. This requires considerable human and other resources. One technology that has established itself as a critical driver of such challenges in recent years is artificial intelligence (AI) (Perez-Vega et al., 2021). The following chapter will now take up the topic of AI.

2.2 AI as a Bridge for Customer Integration in the Product Development process

Artificial intelligence is becoming increasingly useful for new product development. AI technologies can significantly increase the success of product development projects, which had only a commercial success rate of around 30 %. Companies that have adapted AI methods at an early stage report a reduction in new product development times of up to 50 %. AI can act as a creative originator and support existing processes by making them faster and more effective. The ability of AI to identify market opportunities, customer needs and untapped potential from a flood of unstructured data is particularly noteworthy (Cooper & McCausland, 2024).

The transformative impact of AI extends to both the personal and professional spheres. AI-driven technologies have fueled economic growth and significantly improved living standards (Thangam & Sathish, 2018). This observation illustrates how essential AI is to the ongoing Industry 4.0 revolution, in which physical, digital and biological technologies merge. AI plays an increasingly important role by changing how companies interact innovatively with their customers, shaping sales processes and influencing customer behavior (Malhan & Agnihotri, 2023).

2.2.1 Artificial Intelligence

As this paper deals with the topic of AI in the area of consumer engagement, it is appropriate to provide a brief definition of AI and an overview of the various forms and origins of AI.

Alan Turing (1950) conducted the “Imitation Game” experiment, which created the basis for today's understanding of artificial intelligence (AI). The “Turing test” evaluates the ability of a machine to exhibit human-like behavior. In this test, a human questioner tries to find out through written communication whether they are dealing with a human or a machine (Turing, 1950; Russell & Norvig, 2016)

Accepted definitions of AI include two perspectives: humanistic and rational. McCarthy et al. (1955) describe AI from a humanistic perspective, suggesting that machines can behave in ways that would be deemed intelligent if exhibited by humans. On the other hand, a more results-focused and rational viewpoint, as outlined by Kaplan and Haenlein (2019), defines AI as a system's ability to interpret external data accurately, learn from that data, and utilize the acquired knowledge.

Artificial intelligence has various advantages over computer-aided automation, as it is able to recognise which sections of data make the most sense (Sterne, 2017). The idea of getting machines to learn a language and solve problems themselves was already being toyed with in the 1950s “to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves” (Russell & Norvig, 2016, p. 17).

2.2.2 Artificial Intelligence & Big Data analysis

AI offers significant potential in the realm of big data analysis. The following explanation is provided to comprehend the distinctions and understand how AI and big data analysis complement each other. Artificial intelligence is a component of computer science based on human intelligence processes (O’Leary, 2013), whereas big data refers to the handling of huge amounts of structured and unstructured data (Russom, 2011). Integrating AI techniques into extensive data analytics processes has revolutionized data management, analysis and decision-making capabilities across all industries. AI can filter relevant and valuable information from large and complex data sets. AI algorithms and machine learning models enable data processing

with unprecedented speed, identifying trends, patterns and anomalies that would be almost impossible for humans to recognize. Such technology allows companies to gain correlations and predictive insights that would likely not be found without such analysis. Such results can inform your decision-making and drive success (O'Leary, 2013).

A significant advantage of using AI in big data is improving data quality and accuracy. AI-supported data cleaning and pre-processing techniques help to identify and correct errors, inconsistencies and missing values in data sets. AI, therefore, ensures that all data used for analysis is reliable and free from bias (Tae et al., 2019). In addition, AI enables predictive analyses that allow organizations to predict future trends, behavioral patterns and outcomes based on historical data. However, it should also be noted that big data and AI are surrounded by myths that can obscure the actual capabilities and limitations of these technologies and lead to blind faith in data-driven technologies. It is, therefore, important to understand and scrutinize the backgrounds and approaches of both technologies before working with the results (Elish & Boyd, 2017).

2.2.3 The Rise of AI in Fostering Consumer Engagement

AI has spread in recent years, especially in various service areas. For example, automated interactions such as chatbots offer extensive potential for customer engagement. Customer engagement activities enabled by AI have the potential to engage customers more deeply, with predictions from Forbes suggesting that by 2025, around 95% of customer interactions will take place via computerized technologies without human intervention. The development of AI-powered customer interactions can help deliver personalized and efficient services that meet the increasing demands of consumers (Hollebeek, Sprott, & Brady, 2021). Hollebeek, Sprott, & Brady (2021) highlight the essential connection between AI and customer loyalty, noting that as AI transforms service organizations, customer loyalty has emerged as a strategic priority. However, despite the advancements in AI and customer engagement, a gap remains in fully understanding how these two areas intersect (Perez-Vega et al., 2021).

AI-based chatbots and virtual assistants, among other things, can process customer enquiries in real time, ensuring efficient communication around the clock. AI also supports companies in analyzing large amounts of data to understand customer behaviour and develop targeted marketing strategies. But companies can also strengthen customer loyalty and build long-term

relationships through personalized recommendations, optimized service processes and faster response times (Malhan & Agnihotri, 2023).

AI can interpret customer feedback automatically, analyze correlations, and create customer-specific recommendations and responses. Automating customer interactions through AI enables more efficient and personalized customer service that could not be implemented manually. Another benefit of AI-powered customer engagement is that data can be analyzed and made available in real time, which offers faster and more successful interactions with the customer (Perez-Vega et al., 2021).

AI shortens the time between data collection and decision-making (Jarrahi, 2018) allows automated, targeted and customized communication and can automatically use positive customer feedback (Perez-Vegaet al., 2021). Artificial intelligence can help to increase efficiency, reduce costs and improve product quality and customer service (Bag et al., 2020).

But it is not only the evaluation of data by AI that is laying new foundations, the concept of creative synergy between humans and artificial intelligence (AI) is becoming increasingly relevant across industries. This combination can create a framework in which humans and AI can combine their strengths to jointly go beyond what was previously possible. This synergy, which aims to expand and intensify human creativity through AI, is epitomized by the innovative concept of "AI Creativity". This approach opens up ways to increase efficiency and drive innovation through collaborative interaction between humans and AI (Wu, et al., 2021).

The "Human-AI Co-Creation Model" developed by experts outlines this creative exchange in the AI era and is presented as follows. It goes through various phases - from perception, thinking and expression to collaboration, building and testing - and illustrates how cooperation between humans and AI unleashes the potential of both actors:

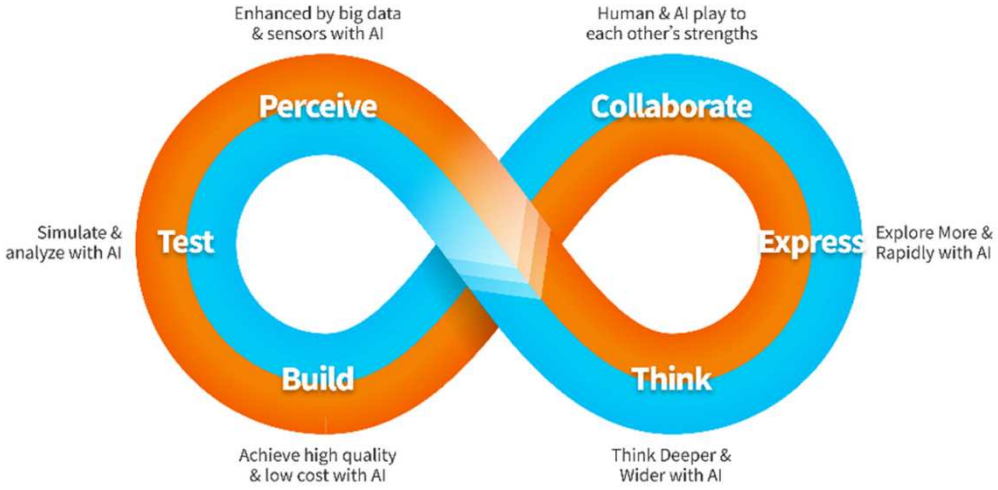

Figure 2: Human-AI Co-Creation Model (Wu, et al., 2021)

The prospects for "AI Creativity" are promising and point to significant progress and opportunities. The increasing integration of AI in organizations of all sizes and industries calls for continuous development in AI-based creativity. Addressing technological, societal and educational challenges by proactively fostering AI creativity allows opportunities to be fully exploited while minimizing potential risks. By supporting AI creativity in a wide range of fields, an inspiring and achievable future can be created in which people and AI open up new horizons in creative harmony (Wu et al, 2021).

However, it is important to note that AI systems deployed in companies will only realize their benefits if consumers accept them (Kaplan & Haenlein, 2019). In this context, the technology acceptance model (TAM) (Chapter 2.4) can be considered, which examines the willingness to use a technology (Chuttur, 2009). Customers must first perceive and understand the recommendations provided by AI before they recognize and use the technology themselves. This impacts the psychological state of everyone involved, be it in manufacturing, design, or use of products (Larivière, et al., 2017).

2.2.4 Integrating AI within Product Development

AI, previously used mainly to automate tasks and improve data analysis, is now a transformative force in product development, helping to increase the success rates of new product projects (Cooper & McCausland , 2024). The authors define AI in product development as a predictive technology that improves the speed, quality, and cost efficiency of predictions in various

business processes, especially in uncertain scenarios, which is often a common feature in product development (Cooper & McCausland , 2024).

Especially in the early stages of product development, AI can be a great help. New product ideas and concepts can be generated with its help, and gaps in the market, emerging trends, and customer needs can be identified. ChatGpt, YouScan and Brand24 are emphasized in this context. However, AI also plays a significant role in the development phases, where it can create 3D models and design technical drawings of products. AI in this phase accelerates time-to-market and improves product-market fit through predictive modelling and virtual prototyping. AI also plays a vital role in the final phase, which can be used to plan the brand launch and develop marketing and sales strategies. It can also analyze existing competitor products and thus calculating the price for your product. Companies must incorporate AI into product development to remain competitive in the coming years (Cooper & Mc Causland, 2024).

2.3 Dynamic Capabilities Theory (Management Framework 1)

2.3.1 Dynamic Capabilities Theory

Dynamic capabilities propose that firms must adapt to succeed in a rapidly changing market environment (Wang & Ahmed, 2007). Developed in the 1990s by David Teece, Gary Pisano and Amy Shuen, competitive advantage is traced to a firm's ability to integrate, build and reconfigure internal and external competencies quickly and effectively (Teece, Pisano, & Shuen, 1997).

Barreto (2010) defines an organization's dynamic capability, considering various modern aspects and constraints, as an interplay of four key dimensions. These capabilities include the "potential for systematic problem solving, which is formed by the propensity to recognize opportunities and threats, make timely and market-oriented decisions, and change its resource base" (p. 271). S. Winter emphasizes that dynamic capabilities encompass activities directed towards specific goals. These activities must enable the organization to solve problems systematically, recognize opportunities, and make relevant decisions to drive innovation and change (Winter, 2003).

2.3.2 Dynamic Capabilities & Competitiveness in the Context of AI based Customer Engagement.

A company's dynamic capabilities can be divided into three simple areas: Sensing, Seizing and Managing Threats/Transforming (Reconfiguring) (Teece, 2007). These capabilities are critical to finding the best structure for an organization, constantly anticipating innovations and managing knowledge effectively (Dangelico, Pujari, & Pontrandolfo, 2017). In a world where organizations increasingly rely on data - AI and cognitive technologies play an essential role. According to the Resourced Base View, The capability of AI is increasingly becoming a necessary and intangible resource for enhancing business performance (Chen, Esperança, & Wang, 2022).

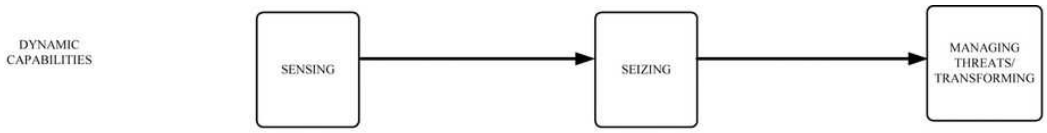

Figure 3: Dynamic Capabilities (Teece, 2007)

AI and machine learning have accelerated the innovation process of companies and, due to the ever-increasing amount of data available, have far-reaching economic consequences (Kohtamäki et al., 2019). For this reason, AI should be valued as a business capability rather than a technological improvement and must driven by companies (Davenport & Ronanki, 2018).

Collis & Anand (2019) point out that while dynamic capabilities can provide a competitive advantage, their effectiveness has inherent limitations. They argue that even if a firm develops particular capabilities, competitors may achieve similar results using alternative methods, thereby reducing the original firm's competitive advantage. Another fundamental limitation is that in highly dynamic or "high-speed" markets, dynamic capabilities can be fragile and difficult to maintain (Eisenhardt & Martin, 2000). Furthermore, managing dynamic capabilities can be resource-intensive and lead to excessive change, bringing significant risk of failure and additional complexity to implementation (Collis & Anand, 2019).

2.4 Technology Acceptance Model (Management Framework 2)

2.4.1 Technology Acceptance Model for AI

The Technology Acceptance Model (TAM) is a theoretical framework first proposed by Davis in 1989. It is based on the psychological theories of reasoned action and planned behavior and is often used to explain and predict how people accept or reject technology. Over the years, the TAM has become a critical model that helps to understand people's behaviour when dealing with new technologies. Researchers emphasize the importance of the TAM because it helps identify factors influencing how users adopt technology (Marangunic & Granić, 2014; Chutter, 2011).

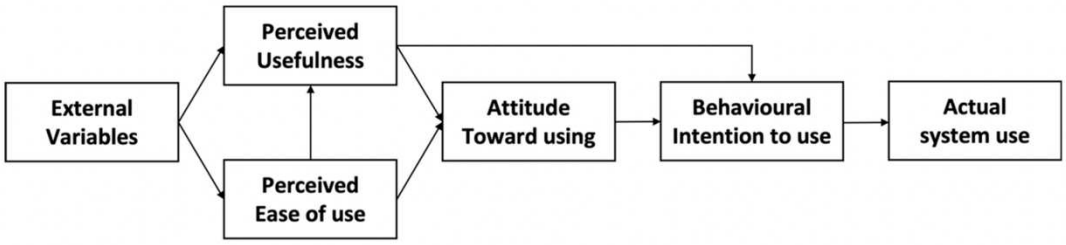

Figure 4: Technology Acceptance Model (TAM) (Davis, 1989)

The model postulates that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) perceived influence attitudes, which in turn influence the actual frequency of use. The model has been applied and adapted in many studies and has proven useful in explaining the acceptance of a variety of technologies in different contexts (Davis, 1989).

In the context of technology acceptance, PU refers to the extent to which users believe a particular technology can improve their work performance or efficiency. If users believe a technology will bring them a clear benefit, they are more likely to use it. This aspect is particularly crucial as it directly influences the motivation to engage with a new technology and integrate it into everyday working life (Na et al., 2022). At the same time, PEOU measures how easily and accessible users find the technology. A high level of PEOU reduces the perceived effort involved in learning and using the technology. The less effort and the more intuitive the use of technology is the greater the acceptance among potential users. This not only promotes a rapid adoption rate but can also ensure the long-term use of the technology (Surendran, 2019).

In addition, these two core components are influenced by many external variables. These can range from the user's previous experience with similar technologies to individual differences and the specific tasks for which the technology is used. System-related characteristics such as the technical infrastructure and support also play a role. These external factors modulate the perceptions of usefulness and ease of use and thus indirectly influence how readily a new technology is accepted and used by the target users (Davis, 1989; Na et al., 2022).

Over the years, the TAM model has changed, and several variables and applications have been added. Venkatesh & Bala (2008) have broadened the Technology Acceptance Model (TAM) by incorporating additional constructs like perceived enjoyment and subjective norms, offering a more comprehensive perspective on technology acceptance. This makes the TAM applicable to e-commerce and AI applications, among others. In the case of AI, the TAM includes factors such as trust, ease of interaction and perceived competence (Wang et al., 2023).

In their meta-analysis, King & He (2006) perceive the model as highly applicable and point to its credibility and effectiveness in over 88 studies. However, they point out limitations, especially about perceived usefulness and behavioral intentions, which often do not match actual behavior. They also criticize the influence of social interactions, as individual characteristics may influence the accuracy of TAM predictions. 'Word of mouth' is often mentioned as a factor influencing these results (Maruping et al., 2016).

Another shortcoming of the TAM is the difficulty of reliably quantifying basic behaviour in an observational study. This is due to many subjective factors such as social values and norms, personality traits and individual characteristics (Malatji, van Eck, & Zuva, 2020).

3. RESEARCH METHODOLOGY

This Chapter provides an overview of the research methodology applied in this thesis, elaborating on the selected research design and the data collection methods used to test hypotheses.

3.1. Research Design

A two-stage research approach was chosen to explore the possibilities of using AI in product development and a company's dynamic capabilities, as well as to evaluate the benefits for the company. Inductive and deductive research methods were used to answer the research question.

Research Question:

How are companies using AI to integrate customers into open strategy product development?

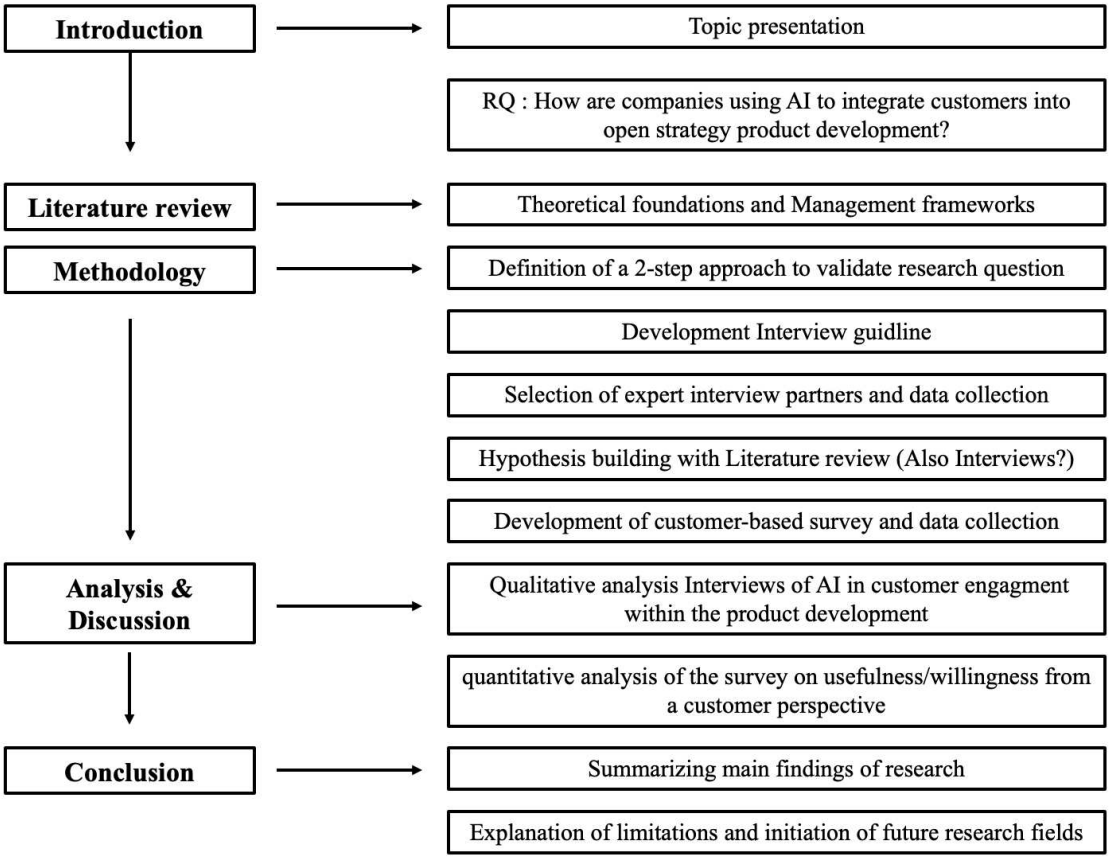

Figure 5: Research Design

In the first phase, a qualitative research method in the form of interviews was used. Here, industry experts, strategy consultants, and AI specialists were interviewed to understand current and potential AI applications in customer engagement and product development. The interviews were used to identify AI's innovative uses and understand how these can strengthen a company's dynamic capabilities.

In the second phase of the research, a consumer survey was conducted to determine consumer's perceptions of the benefits of AI-based product development approaches and to evaluate customers' willingness to adopt such innovations. The consumer survey aimed to gain insights into end-user expectations and possible reservations, which are crucial for guiding product development with customer engagement and the use of AI as a bridge.

This research approach combines qualitative insights from expert interviews with quantitative data from the consumer survey to ascertain opportunities and challenges of integrating AI into product development.

3.2. Expert Interviews

At the beginning of the research, semi-structured interviews were conducted with experts in AI, product development, and (Open) strategy. Semi-structured interviews are considered an effective method of qualitative research (Bansal et al., 2018) for talking to experts and understanding and analyzing complex phenomes (Williams, 2007). In this method, interviewers and industry experts work in one interview with a strict guideline that provides reliable and comparable qualitative data with a precise sequence (Cohen & Crabtree , 2006).

In this study, this method was first used to gain further knowledge about AI in product development and customer engagement in addition to the theory. The evaluation of the interviews also aims to gain further insights into the tested management Frameworks. Each expert was interviewed using the same questions and a five-point Likert scale. Which increases the depth of the analysis. The prepared questions gave the experts enough space to gain further knowledge and trends through further questions and deepening (Adhabi & Anozie, 2017). This allowed room for freedom on the part of the experts, which in turn led to great flexibility within the expert interviews (Rowley, 2019). The experts were selected based on their professional experience, expertise, and company position to ensure their statements contributed to a qualitative result (Galletta, 2013).

The interviews were conducted via Zoom and Teams and lasted between 30 and 60 minutes. They were recorded and then summarized (see Appendix 1). As the interviewees were granted anonymity, all conversations took place anonymously.

Expert	*Current Position*	*Expertise*	*Years of Experience*
A	Team Lead at a **technology company focused on AI** applications	pecialist in machine learning, artificial intelligence, and their implementation in industrial processes, including predictive modeling and customer engagement strategies using AI-driven chatbots	**<5 years**
B	Managing Partner of a consulting firm **specializing in business strategy and innovation**	Expert in business innovation and strategic implementation, with a strong research background on the impact of emerging technologies, including AI, on business strategies and customer experiences	**<15 years**
C	Senior Manager and **AI Expert at Boston Consulting Group**	Extensive experience in AI-driven solutions, ipredictive analytics, and machine learning for customer segmentation, personalized marketing, and automated support systems.	**<10 years**
D	Senior Manager Inhouse Consulting at leading **company for outdoor clothing**	Advising on sustainable product development, growth strategies and operational efficiency within the outdoor clothing industry.	**<10 years**
E	Partner, Innovation consulting firm (**Open Approach)**	worked in many projects where they helped firms to implement Open Strategy and Customer Engagement	**<20 years**
F	Manager Consulting firm specialization in **Innovation Strategies**	Specializes in leveraging AI technologies and crafting innovation strategies, with recent experience in enhancing customer engagement across all business areas, including a 'Voice of the Customer' project aimed at integrating customer feedback into product development	**<5 years**
G	Senior Manager (Innovation Department) of a **leading manufacturer and reseller of outdoor equipment** in Europe	Extensive experience in driving innovation and product development strategies, with a focus on integrating cutting-edge technologies and customer feedback to enhance product offerings and market competitiveness in the outdoor industry.	**<10 years**
H	Strategy In-house Consultant Manager at a **DAX-listed consumer goods company** in Germany	Overseeing strategic initiatives and guiding corporate decision-making processes within the consumer goods sector, with a strong focus on optimizing business operations and enhancing market position through data-driven strategies	**<20 years**

Table 1: Overview Experts

3.2.1 Analytical Approach

The analysis of the interview data was organized into six primary categories, each further divided into subcategories. This approach allows for the answers provided by the interviewees to be compared systematically (Gordal, Anteby, & Holm, 2021). According to Strauss and Corbin (1990), the key to effective categorization is a thorough examination of raw data followed by identifying broader groupings based on recurring themes or concepts emphasized by the different experts. This categorization method helps researchers draw general conclusions from the data set (Krippendorff, 2004), with emerging themes and patterns offering insights into the underlying relationships between the data (Van Maanen, 1979).

3.3 Survey Development

First, the hypotheses are formulated based on the findings from the interviews and the detailed review of the theory. In this paper, seven hypotheses concerning the Technology Acceptance Model (TAM) are developed and then tested using the survey.

H1*: Customers perceive participating in the product development process as too complicated and time-consuming.*

H2a: *Customer willingness to participate in the product development process increases when the process is simplified and they can easily submit ideas.*

H2b: *Customers with a high purchasing frequency are more willing to participate in a simplified product development process than those with a low purchasing frequency.*

H3: *Customers who believe AI tools can improve product development show higher willingness to participate in the product development process.*

H4a: *Customers who receive incentives such as profit sharing, vouchers, or discounts are more willing to participate.*

H4b: *Monthly Income does not influence the willingness to participate in the development process if incentives are offered.*

H5: *Customers perceive surveys as useful for expressing opinions and providing feedback.*

H6: *Customers find AI-driven tools and platforms more effective and user-friendly than traditional methods.*

H7: *Greater customer involvement in product development increases the likelihood of purchasing products in the outdoor and camping industry.*

Existing studies on customer engagement, open strategy, and AI applications in this area were used as benchmarks for developing the hypotheses and survey questions. A large part of the survey is based on hypotheses formulated using theory and the results of the expert interviews. Several studies have already investigated customer engagement and AI applications and their impact on companies' ability to innovate.

The study “Factors influencing customers willingness to participate in virtual brand community's value co-creation” examines the factors influencing customer’s willingness to participate in value creation within virtual brand communities. In particular, it analyzes how subjective factors such as self-efficacy and expected outcome and environmental factors (e.g., community experience and trust) and brand factors (e.g., brand awareness and loyalty) influence customer’s willingness to participate. The findings from this study provided a basis for understanding what conditions encourage customer engagement, particularly concerning the acceptance of new technologies and the role of incentives (Zhao et al., 2018).

Important key points from the study were..

- *Influence of subjective factors*

Customers who believe in their abilities and expect positive results are more willing to participate in value-creation processes (Zhao et al., 2018).

- *Role of customer participation*

The more involved a customer is in the community, the more willing they are to participate, especially when it comes to more straightforward and more intuitive processes (Zhao et al., 2018).

Perez-Vega et al. (2021) investigated the benefits of automated communication between companies and customers with the help of AI and showed how technology such as AI can improve this interaction.

In the study: “The Impact of Artificial Intelligence Stimuli on Customer Engagement and Value Co-creation: The Moderating Role of Customer ability readiness”, the authors examine the effects of AI stimuli on customer engagement and value creation. It also investigates the moderating role of customer’s willingness to engage with AI capabilities in the Service Area. The topic of AI-based surveys as a bridge between companies and customers was also addressed in a survey of 429 customers in the study (Gao, et al., 2023).

All these studies, expert interviews, and literature research form the basis for the survey, which is presented in detail in the following chapter.

The survey aimed to determine a general trend regarding the acceptance of technologies such as AI and the involvement of customers in the development process. One of the critical questions from the Experts & Literature is: are customers willing to participate actively? This study deliberately examined only one specific target group - customers from the camping and outdoor industry. Including a second control group, such as people who do not buy products from this sector, was deliberately omitted from this master's thesis. Examining other target groups outside this industry would have made the analysis more complex. It is important to note that no clear conclusions would have been possible without limiting the variety and size of different industries and products and the interests of various customer groups.

This is also needed within the camping and outdoor industry. The survey could cover customers thinking of more minor, everyday items such as tent pegs and those with expensive equipment such as tents in mind. Nevertheless, narrowing it down to this industry makes sense to get a comprehensive picture of whether customers are fundamentally willing to get more involved in the development process and how they value technologies such as AI.

3.4 Survey Structure

The survey question was designed to achieve the main objective of the research: to investigate the adoption of AI and customer engagement in the product development process within the camping and outdoor industry. The online survey began with an introduction from the researcher and a brief description of the topic. Participants were assured of the confidentiality of their data before being directed to the basic demographic questions. These included age, gender, origin, monthly income and frequency of purchase of products from the camping and outdoor industry.

After the demographic questions, participants were asked if they purchase products from the camping and outdoor industry, such as hiking gear and camping accessories. Participants who did not buy these products were excluded from the rest of the survey. For those who confirmed purchasing such products, the survey formally began with questions about the frequency of their purchases in this industry.

Based on the hypotheses and literature, the questions investigated various aspects of AI in product development, particularly regarding process simplification and communication. Participants were asked for example about their willingness to participate if AI simplified the process or if incentives, like financial rewards, were offered, aiming to assess if such factors increased engagement.

The questions were answered using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). This scale allowed participants to express their agreement or disagreement with various statements.

The survey explored participant's views on the usefulness of surveys for sharing opinions and needs and compared AI-driven tools with traditional methods in terms of effectiveness and ease of use. Additionally, it examined whether increased customer involvement in product development would raise their likelihood of purchasing products in the camping and outdoor industry. The complete survey is available in the appendix.

3.4.1 Data Collection & Sample

The online survey was conducted from July 20, 2024, to August 26, 2024, and reached 215 people who completed it. Qualtrics was chosen as the platform for creating and conducting the survey, which made it possible to independently survey a broad target group within the camping and outdoor industry. The survey was strategically published via a private contact of the author to a major German influencer on Instagram. This decision was made to ensure the survey reached the right target group. People who are closely connected to the industry follow role models and influencers on Instagram and thus show a high level of engagement. In addition, the survey was distributed via WhatsApp, asking recipients to participate if they buy outdoor industry products. As in many other studies, this data collection method (Convenience sampling) was chosen due to time and resource constraints, as it allows easily reachable people to be targeted (Etikan, 2016). Convenience sampling or opportunity sampling is one of the most common types of sampling in many studies (Farrokhi & Mahmoudi-Hamidabad, 2012). With such a data collection method, trends and patterns of a smaller group of people can be extrapolated to a larger group of people (populations) (Emerson, 2015).

3.4.2 Analytical Approach

The geographical framework was defined to include multiple countries to ensure the research design was precise and in-depth in its analysis. In addition, different age groups were defined to examine differences in purchasing frequency or interest in participating in the product development process. After receiving 215 responses, the survey data was cleaned by removing incomplete responses. The data was then analyzed using SPSS software. First, an overview of the sample and the calculation of mean, median, minimum and maximum values for each dimension analyzed was created using descriptive statistics. All categories were clearly presented using bar charts, correlations, regressions and other visual representations. To ensure consistency of results, all statistical analyses were performed using SPSS throughout and the results were then exported to Microsoft Excel. Various statistical tests were applied to test the hypotheses and investigate the relationships between willingness to participate in the product development process, perceived complexity and possible simplifications through the use of AI. This detailed statistical analysis revealed remarkable patterns and dynamics, which are presented in detail in the evaluation.

4. Analysis & Findings

This chapter first analyses the external interviews and then analyses the survey results.

4.1. Expert Interviews analytics – Likert Scale

The Likert scale for the 5 statements ranged from 1 to 5, with 1 meaning "strongly disagree" and 5 meaning "strongly agree".

Question 1

"Incorporating customers into internal processes and open up their internal processes strengthen the firm's ability to innovate." Here, the experts had different opinions. While the majority of experts (B, D, E, F) strongly agreed, Expert A was somewhat more reserved with a 4. Experts C and H were more neutral and awarded a 3, which indicates that they consider the value of customer integration to be important but not decisive for innovation.

Question 2

"Companies could use artificial intelligence to improve their product development processes." here was a broad agreement with this statement among the experts. Experts (B, C, D, F and G) gave the highest rating of 5. Expert A, E and H also agreed, but with a slightly lower rating of 4, which indicates a slightly differentiated assessment of the benefits of AI.

Question 3

"AI can be utilized as an effective tool to streamline communication with customers."

Most of the experts strongly agreed as well. Experts (B, C, E and G) gave a 5, while experts A, D and F gave a 4. H, on the other hand, only gave a 3. This shows that the experts generally recognize the effectiveness of AI in customer communication, albeit with slight gradations in their assessment.

Question 4

"To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers." Here, the experts' opinions were mixed. Experts (B, D and E) strongly agreed, while Expert A and F gave a 4, indicating positive but not unqualified support. Expert C was also supportive with a 4. At the same time, Expert G and H gave a more neutral rating of 2 & 3, indicating that they see the benefits of direct application of customer feedback as less crucial.

Question 5

"Customers are willing to engage with a company and provide feedback." Here, the experts showed a wide spread in their answers. Experts E and D gave a 4 respectively and saw a willingness for customer involvement. Experts (A, B, C and G), on the other hand, gave a 2, indicating skepticism regarding the actual willingness of customers to get actively involved. Experts F and H were in the middle with a 3.

4.2. Expert Interviews analytics – Questions

The interview findings were organized into six primary categories, where the expert's statements were grouped and summarized.

Open Strategy and Industry Engagement

The majority of experts, including (A, B, C, D, E, G and H), emphasized that an open strategy, in which external stakeholders are involved in internal processes, promotes innovation within the company. These experts emphasized that the involvement of external stakeholders increases the innovation potential and strengthens the company's ability to adapt to market requirements and interact with stakeholders. Expert G also highlighted the importance of diverse perspectives and maintaining trust and transparency among all stakeholders. Expert F stated that the variety of opinions involved increases the likelihood that no potential errors/dangers are overlooked. Experts (B, E, and H) specifically emphasized the advantages of direct customer integration as an external stakeholder group in the innovation process. They explained that this integration increases the relevance and user-centricity of the company's innovations. Expert H emphasized the importance of customer involvement and that the company must adequately utilize the input of engaged customers. Experts A and B insisted on the passion of outdoor customers, which supports their willingness to improve continuously.

Nevertheless, some experts pointed out various challenges associated with implementing an Open Strategy. Expert A said that this strategy could potentially raise confidentiality issues, and managing such a strategy is complex. At the same time, Experts (B, C, D, and G) cited the difficulties in coordinating different opinions and the delays in decision-making due to the large number of inputs. Experts C and H also emphasized that employees and managers, in particular, need to support the open strategy.

Customer Integration and Innovation

Most experts (A, B, C, D, E and G) emphasized the value of integrating customers into the innovation process. Expert H, on the other hand, tended to point out the dangers. Experts (B, C, D, E and G) specifically explained that this integration enables the company to directly capture the needs and wishes of customers and incorporate them into product development. Experts B and C emphasized that customer integration strengthens the company's ability to adapt and innovate by promoting continuous learning and quick reactions to market changes. Expert B emphasized that this approach reduces the risk of market denial as products are more closely aligned with customer expectations. Expert G added that in the outdoor industry, where customers have high expectations of their equipment, the active involvement of customers is crucial for the continuous improvement and optimization of products. Experts such as G and F suggested specific approaches to improve customer integration. Expert G spoke of creating special co-creation labs where customers can work with developers and designers on new products. Expert F, on the other hand, pointed out that customers often don't know exactly what they want and that companies should understand and build on customer needs to encourage incremental innovation. Some experts, including F and H, were critical of the unrestricted use of customer feedback. They pointed out that customers only sometimes know what is technically or economically feasible and that the company must carefully consider which ideas can be implemented. Most of the experts emphasize that involving customers in the innovation process significantly strengthens a company's ability to adapt and react to market changes and highlights its Sensing and Seizing Capabilities (mentioned in Chapter 2.4).

Artificial Intelligence

Most experts, including (A, B, C, D and E), emphasized the enormous potential of artificial intelligence (AI) to accelerate product development. They agree that AI can automate repetitive tasks, improve decision-making processes and thus increase the company's innovation capacity. In particular, using AI for data analysis and predictive models makes it possible to react quickly to market changes and use resources more efficiently. Experts (B, C, D, G, and H) emphasized the role of AI in improving communication with customers. They emphasized that AI-driven chatbots and surveys are already simplifying customer interaction and setting new standards in customer service. These tools collect and analyze customer feedback to gain valuable insights into trends and customer preferences, leading to the development of personalized product features. Experts (A, C, D and G) emphasized that AI can automate the development process, freeing up resources for more creative and strategic tasks. Experts (C, D, and G) emphasized

the importance of AI in modeling and prototyping. They explained that AI helps to create prototypes quickly, reduce development costs and shorten the time to market. Although the experts emphasize the potential of AI, some, including H, also expressed concerns about the complexity of developing and implementing AI tools. Nevertheless, most experts agree that AI will play an increasingly important role in product development in the coming years.

Customer Participation and Motivation

Several experts, including (A, B, D and E), agreed that customers are more willing to participate in the development process if they see a direct benefit or improvement to the product. Experts (A,C and D) emphasized that offering incentives such as discounts, rewards or exclusive previews can significantly increase the willingness to participate. Experts (B, D, E and H) emphasized that the simplicity and user-friendliness of feedback channels are crucial for customer's willingness to participate. They emphasized that complicated or time-consuming processes can put customers off and that companies should create clear, simple, appealing ways to provide feedback. Experts (B, D and G) emphasized the importance of showing customers that their feedback impacts product development. Transparent communication and visible results from customer feedback strengthen trust and increase participation.

AI Tools and Technology Acceptance

Most experts, including (A, B, C, D and H), emphasized that AI tools can improve the user experience through personalization and intuitive operation (improved user-friendliness). Experts (E, F and H) also pointed out that simplifying processes through AI tools can increase customer interest. They explained that automated processes enabled by AI increase the willingness of users to engage with and adopt new technologies. Experts (C, G and H) highlighted that AI is helpful in automatically analyzing data and recognizing patterns. This allows individual suggestions to be made based on user behavior.

Technology and infrastructure

Experts (A, B, C, and F) agreed that a robust data infrastructure is a prerequisite for effectively integrating AI tools. This infrastructure should be able to store and manage high-quality data to run AI models efficiently. Experts (B, D, and E) emphasized the need for qualified personnel and continuous training. They emphasized that know-how in implementing AI and ongoing employee training are crucial. Experts B and G also mentioned the topic of cyber-security and presented it as an essential point. Experts G and H emphasized that the willingness of employees

to accept and embrace new technologies is crucial. They noted that in many cases this acceptance needs to be improved, which can hinder the successful implementation of AI tools

4.3. Survey analytics – Demographics & Screening Questions

For this study 215 participants were surveyed, 56 of whom did not take part in the survey as they do not buy products from the camping and outdoor industry. 4 participants were removed from the data set due to invalid data. The demographic data is described first. Five nationalities took part in the survey, including Germany (126), Austria (22), Norway (2) and Switzerland (1). Germany leads with 81.3 % of the participants, followed by Austria with 14.2 %. In terms of age, the majority are between 18 and 34 years old. The largest age group of 25-34 years has a share of 49.7%.

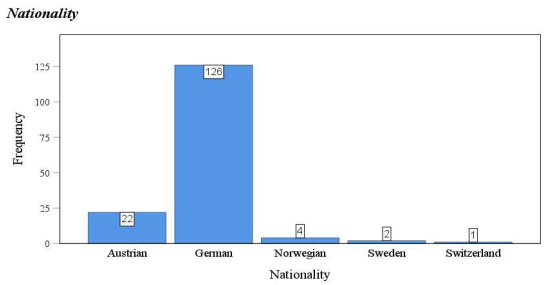

Figure 6: Nationality Survey

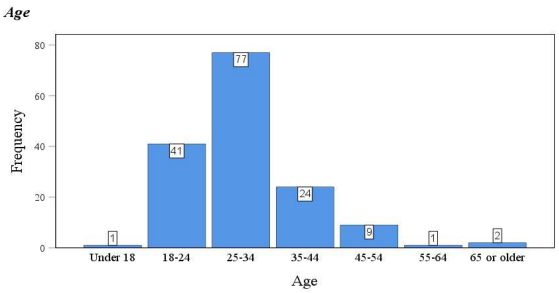

Figure 7: Age Survey

The survey included 70.3% men (109) and 29.7% women (46). Most respondents earned between 1,000 and 2,999 € per month in the monthly income category.

4.4 Survey analytics – Visualizations & Hypothesis testing

First, a look is taken at the variable participants' frequency of shopping. In the answer options, it was possible to choose between *Very Low (1), Low (2), Moderate (3), High (4) and Very High (5).*

The following results were obtained:

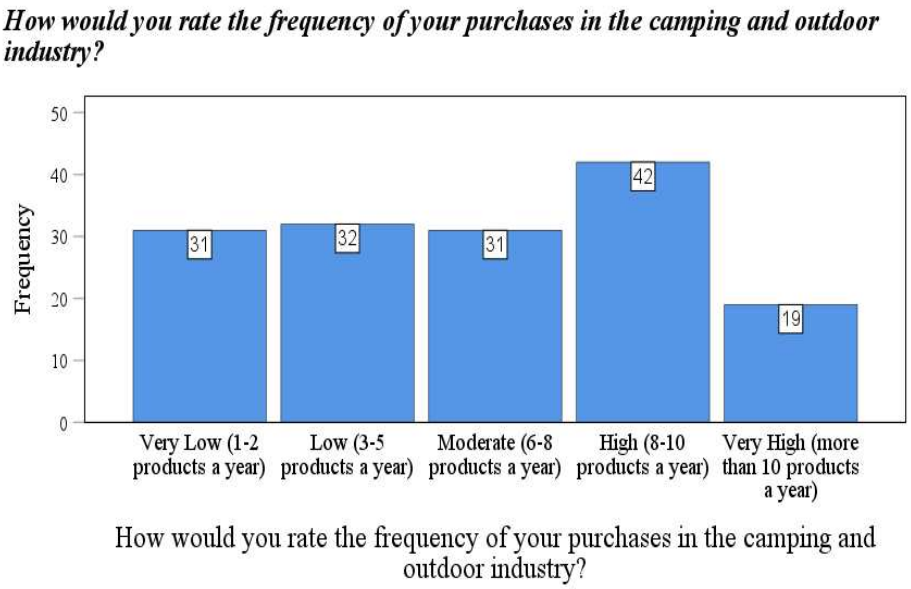

Figure 8: Frequency of Shopping

The mean value is 2.91 and the median value is 3, which shows a very balanced result.

The hypotheses were tested using T-tests, correlations and regressions. T-tests offer a good opportunity for accepting and rejecting the hypothesis (Rouderet al., 2009). A *test value* of 3 was selected, with "4" and "5" indicating agreement, "3" neutrality and "1" and "2" rejection. This methodology clearly distinguishes between agreement, neutrality and rejection in the results.

Hypotheses 1: *Customers perceive participating in the product development process as too complicated and time-consuming*

In the following, a simple T-test was carried out to see whether the statements of the survey participants confirm the hypothesis.

	Test Value = 3						
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
Participating in the product development process, such as suggesting new features for a tent or other outdoor equipment, is too time-consuming and complicated for me	12,247	154	<0,001	<0,001	0,755	0,63	0,88

Table 2: T-Test 1 - H1

The results show statistical significance with a *T-value* of 12.247 and a *p-value* of less than 0.001. The mean difference between the *test value* (3) and the *mean value* 3.755 (*SD* = 0.767) is 0.755.

	Test Value = 3						
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
Do you feel that the complexity of the process reduces your willingness to participate in the product development process	14,010	154	<0,001	<0,001	0,981	0,84	1,12

Table 3: T-Test 2 – H1

The second result shows statistical significance with an approximate *T-value* of 14.010 and a *p-value* of < 0.001. This means that the participants stated, with a statistical majority, that complexity reduces willingness. The mean difference between the *test value* (3) and the *mean value* 3.981 *(SD* = 0.871) is 0.981. Customers perceive participation as overly complicated and time-consuming, significantly reducing their willingness to engage. Therefore, Hypothesis H1 is confirmed, emphasizing that the complexity of the process plays a crucial role in diminishing participation.

Hypotheses2

H2a: *Customer willingness to participate in the product development process increases when the process is simplified and they can easily submit ideas.*

Hypotheses 2b: *Customers with a high purchasing frequency are more willing to participate in a simplified product development process than those with a low purchasing frequency.*

H2a: For hypothesis 2, the same T-test was performed to obtain a statistically significant overview.

	Test Value = 3						
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
If the process for submitting ideas were simpler, I would be more likely to participate.	17,070	154	<0,001	<0,001	0,955	0,84	1,07
A user-friendly platform that allows easy submission of ideas for new outdoor gear would increase my willingness to participate in the product development process.	14,580	154	<0,001	<0,001	0,961	0,83	1,09
If it required less effort to submit my ideas, I would be more willing to participate in the product development process.	15,087	154	<0,001	<0,001	0,903	0,78	1,02

Table 4: T-test H2a

The results of the statistical analysis show consistently significant values. A *T-value* of 17.070, a *mean difference* of 0.955 (*SD* = 0.696) and a *one-sided p-value* of <0.001 were determined for the first question. For the second question, the *T-value* is 14.580, the *mean difference* is 0.961 (*SD* = 0.821), and the *one-sided p-value* is <0.001. The third question has a *T-value* of 15.087, a *mean difference* of 0.903 (*SD* = 0.745) and a *one-sided p-value of* <0.001. The *one-sided p-value* of <0.001 in all cases confirms that the results are statistically significant.

The hypothesis can, therefore, be regarded as confirmed.

H2b: For Hypothesis H2b, Spearman's rho correlation was utilized to examine the relationship between the variables. The Spearman rank correlation coefficient is a non-parametric (distribution-independent) measure used to determine the strength and direction of the relationship between two variables (Hauke & Kossowski, 2011).

Correlations

			How would you rate the frequency of your purchases in the camping and outdoor industry?	If the process for submitting ideas were simpler, I would be more likely to participate.
Spearman's rho	How would you rate the frequency of your purchases in the camping and outdoor industry?	Correlation Coefficient	--	
		Sig. (1-tailed)	.	
		N	155	
	If the process for submitting ideas were simpler, I would be more likely to participate.	Correlation Coefficient	,544**	--
		Sig. (1-tailed)	<,001	.
		N	155	155

**. Correlation is significant at the 0.01 level (1-tailed).

Table 5: Correlation Matrix H2b

The Spearman's rho analysis shows a moderate positive correlation ($r = 0.544$, $p < 0.001$), indicating that frequent buyers in the camping and outdoor industry are more likely to participate in product development if the idea submission process is simpler.

Therefore, H2b can be accepted.

Hypotheses 3: *Customers who believe AI tools can improve product development show higher willingness to participate in the product development process*

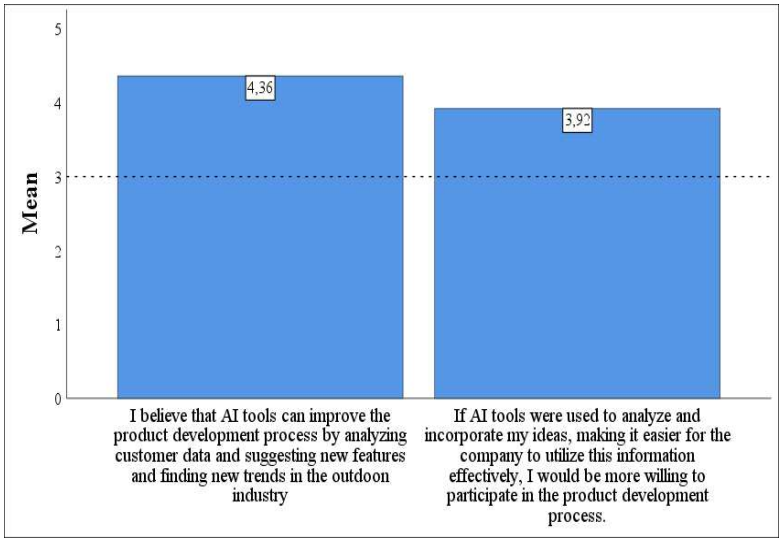

Figure 9: Chart H3

The results of the two questions supported the hypothesis that customers who believe that AI tools can improve product development show a greater willingness to participate in the product development process. As can be seen in the graph, the values obtained are above the *test value* of 3 in all cases. The *T-value* is 25.549 for the question on the left-hand side of the graph and 15.275 for the question on the right-hand side. In addition, all questions have a *p-value* of <0.001, which indicates a high statistical significance. These results confirm the hypothesis, and it becomes clear that customers rate AI tools as helpful. According to customers, they therefore offer potential for improvement about traditional methods.

Hypothesis 4

H4a: *Customers who receive incentives such as profit sharing, vouchers, or discounts are more willing to participate.*

H4b: *Monthly Income does not influence the willingness to participate in the development process if incentives are offered.*

H4a: The statistical analysis of the various response options shows that "Incentives, such as financial rewards" was rated highest with a *mean value* of 4.02 (SD = 0.947, T-value = 13.485), followed by "profit sharing" with a *mean value* of 3.67 (SD = 0.717, T-value = 8.817) and "vouchers or discounts" with a *mean value* of 3.35 (SD = 0.943, T-value

= 6.049). All three results are statistically significant, with a *P-value* of <0.001 in all cases. This confirms the relevance of the results and supports the hypothesis financial incentives promote a greater willingness to participate in product development.

H4b: In the next step, the results were analyzed using a correlation with the monthly income variable. Correlations between the variable and the previously determined values were examined to identify statistically significant patterns.

			Monthly income	received profit sharing. For example, if a product developed with my ideas is successfully sold, I would receive a share of the profits.	Vouchers or discounts would increase my willingness to participate in the product development process.	Incentives, such as financial rewards (e.g., €5), would motivate me to participate in the product development process
Spearman's rho	Monthly income	Correlation Coefficient	--			
		Sig. (2-tailed)	.			
		N	154			
	I would be more willing to participate in the product development process if I received profit sharing. For example, if a product developed with my ideas is successfully sold, I would receive a share of the profits.	Correlation Coefficient	,060	--		
		Sig. (2-tailed)	,459	.		
		N	154	155		
	Vouchers or discounts would increase my willingness to participate in the product development process.	Correlation Coefficient	,060	,157	--	
		Sig. (2-tailed)	,460	,051	.	
		N	154	155	155	
	Incentives, such as financial rewards (e.g., €5), would motivate me to participate in the product development process	Correlation Coefficient	-,205*	-,243**	,121	--
		Sig. (2-tailed)	,011	,002	,133	.
		N	154	155	155	155

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6: Correlation Matrix H4b

The correlation between monthly income and willingness to participate in the product development process in profit sharing is insignificant (r = 0.060, p = 0.459). The correlation between monthly income and the willingness to participate in product development when receiving vouchers or discounts is also insignificant (r = 0.060, p = 0.460). The correlation between monthly income and motivation to participate in the product development process through financial incentives (e.g., 5€) is significantly negative (r = -0.205, p = 0.011), which means that a higher income tends to correlate with lower motivation through financial

incentives and people with lower incomes are more likely to favour financial incentives than vouchers or profit-sharing. There is also a significant negative correlation between profit sharing and financial incentives (e.g. €5), with a *r* of -0.243 (p = 0.002). This indicates that participants tend to be interested in either profit sharing or financial incentives but rarely prefer both options equally. Therefore, The hypothesis cannot be fully confirmed, as there is a negative correlation with statistical significance concerning monthly income and financial rewards (e.g., €5).

H5: *Customers who perceive surveys as useful for expressing opinions and providing feedback are likely to participate in such surveys.*

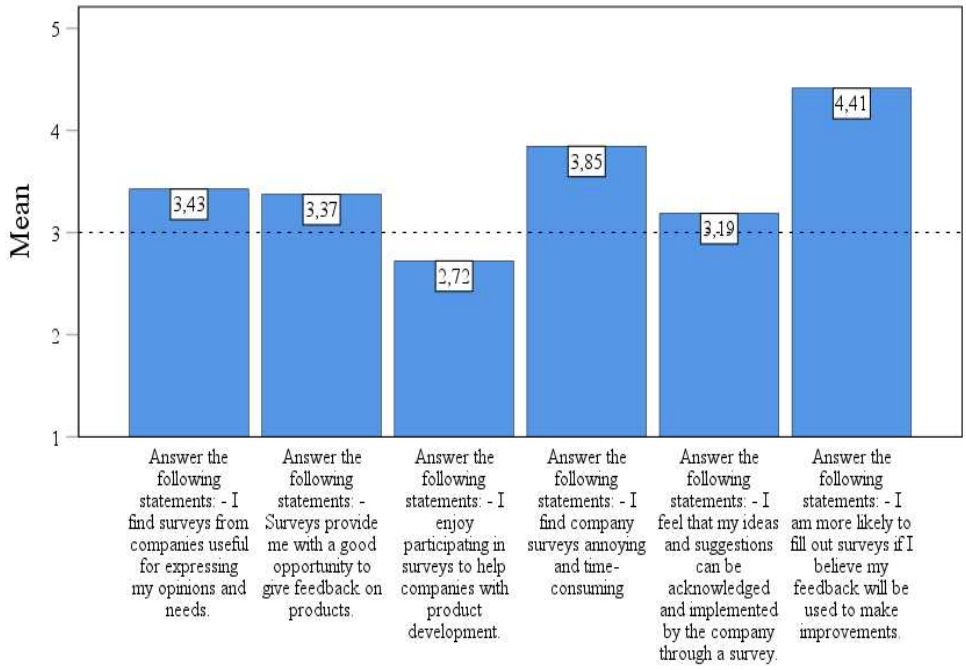

Figure 10: Chart H5

The results show that customers find surveys helpful in expressing their needs. This is evidenced by the statistical significance of the *p-value*, which is <0.001 (T-value = 6.219, *Mean* = 3.34, *SD* = 0.825). In addition, customers see surveys as a good opportunity to provide feedback, which is also statistically significant, with a *p-value* of <0.001 (T-value = 6.373, *Mean* = 3.37, *SD* = 0.731). In contrast, the t-test for the statement "I enjoy participating..." is negative, with a *T-value* of -4.181, and the mean value of 2.72 (*SD* = 0.826) is below the test value of 3, which indicates a majority rejection of this statement. Furthermore, the data shows that most respondents find surveys time-consuming and annoying. This result is statistically significant

with a *p-value* of <0.001 and a *T-value* of 13.742 (*Mean* = 3.85, *SD* = 0.766). The difference between the mean value and the test value is 0.845. This shows that although customers see surveys as a good option, they do not enjoy doing them and tend to see them as time-consuming. Hypothesis 5 can, therefore, not be confirmed. However, it is worth noting that a majority of respondents are statistically significant in stating that they are more willing to participate in surveys if the feedback is implemented by the company, as shown by a *T-value* of 29.282, a *mean-value* of 4.41(*SD* = 0.601) and a *p-value* of <0.001.

The correlations (see Appendix) show that participants who find surveys useful also tend to believe they provide a good opportunity to give feedback ($r = 0.238$, $p = 0.003$). This suggests that participants who value surveys also think they can effectively express their opinions and needs. Another weak positive correlation ($r = 0.233$, $p = 0.003$) exists between the usefulness of surveys and the enjoyment of participating, mainly when these surveys help to support companies in product development. Participants who see surveys as a good opportunity to provide feedback also feel more pleasure participating, supported by a moderate positive correlation ($r = 0.269$, $p < 0.001$).

In contrast, a moderate negative correlation ($r = -0.365$, $p < 0.001$) shows that participants who find surveys annoying are less likely to enjoy participating, even if they intend to contribute to product development. A weak negative correlation ($r = -0.206$, $p = 0.012$) between the perception of surveys as time-consuming and the belief that their suggestions will be implemented shows that participants who find surveys unpleasant also have less confidence in their usefulness.

The moderate positive correlation ($r = 0.289$, $p < 0.001$) demonstrates that participants who believe their feedback will be used for improvement are also more likely to view surveys as a valuable opportunity to provide feedback. This indicates that perceived effectiveness of feedback use enhances the perceived value of participating in surveys.

Finally, the positive correlation ($r = 0.229$, *p-value* 0.004) between the likelihood of filling out surveys and the belief that the company will utilize and acknowledge feedback suggests that participants are more motivated to engage in surveys when they feel their input is valued and acted upon.

H6: *Customers find AI-driven tools and platforms for customer engagement more effective and user-friendly than traditional methods.*

	Test Value = 3						
			Significance			95% Confidence Interval of the Difference	
	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
I find AI-driven tools, such as a platform, AI data analysis, or AI-based surveys, more effective and reliable than traditional methods for submitting my ideas for outdoor and camping equipment.	25,647	154	<0,001	<0,001	1,271	1,17	1,37
An AI-driven platform would improve my communication with the company. This platform could allow customers to submit ideas, receive feedback, and collaborate with the company throughout the product development process.	16,044	154	<0,001	<0,001	0,910	0,80	1,02
If AI enhances and expands on my ideas, turning them into valuable resources for product developers and creating significant benefits, I would prefer this method and be more likely to participate.	15,161	154	<0,001	<0,001	0,955	0,83	1,08

Table 7: T-test H6

The results of the statistical analysis show significant values throughout. For the first question, a *T-value* of 25.647, a mean difference to the *test-value* (3) of 1.271 (*SD* = 0.617) and a *one-sided p-value* of <0.001 were determined. For the second question, the *T-value* is 16.044, the *mean difference* is 0.910 (SD = 0.706), and the one-sided p-value is <0.001. The third question has a *T-value* of 15.161, a *mean difference* of 0.955 (*SD* = 0.784) and a one-sided p-value of <0.001. The *one-sided p-value* of <0.001 in all cases confirms that the results are statistically significant. The hypothesis can, therefore, be regarded as confirmed. Customers see AI tools as valuable and helpful. It also increases the willingness to participate in the product development process.

H7: *Greater customer involvement in product development increases the likelihood of purchasing products in the outdoor and camping industry.*

The following bar chart shows the link between purchase frequency in the outdoor industry and willingness to buy products developed with customer involvement.

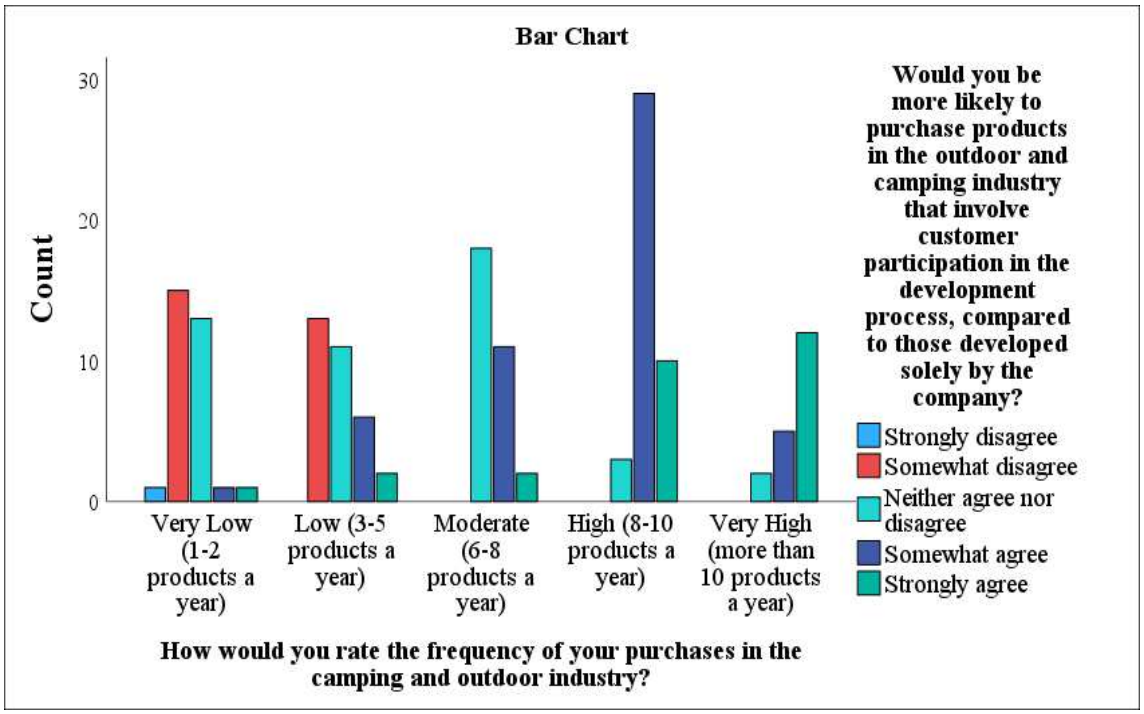

Figure 11: Bar Chart H7

The data shows that participants with a low to shallow purchase frequency (*Low / Very Low*) and a moderate purchase frequency tend to answer the statement "*More likely to purchase products that involve customer participation*" with "*Somewhat disagree*" or "*Strongly disagree*". In contrast, participants with a high to very high purchasing frequency (*High / Very High*) tended to answer "*Somewhat agree*" or "*Strongly agree*". The response category "*Neither agree nor disagree*" is represented across all purchasing frequency groups, although it is less pronounced among participants with a high and very high purchasing frequency. In the next step, a regression is set up to see whether other variables have an influence.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,717[a]	,514	,500	,710

[a]. Predictors: (Constant), Monthly income, How would you rate the frequency of your purchases in the camping and outdoor industry?, Gender, Age

Table 8: *Model Summary H7*

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79,334	4	19,834	39,319	<,001[b]
	Residual	75,159	149	,504		
	Total	154,494	153			

[a]. Dependent Variable: Would you be more likely to purchase products in the outdoor and camping industry that involve customer participation in the development process, compared to those developed solely by the company?

[b]. Predictors: (Constant), Monthly income, How would you rate the frequency of your purchases in the camping and outdoor industry?, Gender, Age

Table 9: ANOVA-test H7

The explanation of variance of the model is 51.4%, which indicates that the model explains a considerable proportion of the variance in the dependent variable. The ANOVA test shows that the model is statistically significant, as the *p-value* is < 0.001.

In the next step, a regression analysis is performed to gain detailed insights into the individual variables “Frequency of Purchase”, “Age”, “Gender”, and “Monthly Income”.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1,491	,336		4,431	<,001	,826	2,156		
	How would you rate the frequency of your purchases in the camping and outdoor industry?	,566	,046	,746	12,199	<,001	,474	,657	,872	1,146
	Age	,059	,074	,056	,800	,425	-,087	,204	,657	1,521
	Gender	,245	,130	,112	1,880	,062	-,012	,502	,921	1,086
	Monthly income	-,050	,060	-,060	-,842	,401	-,168	,068	,650	1,539

[a]. Dependent Variable: Would you be more likely to purchase products in the outdoor and camping industry that involve customer participation in the development process, compared to those developed solely by the company?

Table 10: Regression Model H7

The regression analysis shows a significant relationship between 'Frequency of purchase' and willingness to buy customer-involved products, supported by a *p-value* of <0.001. The *standardized coefficient* (beta) for purchase frequency is 0.746, which indicates that purchase frequency strongly influences the willingness to buy customer-integrated products. This strong correlation is further underlined by the high *T-value* of 12.199, which further confirms the robustness of this result. All these findings indicate that frequent buyers in the camping and outdoor industry tend to prefer products whose development they are involved in.

The variables Age, gender and income show no statistical significance for consumer behavior and the willingness to buy customer-integrated products, as their *p-values* are above the significance level of 0.05. Purchase frequency is the strongest predictor of willingness to purchase customer-integrated products in the outdoor industry, while demographic variables such as age, gender and income show no significant effects. Hypothesis H7 is not fully confirmed, as only the group with a high purchase frequency shows a greater willingness to purchase products with customer involvement. This phenomenon is insignificant in the data for the group with a low purchase frequency.

5. Discussion, Limitation and Future Research

5.1. Discussion of the Findings

This discussion examines how and why companies should use AI to involve customers in product development and drive an open strategy. This chapter comprehensively answers the research question of this thesis. It discusses the theory of dynamic capabilities, the TAM model, and the statements of the experts and survey participants interviewed.

Open Strategy and Customer Engagement

The majority of the experts surveyed emphasized that the involvement of external stakeholders, especially customers, can significantly increase a company's innovative strength. This view supports Chesbrough's (2011) concept of open innovation, which sees integrating external ideas and technologies as key to increasing a company's innovation ability. However, some experts expressed concerns, particularly regarding the challenges of implementing an open strategy. For example, experts (A, C, H) pointed out potential difficulties, such as maintaining confidentiality and the complex coordination of diverse opinions that can arise from the involvement of external stakeholders. Furthermore, experts (B, C, D and G) pointed out delays in decision-making. These challenges also reflect the difficulties discussed in the literature that can arise when implementing open innovation, especially when managing and making decisions in an environment with many different voices (Stadler et al., 2023). Nevertheless, the arguments that an Open strategy in customer-driven product innovation promotes innovation and competitiveness outweigh those that see difficulties.

AI-Driven Product Innovation

The expert interviews illustrate the considerable advantages of using AI in product development. The majority of experts (A, B, C, D, and E) emphasized that AI can automate repetitive tasks and improve decision-making processes, which helps to increase a company's ability to innovate. These views are consistent with the literature, indicating that AI can be central in accelerating product development processes (Cooper & McCausland, 2024).

The statements of the experts (C, D, G) highlight the role of AI in modelling and prototyping, emphasizing that AI has the potential to revolutionize the prototyping process. Creating prototypes quickly reduces development costs, significantly shortens the time to market, and

supports the finding and development of ideas. AI is paving the way for a more efficient and streamlined product development process. These findings are related to the theory of big data and AI, which indicates that AI plays a crucial role in handling large amounts of data and enables data to be processed and analyzed more efficiently (O'Leary, 2013). This is also consistent with the theoretical ability of AI to recognize market opportunities and customer needs (Cooper & Mccausland, 2024).

Dynamic Capabilities

The discussion of a company's dynamic capabilities, particularly concerning the use of AI and the integration of customers into the innovation process, underlines how important adaptability is for long-term competitiveness. The expert interviews confirmed the theory that AI can accelerate product development (Cooper & Mccausland, 2024) and serve as a driver of innovation (Malhan & Agnihotri, 2023), which in turn supports Teece et al.'s (1990) theory of dynamic capabilities. At the same time, some experts expressed concerns regarding implementing AI, especially regarding acceptance within the organization. These concerns are essential as they must be seen as potential hurdles to unfolding dynamic capabilities (Collis & Anand, 2019).

Several experts (A, B, C) emphasized that a company's ability to continuously identify new market opportunities (sensing) is crucial for long-term success. The use of AI for data analysis enables companies to react to changes at an early stage and seize new opportunities. In seizing, i.e. the ability to effectively exploit these opportunities, it has been shown that companies that integrate AI and customer engagement into their innovation processes react faster and more efficiently to market and customer requirements. This confirms that dynamic capabilities depend on technological progress and the ability to effectively integrate it into the corporate structure (Dangelico et al., 2016).

The survey results also show that most customers see AI as the key to improving product development processes. At the same time, however, the interviews reveal challenges in implementing these technologies, particularly regarding acceptance by employees and customers. These aspects significantly influence a company's ability to transform (managing threats/transforming). Overall, the expert interviews support the theory of dynamic capabilities but also point out that the successful implementation of AI is heavily dependent on internal and external acceptance.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) provides a theoretical framework for explaining and predicting how users accept new technologies. The survey results clearly show that customers perceive AI tools as valuable and practical, especially in improving product development processes. This confirms Davis' (1989) theory that perceived usefulness (PU) is a decisive factor in the acceptance of technologies. The high agreement among respondents to statements emphasising the usefulness of AI-supported platforms further underlines this assumption. The significant *T-value* of 25.647 and the *p-value* of <0.001 illustrate the relevance of these results.

At the same time, the survey results also confirm the importance of perceived ease of use (PEOU). Customers who find AI tools easy and intuitive to use are more willing to use these technologies and actively participate in the product development. Here, too, the results are consistent with the TAM model, which emphasizes that a high level of user-friendliness promotes the acceptance of a technology (Na et al., 2022).

The survey shows that customers trust AI and its applications, recognizing its competence in supporting product development. This aligns with the theory, where additional variables like trust can influence technology acceptance (Wang, et al., 2023).

However, in its traditional form, the TAM model could only partially capture some relevant factors for the acceptance of AI tools. The survey results indicate that the perceived relevance of the results and the actual implementation of customer feedback in product development also play an essential role. These aspects, which are not explicitly considered in the TAM model, could also influence the acceptance of AI tools.

Customer participation and incentives

Hypotheses H4a and H4b shed light on the role of incentives in customer participation and show that financial incentives significantly increase customer's willingness to participate in the product development. This is consistent with the literature that emphasizes the importance of such incentives in increasing customer participation (Su, Chen & Sha, 2006). However, the **question arises of whether the feedback gained through financial incentives such as money is of high quality**. There is a danger that customers will only participate to earn monetary rewards without providing truly thoughtful and valuable input.

The correlation with monthly income shows that higher-income people are less motivated by financial incentives. This could indicate that such individuals may have other, more qualitatively valuable motives, such as profit sharing. Profit sharing could lead to higher quality and more engaged feedback, especially among customers who are strongly connected to the company, as these customers are more interested in seeing their ideas implemented. Vouchers could be a middle solution, as they offer a financial incentive and strengthen a particular bond with the company. However, whether vouchers promote the same qualitative contribution as profit sharing remains to be questioned.

AI in Customer-Driven Product Innovation

The integration of AI into the product development-based innovation process offers significant advantages, particularly in the area of customer participation. Experts (C, D, G) emphasize that AI-powered tools and platforms that enable customers to submit ideas and provide feedback represent a tremendous opportunity to accelerate and optimize the innovation process. This points to the ability of AI to process large amounts of data efficiently (O'Leary, 2013) and bring valuable customer information into the development process

Several experts point out that a co-creation product development approach with customers is only suitable for some products and should be critically scrutinized. Customers often tend to have unrealistic ideas, so their ideas for radical innovations should be viewed cautiously. Some experts, therefore, recommend focusing on incremental innovations in customer product development in some cases. These results raise criticism of the ECK model mentioned in the theory by Su, Chen, & Sha (2006), which aims to involve customers in new product development to adapt products even more precisely to their needs. The criticism suggests that the model may not be sufficient to address modern product development's complexity and innovation requirements fully.

The findings show that AI improves product development, simplifies processes, and promotes communication between companies and customers. This confirms AI's role in optimizing internal and external processes emphasized in the literature, especially in communication and value creation (Perez-Vega et al., 2021). Some experts also mentioned the importance of the synergy between Customers and the analytical capabilities of AI as a central innovation factor. The combination of human intuition, which comes from a company's customers, and AI efficiency accelerates processes such as idea generation and increases their quality. Looking

back into the theory demonstrates a connection with the “Human-AI Creativity Model” (Wu et al., 2021). Applied to this case, the strengths of customer creativity can become valuable resources for companies with the help of AI and its analytical capabilities.

The survey shows that **customers often find traditional surveys tedious and time-consuming**, which makes them less willing to participate. They are more willing to join if they recognize a clear added value. **AI-supported platforms and surveys can increase attractiveness through user-friendliness, interactivity,** and the acceptance to use this opportunity (TAM). Experts emphasize that **AI tools increase participation by providing easy ways to submit ideas and efficiently collect and evaluate data**, optimizing product developer’s resources.

The survey revealed that customers with higher purchase frequency in the camping and outdoor industry show greater interest in participating in product development and buying products developed in co-creation with customers. This trend is consistent with other studies: The more involved a customer is in the community, the more willing they are to participate (Zhao et al., 2019).

AI-supported processes offer developers direct insights into customer wishes by immediately incorporating collected data into product development and thus creating real added value. These findings highlight the critical role of AI in customer engagement, especially in optimizing surveys and feedback platforms. According to experts and theory, AI improves the analysis of ideas and the shaping of these by customers, making the process more enjoyable for both sides. This leads to a more efficient, customer-oriented innovation process and more market-oriented products

5.2. Contributions to Theory

This study explores the role of AI in enhancing customer engagement in the product development process, deepening the understanding of open strategies, customer engagement and innovation. The findings highlight a clear shift towards more active customer participation through AI-driven platforms, which are challenging traditional methods and emphasizing the importance of interactivity and co-creation in product development. At the same time, the possibility of evaluating large amounts of data, such as those collected in surveys, sets new standards for the co-creation process and contributes significantly to the optimization of

innovative product development. It also highlights how digital transformation through AI strengthens organizations' dynamic capabilities and broadens the understanding of how technological advances drive customer engagement. These advances go beyond traditional models such as the Technology Acceptance Model (TAM) by demonstrating how customers perceive new technologies and how their willingness to participate in the innovation process is influenced. The work also illustrates that customer's preferences for participation strongly depend on the ease of use and perceived impact of their contributions, supported by AI tools. The study thus lays the foundation for further research on the intersection of open strategy, AI and customer-driven product development & innovation. It helps companies to optimize customer-centric innovation processes and leverage competitive advantages.

5.3. Limitations & Future Research

As this study was conducted as part of a Master's thesis, financial and time constraints affected the scope of the research. The survey, which collected 215 complete responses, is not representative of the general population, so the results should be interpreted in the context of the specific characteristics of the sample. For future research, a more extensive and demographically diverse sample would be desirable to improve the generalizability of the results. Investigating the willingness to participate in such processes for more specific product categories would also be desirable, as the desire to participate can vary significantly from product to product. The study was conducted over a comparatively short period, which may have limited the depth of the data collected, extending the duration of the research could provide more robust findings. In addition, the frequent use of Likert scale questions carries the risk of an approval bias, where respondents tend to agree with positive statements (Krosnick, 1999). This should be viewed with particular caution as, as mentioned in the theory, technologies such as AI are often associated with a specific myth and are perceived as a jack of all trades (Elish & Boyd, 2017). Those who see AI as a jack of all trades tend to respond positively in the survey once they learn that AI is involved

The semi-structured interviews were also limited by the availability of participants, potentially limiting the diversity of perspectives. The subjective nature of the experts's opinions, shaped by their professional backgrounds, may influence the objectivity of the results. A more significant number of interviews in future studies could help to capture more diverse opinions.

While this study primarily focuses on the role of AI in improving customer engagement in the product development process, future research could investigate the interface between open strategy and other emerging technologies such as blockchain or augmented reality. Such a comparative analysis could provide valuable insights into the different influences of these technologies on customer engagement and innovation processes.

5.4. Conclusion

The study demonstrates the crucial role of Open Strategy, customer engagement, and the role of AI. It provides clear evidence that integrating customers into the product development process through Open Strategy, supported by AI-driven tools, significantly boosts innovation. The research also shows that customers are generally willing to participate in such processes, especially when the technology is perceived as user-friendly and practical, as outlined in the Technology Acceptance Model (TAM). AI facilitates more active customer participation and simplifies and optimizes the co-creation process, enabling companies to better align products with market needs. Moreover, the dynamic capabilities framework shows that companies leveraging AI in customer engagement can adapt more swiftly to changing market demands, ultimately driving more effective and innovative outcomes. This combination of Open Strategy and AI fosters a more interactive and responsive approach to product development, essential for maintaining competitiveness in a rapidly evolving market. In conclusion, the integration of Open Strategy, customer engagement, and AI represents a transformative approach to innovation, allowing companies to harness the collective intelligence of their customers while utilizing advanced technologies to stay ahead in the competitive landscape.

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APPENDIX

Appendix 1: Questions & Answers Expert Interviews

Content group	Questions
Introduction	Could you please introduce yourself, your background, and your role at your company? Have you already had contact with AI, customer Engagement & innovation strategies, and if so, which ones?
Likert Scale Questions	**Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":** *Question 1:* Incorporating customers into internal processes and open up their internal processes strengthen the firm's ability to innovate. *Question 2:* Companies could use artificial intelligence to improve their product development processes *Question 3:* AI can be utilized as an effective tool to streamline communication with customers. *Question 4:* To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers *Question 5:* Customers are willing to engage with a company and provide feedback.
Open Strategy and Industry Engagement	What potential benefits and challenges do you see in applying an open strategy, i.e. involving external stakeholders in internal processes? What points of contact do you have with the outdoor and camping industry? To what extent could customer engagement play a significant role in this industry?
Customer Integration and Innovation	How does the integration of the customer into the product development process influence the company's ability to innovate? Where do you see the biggest challenges in integrating customers into product development? How could involving customers in the product development process affect the company's adaptability and innovative strength?

Artificial intelligence	How do you assess the potential of artificial intelligence to accelerate product development and what innovative benefits could it bring? What types of artificial intelligence do you know that could be useful as a communication bridge between customers and companies? How can AI turn customer data and ideas in the outdoor camping industry into valuable resources for product development, and what role does human creativity play in this?
Customer Participation and Motivation	How would you rate the willingness of customers to participate in the development process and help the company by providing their feedback? How can companies motivate customers to contribute their feedback and ideas?
AI Tools and Technology Acceptance	To what extent could AI tools contribute to a better understanding and acceptance of complex technologies?
Technology and infrastructure	What infrastructural requirements are necessary to effectively integrate AI tools for customer engagement & product development?

Expert: A	**Date**: 10.05.24	**Duration**: 41min	**Type**: Zoom
Introduction		• Expert A has a background in computer science with a focus on machine learning and artificial intelligence. Lead of a Team exploring the applications of AI in various industrial processes • worked extensively with AI, particularly in developing predictive models • implemented customer engagement strategies using AI-driven chatbots.	
Likert Scale Questions		*Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":* Incorporating customers into internal processes and open up their internal processes strengthen the firm's ability to innovate. → **Answer: 4** Companies could use artificial intelligence to improve their product development processes → **Answer: 5** AI can be utilized as an effective tool to streamline communication with customers. → **Answer: 4**	

	To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers → **Answer: 2** Customers are willing to engage with a company and provide feedback. → **Answer: 2**
Open Strategy and Industry Engagement	• Open strategy brings fresh perspectives and increases the innovation potential within the company. But it can raise confidentiality issues and complicate the management of diverse stakeholder expectations • I don't have that much contact, but I think it's important because customers are very patient with their hobby.
Customer Integration and Innovation	• Customer integration enhances the organization's adaptability and responsiveness to market changes. • The biggest challenges are balancing customer input with technical feasibility and managing cost constraints.
Artificial intelligence	• AI has a high potential to streamline product development by automating repetitive tasks and enhancing decision-making. It allows for faster iteration cycles and more efficient resource allocation, boosting innovation capacity. • We've integrated AI-driven analytics platforms and machine learning models for predictive maintenance. These tools have significantly reduced downtime and improved product quality by predicting issues before they occur. • AI can analyze large volumes of customer data to identify trends and preferences. For example new Featers from Outdoor camping cookers or Tents. It can also facilitate the creation of predictive models to forecast customer needs and optimize product features accordingly.
Customer Participation and Motivation	• In my Opinion, customers are more willing to participate in the development process by providing feedback if they see a direct benefit or improvement to the product. Also, I would say customers are often more willing to give bad feedback if they are dissatisfied. • Offering incentives can motivate customers to share their feedback.
AI Tools and Technology Acceptance	• AI tools can enhance user experience by personalizing interactions and simplifying complex tasks. Additionally, customers provide valuable insights from their perspective, which could drive technological innovation and product refinement.
Technology and infrastructure	• I think especially a robust data infrastructure with high-quality data storage and management systems. • Scalable cloud computing resources to handle AI workloads and facilitate integration

Expert: B	**Date**: 10.05.24	**Duration**: 36min	**Type**: Zoom
Introduction		• Expert B has a PhD in business innovation and a background in Strategy implementation • Active Researcher on the impact of emerging technologies on business strategies • Has been involved in research projects that integrate AI for enhancing customer experiences.	
Likert Scale Questions		*Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":* Incorporating customers into internal processes and open up their internal processes strengthen the firm's ability to innovate. → **Answer: 5** Companies could use artificial intelligence to improve their product development processes → **Answer: 5** AI can be utilized as an effective tool to streamline communication with customers. → **Answer: 5** To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers → **Answer: 5** Customers are willing to engage with a company and provide feedback. → **Answer: 2**	
Open Strategy and Industry Engagement		• Open strategy fosters co-creation and Crowdsourcing and accelerates the development of innovative solutions. It may lead conflicts over decision-making authority and can thus slow down the whole process. • In consumer goods companies, particularly in industries like the outdoor industry, customers demonstrate a strong affinity and passion for the products. This heightened interest naturally extends to a desire for continuous improvement. • For example, when customers use a tent multiple times a year and express wishes for extra features or general improvements for new models, the customer benefit is significantly enhanced through incremental innovation in collaboration with the company	
Customer Integration and Innovation		• Customer integration provides valuable insights that can drive innovations. It enables the company to identify and respond more effectively to customer needs and market trends. This approach helps reduce the risk of market rejection by aligning products more closely with customer expectations. • When we look at integrating customer, it significantly boosts the organization's learning capability and innovation agility. Customer feedback helps in quickly adapting to market	

	changes and enhances the firm's ability to pivot strategies.
Artificial intelligence	• AI can reduce time-to-market by enhancing prototyping and testing phases. It improves innovation by providing deeper insights through advanced data analytics and simulations. • I know the common ones like Ai-based Chatbots, AI driven customer Surveys • AI systems can synthesize customer feedback into actionable insights by identifying key patterns. They can also automate the prioritization of features based on customer preferences, streamlining the development process. • With the help of AI, customer can better develop their ideas and translate them into concrete plans
Customer Participation and Motivation	• Studies based on customer engagement showed, that customers are usually eager to participate if they feel their input will lead to meaningful changes and improvements and if they are addicted to the product or brand. • Creating easy-to-use feedback channels and demonstrating how customer input directly influences product development can encourage participation.
AI Tools and Technology Acceptance	• AI tools can make technology more intuitive and user-friendly.
Technology and infrastructure	• Comprehensive data integration frameworks to ensure seamless data flow across systems. • Know-How in AI implementation • Strong cybersecurity measures to protect sensitive customer data and AI models.

Expert: C	**Date**: 13.05.24	**Duration**: 48min	**Type**: Teams
Introduction		• Senior Manager and AI expert at our consultancy firm. With a background in computer science and over 15 years of experience • lead a team of consultants to implement AI-driven solutions and strategies for our clients, ensuring they leverage cutting-edge technologies to achieve their business goals • Yes, I have experience with AI in natural language processing, predictive analytics, and machine learning for customer engagement, including customer segmentation, personalized marketing, and automated support systems.	
Likert Scale Questions		*Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":* Incorporating customers into internal processes and open up their internal processes strengthen the firm's ability to innovate. → **Answer: 3** Companies could use artificial intelligence to improve their product development processes	

	→ **Answer: 5** AI can be utilized as an effective tool to streamline communication with customers. → **Answer: 5** To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers → **Answer: 4** Customers are willing to engage with a company and provide feedback. → **Answer: 2**
Open Strategy and Industry Engagement	• For me, benefits include increased innovation through diverse perspectives and improved alignment with market needs. Challenges instead involve managing diverse opinions and potential delays in decision-making. • Above all, I would say that the employees agree with the open strategy, as they also give up a piece of control • I have not yet had any direct points of contact with the outdoor Industry, but I have managed several projects in similar industries from the consumer goods sector
Customer Integration and Innovation	• Customer integration can significantly enhance innovation by ensuring products meet real-world needs and preferences. However, it might also lead to a slower development process due to the need to align with customer feedback. We use surveys, focus groups, and user testing to collect feedback. Challenges include ensuring a representative sample, dealing with conflicting feedback, and integrating insights into the development process without causing delays. In some customer projects, we implement chat bots and other technologies that simplify the conversation between customers and companies • The biggest challenges include managing customer expectations, protecting intellectual property, and ensuring the feedback is actionable and aligns with the company's strategic goals. • Customer integration enhances dynamic capabilities of a firm by fostering agility and responsiveness to market changes. It requires continuous learning and adaptation, which can strengthen the organization's overall resilience and innovation capacity.
Artificial intelligence	• AI accelerates product development by automating tasks, providing data insights, and enhancing decision-making, thus supporting innovation by opening up resources for creative work. • AI will be crucial in product development, for example enabling rapid prototyping • We use NLP (Natural Language Processing) with our clients for their customer feedback, machine learning for predictive maintenance and AI chatbots for customer support. These tools have streamlined development, improved satisfaction and increased efficiency. • In our approach, AI acts as a collaborative tool that enhances creativity by offering data-driven

	insights. Designers and customers alike can input their ideas into the AI system, which then provides tailored suggestions to further develop those concepts. • For example, customers could transform their ideas for new features for their outdoor equipment, into a model that visualises this concept and can be understood and used by both the company and the customer.
Customer Participation and Motivation	• Generally, obtaining feedback from customers can be challenging. • Customers play a vital role by offering feedback and insights that drive technological innovation. • Engaging customers in beta testing and soliciting their opinions on new features can further integrate their perspectives into the innovation process. • Companies can motivate customers by offering a bonus system, vouchers or any other reward
AI Tools and Technology Acceptance	• AI tools shoul personalise the user experience and provide tailored support, improving adoption. • For instance, AI-driven chatbots can offer immediate assistance, while data can tailor product suggestions based on user behavior.
Technology and infrastructure	• Advanced AI platforms, AI experts • Effective integration of AI tools requires robust data infrastructure

Expert: D	**Date**: 14.05.24	**Duration**: 49min	**Type**: Teams
Introduction		• Senior Manager for Innovation Strategies over 15 years of experience in technology and innovation in a corporate group • Responsible for implementing new technologies and promoting an innovation-driven culture	
Likert Scale Questions		*Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":* Incorporating customers into internal processes and open up their internal processes strengthen the firm's ability to innovate. → **Answer: 5** Companies could use artificial intelligence to improve their product development processes → **Answer: 4** AI can be utilized as an effective tool to streamline communication with customers. → **Answer: 4** To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers	

	→ **Answer: 5** Customers are willing to engage with a company and provide feedback. → **Answer: 4**
Open Strategy and Industry Engagement	• An open strategy that involves external stakeholders promotes innovative ideas through diverse perspectives and strengthens the company's ability to adapt to the market. • The main challenges lie in the complexity of coordinating different stakeholders and in the security and data protection risks associated with the involvement of external partners. • Yes, I have been working on this area for many years. In recent years, the support of AI-driven customer engagement and the implementation of co-creation has also become more important in our company
Customer Integration and Innovation	• Integrating customers into the product development process increases the company's innovative strength by gaining direct insights into the needs and wishes of customers. However it is important to say, that the company must strike a balance between customer wishes and technical feasibility. • The biggest challenges lie in making customer feedback structured and actionable and finding a balance between customer requirements and the company's strategic goals. It also requires effective coordination between different departments to integrate the feedback into the development process without requiring too many resources. • Ultimately, the feedback must be implemented profitably and some customers may come up with ideas that are not technically or economically feasible • Customer feedback provides valuable insights that stimulate innovation processes and enable the company to respond proactively to trends and needs.
Artificial intelligence	• I'm sure that AI has huge potential to accelerate product development by automating tasks and providing data-driven insights. This encourages innovation as the team can focus on creative and strategic tasks • We have integrated AI-driven chatbots for customer service. This tool has improved customer satisfaction and increased operational efficiency. it also meant that employees were relieved and their capacities were freed up for other things • AI systems can analyse customer feedback and data to identify trends and preferences. This allows personalised product features to be developed. • Machine learning through AI can predict customer needs and provide valuable insights
Customer Participation and Motivation	• Our customers are generally willing to participate in the development process, but it depends on the product and, above all, on the target group. Willingness can therefore vary from product to product. Transparent communication and visible results increase their willingness to participate.

	• Companies can motivate customers by offering incentives, such as discounts or exclusive previews of new products. It is also important to create simple and engaging ways to provide feedback and make it clear how feedback is used to make real improvements.
AI Tools and Technology Acceptance	• AI tools can improve the acceptance of technology by offering personalised and intuitive user experiences.
Technology and infrastructure	• Effective integration of AI tools requires qualified personnel as well as continuous learning and collaboration tools. But above all, it is important to train employees and provide the necessary technical resources. For example, we work with external consultancies and internal consultants who have extensive knowledge in areas such as AI

Expert: E	**Date**: 15.05.24	**Duration**: 51min	**Type**: Zoom
Introduction		• Expert E is a senior consultant at an innovation consultancy specializing in an open approach to innovation • He worked in many projects where they helped firms to implement Open Strategy and Customer Engagement	
Likert Scale Questions		*Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":* Incorporating customers into internal processes and open up their internal processes strengthen the firm's ability to innovate. → **Answer: 5** Companies could use artificial intelligence to improve their product development processes → **Answer: 4** AI can be utilized as an effective tool to streamline communication with customers. → **Answer: 5** To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers → **Answer: 5** Customers are willing to engage with a company and provide feedback. → **Answer: 4**	
Open Strategy and Industry Engagement		• By involving a wide range of stakeholders, including employees, customers, partners and even competitors, different perspectives and ideas can be incorporated into the strategy process. An open strategy ensures greater transparency throughout the organisation.	

	• By involving customers in the strategy process, companies can better respond to their needs and expectations • It can often happen that some employees and managers may resist openness, especially if they are used to traditional hierarchical structures.
Customer Integration and Innovation	• Customers can bring in fresh perspectives and new ideas that may not have been available within the organization • As a consultant, I have already gained experience in the outdoor and camping industry, in particular through a major project I managed for a large outdoor brand. This project was about strengthening customer loyalty and engagement in order to develop innovative and market-orientated products. • In this project, we have developed a new product line that is specifically tailored to customer requirements
Artificial intelligence	• Artificial intelligence has enormous potential to accelerate product development by enabling faster data analyses and more precise forecasts, and AI certainly has a major role to play in evaluating and recognising trends. We are also trying to integrate AI more and more into our processes. • Chatbots, voice assistants and sentiment analysis tools, collecting ideas with chatGPT or even creating useful plans. I could imagine an AI-driven platform where customers and companies can interact. This could create an exchange between customers and product developers, which is currently very difficult because the technical expertise often differs greatly.
Customer Participation and Motivation	• The willingness of customers is basically there, especially in sectors such as the outdoor industry or other sectors where customers have a strong bond with the brand and often use the products in their free time. You just have to make sure that the process is simple and that customers don't drop out during the process. In addition, it must be made clear to customers that their work has an impact and that they are not making the effort in vain
AI Tools and Technology Acceptance	• I would say: “Simplification of cooperation”. This can lead to customers being better guided through the process and not losing interest
Technology and infrastructure	• The main prerequisite should be free capacity and a team that is ready to introduce and use AI tools and has knowledge of data analysis, machine learning and artificial intelligence.

Expert: F	**Date**: 16.05.24	**Duration**: 35min	**Type**: Zoom
Introduction		• Master of Business Administration at Bocconi, Manager Consulting • In my work, I am always intensively involved with artificial intelligence and innovation strategies. In the last few months in	

	particular, my focus has been on researching and improving texts using AI technologies • I carried out a “Voice of the Customer” project for a client, focussing on customer engagement. This was not just about involving customers in product development, but in all areas of the company.
Likert Scale Questions	*Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":* Incorporating customers into internal processes and open up their internal processes strengthen the firm’s ability to innovate. → **Answer: 5** Companies could use artificial intelligence to improve their product development processes → **Answer: 5** AI can be utilized as an effective tool to streamline communication with customers. → **Answer: 4** To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers → **Answer: 4** Customers are willing to engage with a company and provide feedback. → **Answer: 4**
Open Strategy and Industry Engagement	• The advantages of including a wider circle of addressees are that there is less chance of something being overlooked. If you involve experts, it has a higher credibility than if it is only internal. Broader picture by validating several people in one process. • Confirmation of trend assumptions: "The picture has emerged from the feedback or conversations from X people" is more meaningful than if it is considered meaningful within a department
Customer Integration and Innovation	• Can have a positive but also a negative impact on the company. Example statement by Henry Ford: "If I had asked people what they wanted, they would have asked for faster horses" -> The customer often doesn't even know what they want. **Understand the customer's needs and build on them**. Clear focus on incremental innovation.
Artificial intelligence	• Take the automotive industry, for example. If I have all the information from customers about why their car was in the workshop, I can use this and validate it with AI for certain trends in damage or weaknesses. These can then be incorporated into product development. • The integration of artificial intelligence has a very high impact, especially in the conceptualisation of models and ideas. The wishes and ideas of outdoor enthusiasts can be collected and analysed effectively. Customer information is of great importance in this industry, as customers

	use the products with enthusiasm and have a strong interest in functionality, special features and design. • In addition, I am very sure that AI can also provide valuable services in the procurement and finding of new resources as well as in the optimisation of the supply chain • Analysis of user behaviour through automated AI-controlled evaluation. • IoT: The example I am most familiar with: Washing machine connected to the network, when do people wash, how should the washing machines be aligned, which programmes are particularly popular. • Automated processing of customer interviews
Customer Participation and Motivation	• Innovative benefits for customers, such as the comprehensive consideration of customer wishes, play a major role when it comes to the acceptance and readiness of such technologies. The product range can be designed to include a wide range of buyer groups. If customer feedback shows that customers want both affordable two-man tents and large family tents with various luxury features, these trends can be recognised through AI analyses and implemented accordingly. In this way, products can be customised to meet the different needs and wishes of customers. • Surveys or pure questioning of customers are often seen as "annoying" and "time-consuming
AI Tools and Technology Acceptance	• Maybe that customers will see even more interest in a cooperation due to the simplification of the processes.
Technology and infrastructure	• Sufficient resources and a data-based innovative company mission, IT requirements & AI knowledge

Expert: G	**Date**: 16.05.24	**Duration**: 57min	**Type**: Zoom
Introduction		• Innovation department of leading manufacturers and resellers of outdoor equipment in Europe • Driving innovation strategies, with a focus on integrating cutting-edge technologies and customer feedback to enhance product offerings and market competitiveness in the outdoor industry.	
Likert Scale Questions		*Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":* Incorporating customers into internal processes and open up their internal processes strengthen the firm's ability to innovate." → **Answer: 4**	

	Companies could use artificial intelligence to improve their product development processes → **Answer: 5** AI can be utilized as an effective tool to streamline communication with customers. → **Answer: 5** To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers → **Answer: 2** Customers are willing to engage with a company and provide feedback. → **Answer: 2**
Open Strategy and Industry Engagement	• The advantages of involving external stakeholders include the diversity of perspectives, which strengthens the trust and transparency of all groups involved, as well as a wealth of ideas and inputs that go beyond the boundaries of the company. • It must also be made clear that many opinions can also lead to longer decision-making processes, as the extensive input must be carefully weighed up.
Customer Integration and Innovation	• For example, companies can set up special co-creation labs where customers can work on new products together with developers and designers. This creates a collaborative environment in which ideas can flow freely and be implemented directly. In this way, companies open up their processes and offer innovative freedom for new ideas. This encourages innovation both inside and outside the company. • Customer engagement plays a crucial role in the outdoor industry, as outdoor enthusiasts have specific requirements and high expectations of their equipment. Through active customer engagement, we can gather direct feedback and innovative ideas to continuously improve our products and optimise them to meet the needs of users. This is particularly important when developing new features, technical characteristics or materials for existing products. • Customers often contribute new ideas, particularly in the outdoor segment, as they are active in their leisure time and develop needs for new solutions when using current products. These are often decisive, as they are regarded as “real practice”. Companies should incorporate these ideas and we have been working for several years to involve our customers more and more. • So far, we have mainly tried to gain new insights through surveys and customer reviews. This has also worked successfully, but I see enormous potential here.
Artificial intelligence	• In my eyes, the potential is huge! AI could be used in model development in particular. This can significantly reduce time and resources. But AI could also play a decisive role in communication with customers. Especially through automated chatbots or surveys.

Customer Participation and Motivation	• Campaigns in which customers can express their wishes show the public that their opinions and ideas have a real impact. **An example of this would be a campaign such as "Make a wish at Müller Milch", where customers can suggest new flavours. The most popular suggestions are then implemented.** • Companies can set up special co-creation rooms where customers can work on products together with developers and designers.
AI Tools and Technology Acceptance	• I'm not entirely sure here, as I have few points of reference on the subject of AI. But I think tools like chatPGT make it easier to gather new ideas. Automatic analyses and the creation of patterns would also be very interesting for us. We have largely implemented this, but we keep realising that it still requires a lot of resources. Especially when invalid data has to be deleted from large data sets.
Technology and infrastructure	• Above all, employees must be prepared to accept and really process ideas from customers. We have often seen that both employees and management remain loyal to their tried and tested methods and have a certain scepticism towards new technologies. • Such tools should be usable for everyone and offer clear added value. An automated chatbot that asks customers for their opinion won't do us any good as a company if it doesn't provide in-depth insights. • A secure cyber security structure is essential

Expert: H	**Date**: 16.05.24	**Duration**: 34min	**Type**: Zoom
Introduction		• Strategy Inhouse consultant manager - Dax group consumer goods in Germany	
Likert Scale Questions		*Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":* Incorporating customers into internal processes and open up their internal processes strengthen the firm's ability to innovate." → **Answer: 3** Companies could use artificial intelligence to improve their product development processes → **Answer: 4** AI can be utilized as an effective tool to streamline communication with customers. → **Answer: 3** To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers → **Answer: 4**	

	Customers are willing to engage with a company and provide feedback. → **Answer: 3**
Open Strategy and Industry Engagement	• Integrating customers enhances the relevance and user-centricity of the company's innovations. • It's crucial that when customers are willing to collaborate, the company effectively draws the right conclusions from their input. • Internal managers and employees must also pull together in the open strategy. Rejection, especially from responsible managers, can jeopardize the entire project
Customer Integration and Innovation	• A certain size to be able to make deductions • Sailing ship example: people say they need faster sailing ships, and a single customer says he wants to work with a motor. How are different feedbacks interpreted? • If a large proportion of incremental innovations say so, you can draw information and food for thought from them, but these must be weighed up and viewed with caution, as not all ideas can be implemented, as the example above shows.
Artificial intelligence	• AI can play an important role in conceptualising customers' ideas and making them usable for product developers. Surveys on trends and wishes regarding new products, materials or features, which are analysed by AI, can be used by companies to derive valuable trends. Analysing such trends in surveys plays a major role for us and requires a lot of resources. The use of AI would therefore be highly relevant and extremely interesting for us. • The development of AI tools for customer engagement in product development is complex, and there is a lack of expertise and examples on the market. Nevertheless, its importance is enormous • Chatbots and other technologies have already become established to simplify communication and set new standards in service. These are constantly being further developed. • **Tools such as AI-based platforms and surveys will certainly undergo enormous development over the next few years**
Customer Participation and Motivation	• Customers are more willing if it is quick and easy. If the process is too long or too complicated, most customers might end the process and their ideas/feedback will be lost • It should be noted that rewards or exclusive benefits could increase willingness. This is best researched to gain useful insights
AI Tools and Technology Acceptance	• Acceptance can be increased through simplified steps, improved user-friendliness and automated processes, made possible by AI.
Technology and infrastructure	• I think that sufficient capacities and a certain company size are necessary to implement such strategies

Likert Scale Questions (Summary of Responses)

Please rate the following statements on a scale of 1 to 5, where 1 is "Strongly Disagree" and 5 is "Strongly Agree":

“Incorporating customers into internal processes and opening up their internal processes strengthen the firm’s ability to innovate.”

Expert A: 4; Expert B: 5; Expert C: 3; Expert D: 5; Expert E: 5; Expert F: 5; Expert G: 4; Expert H: 3

“Companies could use artificial intelligence to improve their product development processes.”

Expert A: 5; Expert B: 5; Expert C: 5; Expert D: 4; Expert E: 4; Expert F: 5; Expert G: 5; Expert H: 4

“AI can be utilized as an effective tool to streamline communication with customers.”

Expert A: 4; Expert B: 5; Expert C: 5; Expert D: 4; Expert E: 5; Expert F: 4; Expert G: 5, Expert H: 3

“To improve innovative product development, it is beneficial to solicit and directly apply ideas and feedback from customers.”

Expert A: 2; Expert B: 5; Expert C: 4; Expert D: 5; Expert E: 5; Expert F: 4; Expert G: 2; Expert H: 4

“Customers are willing to engage with a company and provide feedback.”

Expert A: 2; Expert B: 2; Expert C: 2; Expert D: 4; Expert E: 4; Expert F: 4; Expert G: 2; Expert H: 3

Appendix 2: Qualtrics Online Survey Questions

Dear participant,

thank you for participating in my study! This research study is being conducted as part of my master thesis at Católica Lisbon. This survey is expected to take 8 minutes to complete, and your participation is voluntary and anonymous.

The data collected will be kept strictly confidential and will only be used within this study.

How old are you?

- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65 or older

What is your nationality?

What is your gender?

- Male
- Female
- Non-binary / third gender
- Prefer not to say

What is your monthly income?

- Under €1,000
- €1,000 - €1,999
- €2,000 - €2,999
- €3,000 - €3,999
- €4,000 - €4,999
- €5,000 or more
- Prefer not to say

Do you purchase products from the camping and outdoor industry, such as outdoor sport-, hiking equipment and camping gear?

- Yes
- No

How would you rate the frequency of your purchases in the camping and outdoor industry?

- Very High (more than 10 products a year)
- High (8-10 products a year)
- Moderate (6-8 products a year)
- Low (3-5 products a year)
- Very Low (1-2 products a year)

Please indicate the extent to which you agree with the following statements by selecting an option on the scale from "Strongly Agree" to "Strongly Disagree.

Participating in the product development process, such as suggesting new features for a tent or other outdoor equipment, is too time-consuming and complicated for me

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Do you feel that the complexity of the process reduces your willingness to participate in the product development process

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

If the process for submitting ideas were simpler, I would be more likely to participate.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

A user-friendly platform that allows easy submission of ideas for new outdoor gear would increase my willingness to participate in the product development process.

- strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

If it required less effort to submit my ideas, I would be more willing to participate in the product development process.

- strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I believe that AI tools can improve the product development process by analyzing customer data and suggesting new features and finding new trends in the outdoon industry

- strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

If AI tools were used to analyze and incorporate my ideas, making it easier for the company to utilize this information effectively, I would be more willing to participate in the product development process.

- strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I would be more willing to participate in the product development process if I received profit sharing. For example, if a product developed with my ideas is successfully sold, I would receive a share of the profits.

- strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Vouchers or discounts would increase my willingness to participate in the product development process.

- strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Incentives, such as financial rewards (e.g., €5), would motivate me to participate in the product development process

- strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Answer the following statements:

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I find surveys from companies useful for expressing my opinions and needs.	○	○	○	○	○
Surveys provide me with a good opportunity to give feedback on products.	○	○	○	○	○
I enjoy participating in surveys to help companies with product development.	○	○	○	○	○
I find company surveys annoying and time-consuming	○	○	○	○	○
I feel that my ideas and suggestions can be acknowledged and implemented by the company through a survey.	○	○	○	○	○
I am more likely to fill out surveys if I believe my feedback will be used to make improvements.	○	○	○	○	○

I find AI-driven tools, such as a platform, AI data analysis, or AI-based surveys, more effective and reliable than traditional methods for submitting my ideas for outdoor and camping equipment.

- ○ strongly agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Strongly disagree

An AI-driven platform would improve my communication with the company. This platform could allow customers to submit ideas, receive feedback, and collaborate with the company throughout the product development process.

- ○ strongly agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Strongly disagree

If AI enhances and expands on my ideas, turning them into valuable resources for product developers and creating significant benefits, I would prefer this method and be more likely to participate.

- ○ strongly agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Strongly disagree

Would you be more likely to purchase products in the outdoor and camping industry that involve customer participation in the development process, compared to those developed solely by the company?

- ○ strongly agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Strongly disagree

Appendix 3: Qualtrics Online Survey Results

How would you rate the frequency of your purchases in the camping and outdoor industry?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low (1-2 products a year)	31	20,0	20,0	20,0
	Low (3-5 products a year)	32	20,6	20,6	40,6
	Moderate (6-8 products a year)	31	20,0	20,0	60,6
	High (8-10 products a year)	42	27,1	27,1	87,7
	Very High (more than 110 products a year)	19	12,3	12,3	100,0
	Total	155	100,0	100,0	

		Participating in the product development process, such as suggesting new features for a tent or other outdoor equipment, is too time-consuming and complicated for me	Do you feel that the complexity of the process reduces your willingness to participate in the product development process	If the process for submitting ideas were simpler, I would be more likely to participate.	A user-friendly platform that allows easy submission of ideas for new outdoor gear would increase my willingness to participate in the product development process.	If it required less effort to submit my ideas, I would be more willing to participate in the product development process.	I believe that AI tools can improve the product development process by analyzing customer data and suggesting new features and finding new trends in the outdoon industry	If AI tools were used to analyze and incorporate my ideas, making it easier for the company to utilize this information effectively, I would be more willing to participate in the product development process.	I would be more willing to participate in the product development process if I received profit sharing. For example, if a product developed with my ideas is successfully sold, I would receive a share of the profits.	Vouchers or discounts would increase my willingness to participate in the product development process.	Incentives, such as financial rewards (e.g., €5), would motivate me to participate in the product development process
N	Valid	155	155	155	155	155	155	155	155	155	155
	Missing	0	0	0	0	0	0	0	0	0	0
Mean		3,75	3,98	3,95	3,96	3,90	4,36	3,92	3,67	3,35	4,02
Median		4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00	3,00	4,00
Std. Deviation		0,767	0,871	0,696	0,821	0,745	0,663	0,752	0,947	0,717	0,943
Range		4	4	3	3	3	4	3	3	4	4
Minimum		1	1	2	2	2	1	2	2	1	1
Maximum		5	5	5	5	5	5	5	5	5	5

		Incentives, such as financial rewards (e.g., €5), would motivate me to participate in the product development process	Answer the following statements: - I find surveys from companies useful for expressing my opinions and needs.	Answer the following statements: - Surveys provide me with a good opportunity to give feedback on products.	Answer the following statements: - I enjoy participating in surveys to help companies with product development.	Answer the following statements: - I find company surveys annoying and time-consuming	Answer the following statements: - I feel that my ideas and suggestions can be acknowledged and implemented by the company through a survey.	Answer the following statements: - I am more likely to fill out surveys if I believe my feedback will be used to make improvements.	I find AI-driven tools, such as a platform, AI data analysis, or AI-based surveys, more effective and reliable than traditional methods for submitting my ideas for outdoor and camping equipment.	An AI-driven platform would improve my communication with the company. This platform could allow customers to submit ideas, receive feedback, and collaborate with the company throughout the product development process.	If AI enhances and expands on my ideas, turning them into valuable resources for product developers and creating significant benefits, I would prefer this method and be more likely to participate.	Would you be more likely to purchase products in the outdoor and camping industry that involve customer participation in the development process, compared to those developed solely by the company?
N	Valid	155	155	155	155	155	155	155	155	155	155	155
	Missing	0	0	0	0	0	0	0	0	0	0	0
Mean		4,02	3,43	3,37	2,72	3,85	3,19	4,41	4,27	3,91	3,95	3,49
Median		4,00	4,00	3,00	3,00	4,00	3,00	4,00	4,00	4,00	4,00	4,00
Std. Deviation		0,943	0,852	0,731	0,826	0,766	0,710	0,601	0,617	0,706	0,784	1,002
Range		4	4	4	4	4	4	2	3	3	3	4
Minimum		1	1	1	1	1	1	3	2	2	2	1
Maximum		5	5	5	5	5	5	5	5	5	5	5

Correlations

			Answer the following statements: - I find surveys from companies useful for expressing my opinions and needs.	Answer the following statements: - Surveys provide me with a good opportunity to give feedback on products.	Answer the following statements: - I enjoy participating in surveys to help companies with product development.	Answer the following statements: - I find company surveys annoying and time-consuming	Answer the following statements: - I feel that my ideas and suggestions can be acknowledged and implemented by the company through a survey.	Answer the following statements: - I am more likely to fill out surveys if I believe my feedback will be used to make improvements.
Spearman's rho	Answer the following statements: - I find surveys from companies useful for expressing my opinions and needs.	Correlation Coefficient	--					
		Sig. (2-tailed)	.					
		N	155					
	Answer the following statements: - Surveys provide me with a good opportunity to give feedback on products.	Correlation Coefficient	,238**	--				
		Sig. (2-tailed)	,003	.				
		N	155	155				
	Answer the following statements: - I enjoy participating in surveys to help companies with product development.	Correlation Coefficient	,233**	,269**	--			
		Sig. (2-tailed)	,003	<,001	.			
		N	155	155	155			
	Answer the following statements: - I find company surveys annoying and time-consuming	Correlation Coefficient	-,262**	-,317**	-,365**	--		
		Sig. (2-tailed)	<,001	<,001	<,001	.		
		N	155	155	155	155		
	Answer the following statements: - I feel that my ideas and suggestions can be acknowledged and implemented by the company through a survey.	Correlation Coefficient	,089	,202*	,178*	-,206*	--	
		Sig. (2-tailed)	,269	,012	,026	,010	.	
		N	155	155	155	155	155	
	Answer the following statements: - I am more likely to fill out surveys if I believe my feedback will be used to make improvements.	Correlation Coefficient	,322**	,289**	,252**	-,148	,229**	--
		Sig. (2-tailed)	<,001	<,001	,002	,065	,004	.
		N	155	155	155	155	155	155

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).