Field Lab Marketing Research

Factors Influencing Consumer Purchase Decisions for Cultivated Meat: An Analysis to Inform Effective Marketing Strategies for Mosa Meat

Market Background & Cluster Analysis

Group constitution:

Student Name	Program
Allegra Baumanns (52596)	Management

Work project carried out under the supervision of:

Advisor: Arash Laghaie

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Reading observations for jury:
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Abstract – Group Part

This research investigates consumer factors influencing cultivated meat purchase decisions in Germany, aiming to develop marketing strategies for Mosa Meat. Utilizing qualitative and quantitative methods, five hypotheses are explored, revealing preferences for plant-based products, animal-friendly variants, and branded cultivated meat. Results show consumers resist paying a premium for cultivated meat, and Mosa Meat's brand was perceived as less tasty than established plant-based and conventional meat brands. Finally, cultivated meat products from a well-known brand were more attractive to consumers than stand-alone products. Bridging theory and application, the study offers tailored marketing recommendations and vital insights for policymakers and industry stakeholders.

Abstract – Individual Part

This thesis delves into the cultivated meat market with a detailed case study of Germany within the global landscape. It explores industry growth, hybrid product strategies, venture capital investments, and addresses consumer acceptance and regulatory challenges. A focal point is the in-depth cluster analysis conducted to identify consumer segments within the German market, which revealed distinct groups with varying propensities towards cultivated meat. These insights inform tailored marketing strategies for Mosa Meat, highlighting the importance of brand positioning in influencing consumer preferences.

Keywords:

Cultivated Meat, Purchase Decisions, Consumer Behaviour, Sustainability, Marketing Strategies, Conjoint Analysis, Perceptual Map, Cluster Analysis

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Group Part

1 Introduction

In an era marked by environmental crisis, the words of Rachel Carson resonate profoundly: 'The human race is challenged more than ever before to demonstrate our mastery, not over nature but of ourselves' (R. Carson, personal communication, 1962).

Over the past five decades, global overpopulation has become a critical concern. The rapid surge in the world's population is contributing to an increased demand for food. In addition, the COVID-19 pandemic has exerted a distressing impact on global food security, leading to a rise in chronic hunger. According to the Food and Agriculture Organization of the United Nations (2023), this trend has led to an additional 150 million people affected by hunger. Humankind is currently utilizing most of the world's arable land, and food production barely meets the demands of the world's population (Ord, 2014). This challenge takes a critical form in our dietary choices, particularly in our reliance on traditional meat products (Stanbury, 2022).

The negative externalities on the environment resulting from traditional farming are increasingly perused in academic research as a substantial factor for global warming and pollution (Djekic, 2015). Conventional meat production, as detailed by Leip, et al. (2015) and Recanati, et al. (2015), stand as pivotal contributors to global greenhouse gas emissions, deforestation, water and air pollution. The resource-intensive nature of these practices further compounds their environmental toll. Simultaneously, ethical concerns regarding livestock farming, as articulated by Linzey (2013), convince more and more consumers and businesses to explore alternatives (Brigl, et al., 2021; Carter, et al., 2019). Lastly, mounting attention is targeted toward aspects of food security and risks of public health crises, notably antibiotic resistance, and zoonotic diseases, caused by mass meat production (Parlasca & Qaim, 2022).

Despite these challenges, global meat consumption continues to increase (Parlasca & Qaim, 2022). Nonetheless, it is widely acknowledged among scientists and the media that a reduction in consumption is inevitable (Leip, et al., 2015; Parlasca & Qaim, 2022). While meat production is still rising in Europe, too (Statista Consumer Insights, 2023a), Western countries, are exhibiting growing concerns about meat production concurrently with emerging trends in healthy lifestyles, vegetarianism, and veganism (Saari, Herstatt, Tiwari, Dedehayir, & Mäkinen, 2021; Smart Protein Project EU, 2022). Germany, for instance, is observing a decline in meat consumption (Bundesanstalt für Landwirtschaft und Ernährung, Statistisches Bundesamt, Thünen-Institut, Deutscher Jagdverband, Statista, 2023), rendering the necessity of diversification apparent to the meat industry (Allahverdiyev, 2023). The emergence of cultivated meat in science and commerce is intricately tied to these geoeconomic and climate change challenges (Lonkila & Kaljonen, 2021).

1.1 The Potential of Cultivated Meat

Cultivated meat products are meanwhile leveraging the opportunity and materialize as a potential solution for world hunger, climate change, food waste reduction, and animal welfare in literature (Bryant, Nek, & Rolland, 2020; Chriki & Hocquette, 2020; Stephens, et al., 2018). Also referred to as cell-based or lab-grown meat, this novel technology involves cellular agriculture and tissue engineering techniques to create muscle tissue from animal cells that is suitable for human consumption (Olenic & Thorrez, 2023; Santos, et al., 2023). This technology is a part of the broader field of cellular agriculture (Stephens, et al., 2018). As pointed out by Weinrich, Strack, & Neugebauer (2020), it appears unrealistic that German consumers would willingly reduce meat consumption by 83%. Thus, the adoption of cultivated meat could not only cater to the market demands but would have potential to alleviate the environmental burden associated with meat production.

1.2 Case Company Mosa Meat

Mosa Meat was selected as the case company for this research purpose as a Dutch start-up that developed the world’s first cultivated burger and is expected to cater to the German market

(Fountain, 2013). Founded in 2016, Mosa Meat develops clean meat production techniques based on the cultivation of animal cells and is seen as one of few European start-ups with immense potential (Lorenzo, 2023). Whilst making significant progress in the go-to-market process, having secured over 70 million euros in funding (de Volkskrant, 2021) and experiencing scientific breakthroughs (Mosa Meat, 2023a), a foreseeable challenge in the future will be achieving consumer acceptance.

1.3 Research Purpose, Question, and Scope

This research paper aims to delve into this dynamic environment by exploring the research question which factors are influencing consumer purchase decisions for cultivated meat to develop effective marketing strategies for Mosa Meat. Understanding these factors is essential, particularly for companies like Mosa Meat which are navigating the complex interplay of sustainability, ethical considerations, and evolving consumer preferences in the German market. The research investigates various dimensions influencing consumer behaviour, including sustainability, animal welfare, taste, price, and brand preferences. The scope is hereby focused on the retail environment of burger patties in the German market. This study addresses the challenges faced by the cultivated meat industry in gaining acceptance and market share. By doing so, it offers imperative information to policymakers, industry stakeholders, and marketers who are at the forefront of shaping the future of food production and consumption.

1.4 Structure, Theoretical Framework, and Insight into Findings

This study explores the background of cultivated meat addressing go-to-market challenges, global key drivers, and specifically the German market, and its competitive dynamics, potential customer base, and regulations. Further, existant literature on cultivated meat and consumer acceptance is reviewed whilst identifying research gaps. Expert and consumer interviews were conducted, and two consumer surveys, conjoint and perceptual map, are analyzed using statistical methods such as principal component and willingness-to-pay analysis. After detailing research methods and data collection, results are presented and analyzed of which an overview can be found in Table 1. Findings are translated into marketing strategy recommendations for Mosa Meat.

Nr	Hypotheses (H)	Result
H1	In a choice between cultivated, plant-based, and conventional burger patty products, consumers prefer to buy plant-based products	√
H2	Product variants that are more animal-friendly and sustainable are preferred over other products by consumers	√
H3	Consumers in the German market are willing to pay a premium for cultivated meat products compared to vegan and traditional burger products	×
H4	Mosa Meat’s brand is perceived to be less tasty than other established plant-based, and conventional meat brands	√
H5	Cultivated meat products from a well-known brand are more attractive to consumers than stand-alone products	√

Table 1: Overview of Results for Hypotheses

In conclusion, our study stands at the intersection of environmental science, ethics, marketing, and consumer behaviour. It not only seeks to understand the present landscape of cultivated meat acceptance in Germany but also to inform strategies that can effectively steer consumer preferences towards more sustainable, ethical, and environmentally friendly food choices. In doing so, it contributes to a broader effort to align dietary habits with the imperative of environmental stewardship, a challenge that will shape the future of our planet.

2 Market Background

Before exploring the specific market situation in Germany, it is essential to understand the broader context of the global cultivated meat market. The worldwide shift toward sustainable and ethical food choices, coupled with concerns about the environmental impact of traditional livestock farming, has fueled the growth of the cultivated meat industry on a global scale.

2.1 Overview of the Global Cultivated Meat Market

The inception of cultivated meat gained significant attention in 2013 when the first lab-developed burger patty was created by Mark Post, albeit at a staggering estimated cost of €250,000 (Post & Weele, 2020). Although still in the gestation period with remaining questions concerning production efficiency and supply chains, the production process and costs have experienced noteworthy progress in the previous years (Ye, Zhou, Guan, & Sun, 2022). For instance, production costs have sunken to $9.8 per burger in 2022 (Bandoim, 2022). Since 2013, interest and investment in this technology have burgeoned, with close to 156 companies presently active in this space, affirming the establishment of cultivated meat as a global industry with entities headquartered in 26 countries across all major world regions (GFI, 2022a). While more than 150 companies are solely focused on cultivated meat or seafood, an additional 70 companies have entered the industry via partnerships or offerings within the cultivated meat technology stack. This business-to-business (B2B) activity is expected to significantly bolster the industry's growth (GFI, 2022a). Major players such as Nestlé, Merck KGaA, Mitsubishi, JBS, Kerry, and CP Kelco have entered through investment, acquisition, or provision of inputs for cultivated meat production. The cultivated meat companies initially started as vertically integrated, handling most stages in-house. However, as the industry matures, specialization across different steps of the production process is expected to increase, thereby enhancing the B2B ecosystem (GFI, 2022a). As production costs decrease and volumes increase, cultivated meat and seafood companies are strategically positioned to launch commercially upon securing regulatory approval. However, initial commercial launches following regulatory clearance are expected to be small-scale, offering limited product availability and maintaining a premium positioning due to the relatively higher costs associated with small-volume production (GFI, 2022a).

The integration of hybrid products, combining cultivated meat and fat with plant-based or fermentation-derived proteins, serves as a potential strategy to expedite launches and enhance ingredient accessibility, thereby improving the taste and sensory appeal of alternative protein products as also mentioned by Ramona Weinrich (see Appendix C.1 – Ramona Weinrich). Incorporating plant-based protein not only reduces costs but also introduces beneficial nutritional attributes like fiber. Anticipating the market trend, most companies preparing to enter the market are envisaging launching with hybrid products featuring a blend of cultivated and plant-based ingredients, a pattern that is projected to persist in the near future (GFI, 2022a). Presently, there is a critical juncture for successful market players and startups to establish shared objectives and commence work on products that could potentially redefine the market landscape. This collaborative approach is exemplified in the strategic partnership of Mirai Foods and Rügenwalder Mühle. Together, the goal is to introduce Germany's pioneering hybrid plant-based and cultivated fat burger. While successful in implementing vegan meat alternatives, the strategy aims to cater to a segment of consumers who may not be ready to entirely transition to a vegan diet. The potential solution to address consumer hesitation regarding sensory aspects involves introducing a hybrid product, envisioned as the optimal solution (Rügenwalder Mühle, 2022).

Venture capital and private investors have fueled the growth of cultivated meat startups, propelling advancements in research, development, and market entry. Between 2010 and 2022, the alternative protein sector attracted a significant investment of $14.2 billion. Venture capital firms are increasingly attracted to sustainable, high-growth opportunities in this space (Saied et al., 2023). The U.S. FDA's completion of the first premarket review for UPSIDE Foods and ongoing reviews signaled further de-risking event for investors. Industry analysts anticipate a record surge in funding in 2023, akin to the post-regulatory approval spike observed in 2020 in Singapore (Bradbury, 2023).

Apart from private investments, the alternative protein sector, including cultivated meat, faces a challenge of insufficient public research funding. This reliance on private investment contributes to research fragmentation and limited accessibility of breakthroughs. To address this, increased public research funding is crucial (GFI Europe, 2023). In a notable move, the EU research program Horizon Europe committed €32 million in June 2021 to advance alternative proteins, supporting research consortia. This commitment continued with three specific projects related to cultivated meat and modern fermentation processes, receiving €25 million in total funding in the 2023-2024 work program (Commission, 2023). Further signaling a huge market potential for cultivated meat.

2.1.1 Challenges

Initial tasting trials have generally received positive feedback on taste and quality. Nevertheless, achieving complete taste parity remains an ongoing challenge, according to some studies (Joo, et al., 2022). Additionally, there are several other challenges that need to be addressed for the widespread adoption of cultivated meat. These challenges include consumer acceptance, scalability, safety, and reproducibility (Santos, et al., 2023). Consumer acceptance, especially among Muslim consumers in emerging markets, is an important consideration, and the Halal status of cultivated meat products needs to be addressed (Attwood, Jameel, Fuseini, AlKhalawi, & Hajat, 2023). Also, technological aspects such as the development of biomaterials, microcarriers, scaffolds, and assembly methods play a crucial role in the production of cultivated meat (Santos, et al., 2023; Ye, Zhou, Guan, & Sun, 2022). The scalability of cultivated meat presents a significant challenge in its widespread adoption. Florentine

Zieglowski emphasized the inherent challenges associated with transitioning from lab-scale to large-scale automated processes, as elaborated in Appendix C.3 – Florentine Zieglowski. Bioreactors, the essential vessels for cell culture, were initially developed for small-scale processing. Expanding their capacity for industrial use demands substantial investment and innovation (Santos, et al., 2023; Stephens, et al., 2018). Detlef Exner points out a significant challenge in the cultivated meat industry: the high production costs, rendering it currently more expensive than traditional meat. Furthermore, the quality of cultivated meat, particularly in terms of replicating the taste and consistency of traditional meat, remains an ongoing area of improvement (Appendix C.4 – Detlef Exner).

Ethical concerns have also arisen, particularly regarding the use of fetal bovine serum (FBS), sourced from cattle fetuses, contradicting the ethos of moving away from animal slaughter (Chriki & Hocquette, 2020). Additionally, the cost associated with FBS makes it impractical for large-scale meat production. As a result, major industry players have been actively seeking cost-effective and ethical alternatives, showing progress but not yet achieving a breakthrough in identifying an inexpensive serum replacement (Santos, et al., 2023).

Regulatory challenges also need to be addressed, as the industry is still in its early stages and requires the development of appropriate safety and regulatory frameworks (Ye, Zhou, Guan, & Sun, 2022; Bhat, Morton, Mason, Bekhit, & Bhat, 2019; Stephens, et al., 2018). Within the regulatory domain, cellular agriculture falls under the classification of novel foods in Europe (EU, 2021) and various other regions. Hence, obtaining regulatory approval is an essential step for market entry and still a challenge in many markets. Ivo Rzegotta anticipates that regulatory approval in the EU will likely be secured by 2026, but there is a high potential of delays and uncertainties in the process (Appendix C.2 – Ivo Rzegotta). However, Singapore marked a milestone by issuing the first regulatory approval for lab-grown meat in December 2020 (Lucas, 2020), potentially setting a precedent for other jurisdictions. The FDA granted regulatory approval to UPSIDE Foods for its cultivated chicken, marking a significant breakthrough for cultivated meat in the United States. With only a few regulatory steps remaining, cultivated meat is closer to entering the U.S. market than ever before (GFI, 2022a). However, cultivated meat remains largely unavailable in markets globally. Nevertheless, throughout 2022, numerous companies conducted exclusive tasting events tailored for policymakers, investors, journalists, and stakeholders. These events provided a platform for showcasing the innovation and progress within the cultivated meat industry. For instance, Israel-based SuperMeat organized a blind tasting event, inviting participants to compare its cultivated chicken product against conventional chicken. As companies continue to innovate and present their creations through these exclusive tastings, it further propels the anticipation and momentum for the future commercialization and widespread availability of cultivated meat (GFI, 2022a).

Despite these challenges, the cultivated meat market is projected to grow significantly in the coming years, with estimates suggesting that nearly 35% of all meat available in the market by 2040 will be cell-based and the global cultivated meat market is expected to reach 20 million by 2027 (Navath, 2021).

2.1.2 Global Key Drivers

The global cultivated meat market has been witnessing rapid growth in recent years. Major regions contributing to this growth include North America, Europe, and Asia-Pacific, with North America historically leading in terms of investment and market development. The key factors driving the growth of the global cultivated meat market include the increasing demand for meat products, the environmental impact of traditional livestock farming, and the potential to address health and ethical concerns associated with meat consumption (Navath, 2021; Negulescu, et al., 2022; Santos, et al., 2023). The global population is rapidly increasing, particularly the Muslim population, which is expected to comprise 30% of the global population by mid-century. This is driving the demand for Halal meat products, creating an opportunity for cultivated meat to meet the dietary demands of Muslim consumers (Attwood, Jameel, Fuseini, AlKhalawi, & Hajat, 2023). Traditional livestock farming has a substantial impact on greenhouse gas emissions, land use, water consumption, and animal welfare, making it unsustainable. Cultivated meat offers a more environmentally sustainable alternative by avoiding the need for live-animal farming (Negulescu, et al., 2022). Additionally, cultivated meat has the potential to address health concerns associated with meat consumption, such as antibiotic resistance and the risk of zoonotic diseases (Santos, et al., 2023).

Several factors have been driving the global adoption of cultivated meat:

Sustainability: Growing concerns about the environmental impact of traditional meat production have led consumers to seek more sustainable alternatives.

Animal Welfare: Ethical considerations and increased awareness of animal welfare issues have motivated consumers to explore meat options that do not involve traditional livestock farming.

Health and Nutrition: Health-conscious consumers are drawn to cultivated meat for its potential to offer healthier, leaner meat products with fewer additives.

Food Security: The ability to produce meat in controlled environments, without reliance on extensive land and resources, aligns with global food security goals.

Cultural Acceptance: As consumers become more familiar with the concept of cultivated meat, cultural acceptance and culinary integration are on the rise.

2.2 Market Situation of Cultivated Meat in Germany

In recent times, Germany has emerged as a focal point of transformative change within the global food industry. As the world seeks sustainable alternatives to traditional meat production, Germany has not only been at the forefront of this revolution but has also set remarkable precedents. The German per capita meat consumption reached its lowest point last year (52 kilograms) (Bundesanstalt für Landwirtschaft und Ernährung, Statistisches Bundesamt, Thünen-Institut, Deutscher Jagdverband, Statista, 2023), a milestone representing a significant departure from decades of dietary habits. This biggest decline, captured in data since 1989, reflects a fundamental shift in the choices made by German consumers (vegconomist, 2023). Concurrently, Germany's position as a trailblazer in the plant-based food sector has been cemented by its exemplary performance in 2023, representing the highest plant-based food sales value in Europe. This achievement, documented by Nielsen and corroborated by Global Food Innovation (GFI) Europe, underscores the burgeoning appetite among Germans for alternative and sustainable food options (GFI Europe, 2023b). Moreover, the Federal Statistical Office of Germany reveals that in 2022, companies in the country produced 6.5% more meat alternatives compared to the previous year. This impressive growth is further exemplified by a staggering 72.7% increase in production when compared to 2019. The economic value of plant-based products surged by 17.3% year-on-year in 2022, reaching an impressive 537.4 million euros, a substantial increase from the 2021 figure of 458.2 million euros (vegconomist, 2023).

However, the remarkable transformation doesn't end here. Germany hosts a vibrant ecosystem of over 90 companies fervently engaged in the development of alternative products based on plants, cultivation, and fermentation (GFI Europe, 2023a). This achievement places Germany firmly alongside traditional innovation powerhouses, the United States and Israel.

In the following sections, we will dissect the regulatory, consumer, and competitive facets of this evolving market in Germany, providing insights that can inform strategic decisions for companies like Mosa Meat operating in this dynamic environment.

2.2.1 Competitive Landscape

In the evolving landscape of cultivated meat, several companies are vying for a share of the market. These competitors can be categorized into two primary groups: Direct and indirect competition.

Direct Competitors

To ensure a comprehensive and focused comparison among direct competitors, specific objective dimensions were identified. While Mosa Meat is the focal company of this thesis, two additional cultivated meat companies were chosen, leveraging the GFI database. This resource aims to encompass a wide array of companies centered on cultivated meat and seafood, forming the foundational base for identifying direct competitors. Emphasis was placed on companies engaged in the production of final cultivated meat products rather than focusing on intermediate steps. Specifically targeting beef product manufacturers aligns with Mosa Meat's area of development. Furthermore, the selection criteria were refined to include only companies intending to penetrate the European market, given that this thesis centers in Germany. Notably, expert interviews highlighted significant market distinctions, particularly concerning genetically modified organism (GMO) or Non-GMO preferences. Thus, all chosen companies produce non-GMO products. This stringent selection process led to the identification of five potential companies, including Mosa Meat: Mosa Meat, Mirai Foods, Alife Foods, Uncommon, and BioTechFoods. Subsequently, based on insights garnered from expert interviews, Mosa Meat, Mirai Foods, and Alife Foods were chosen for in-depth comparison.

These three selected companies were meticulously evaluated across several dimensions, as outlined in Figure 1, to provide a comprehensive comparative analysis.

	Mosa Meat	Mirai Foods	Alife Foods
Country			
Year Founded	2015	2019	2019
Founders	Peter Verstrate, Mark Post	Christoph Mayr, Suman Kumar Das	Steffen Sonnenberg, Dat Tran, Joe Natoli, Bernd Boeck
Product Type	Beef Burger Patty	Beef Steaks	Beef Schnitzel
Product Developement	Commercial Product	Prototype	Prototype
Strategic Partnerships	✓	✓	✓
Financial Situation	$96M (Angel Round/Series B)	$6.9M (Seed Funding)	Amount Unknown (Seed Funding)
Investors	Leonardo DiCaprio, Beyond Impact, Blue Horizon Corporation, Jitse Groen, Nutreco, Target Global, Rubio Impact Ventures, ArcTern Ventures, Mitsubishi Corporation, Bell Food Group, Lowercase Capital, M Ventures	PINC, FRIBA Investment, Ulf Claesson, Team Global, Yakumi, Skyviews Life Science	2b AHEAD Ventures
Operating Regions	Europe	Europe	Europe
Production Facilities	✓	✗	✗

Figure 1: Mosa Meat Direct Competitor Overview for the German Market

Mosa Meat, previously introduced in chapter 1, emerges as the most mature and advanced startup among the three companies under comparison. Its maturity is not solely due to being the oldest company but is attributed to its significant financial backing, placing it ahead of its counterparts. Boasting an impressive funding of $96 million (Crunchbase, 2023c), Mosa Meat stands as the most well-financed among the trio. The company has secured support not only in substantial financial resources but also from a diverse pool of investors. Notably, renowned figures such as environmental activist and Academy Award-winning actor, Leonardo DiCaprio, have not only invested in the company but also lend their advisory expertise (Mosa Meat, 2023b). This association presents a compelling advantage for potential marketing strategies, leveraging not just DiCaprio's celebrity status but also his industry experience.

With a backing of 15 investors, Mosa Meat demonstrates a robust support network (Crunchbase, 2023c). Notably, the company has already developed a commercial product that has undergone rigorous testing, including blind taste tests. These tests, where individuals were unable to discern between the cultivated meat and traditional meat, underscore a significant achievement in the product's likeness and quality (Mosa Meat, 2023c).

Additionally, Mosa Meat has forged a strategic partnership with Esco Aster, a reputable Singaporean contract manufacturer. Esco Aster's unique distinction as the solitary facility to obtain regulatory clearance in Singapore for cultivated meat production presents a strategic advantage for Mosa Meat. This partnership not only facilitates the introduction of cultivated beef to the market but also positions Mosa Meat to learn from the launch in the Singaporean market and apply this experience to its entry into the German market, offering a competitive edge over rivals (Business Wire, 2022).

Moreover, Mosa Meat distinguishes itself as the only company among the three with an operational production facility. Its facility, spanning 77,000 square feet, stands as the world’s largest cultivated meat campus (Food Frontier, 2022). This extensive infrastructure not only positions them for substantial production capabilities but also allows them to operate in two countries, a strategic move that bolsters sustainability efforts by minimizing shipping needs. This multifaceted advantage augments Mosa Meat's position as a leader in the cultivated meat industry.

Mirai Foods emerges as a dynamic and innovative contender in the cultivated meat industry, representing a relatively new yet promising force compared to Mosa Meat. Founded in 2019 (Mirai Foods, 2023), this Swiss-based company has swiftly made strides within the cultivated meat sector, boasting an impressive breakthrough in meat replication technology. While most competitors can only produce minced meat or thinly sliced alternatives, Mirai Foods has successfully demonstrated the creation of genuine steaks with a thickness of one and a half centimetres or more, pushing the boundaries of what's achievable in this field (Swiss Food & Nutrition Valley, 2023).

Currently in its pilot phase, Mirai Foods has garnered attention through a well-received tasting event, marking a significant milestone in its journey (OTS, 2021). The company is dedicated to transitioning its prototypes into commercial products, focusing on accelerating product development to bring its slaughter-free meat to market.

The company has strategically partnered with Shiok Meats subsidiary Gaia Foods, a collaboration aimed at developing cultivated beef products in Singapore. This alliance facilitates the exchange of expertise and resources, leveraging Shiok's regulatory knowledge and experience gained from operating in the first country to approve the sale of cultivated meat in Asia (Gulfood Manufacturing, 2022). Notably, Mirai Foods has secured a significant alliance with Rügenwalder Mühle, a respected German food manufacturer, producing meat products, and well-known for its leadership in vegetarian and vegan meat alternatives. Seeking to further solidify this position, the company is poised to integrate cultivated meat into its product portfolio. This strategic move will see Rügenwalder Mühle joining forces with Mirai Foods, leveraging the Swiss startup's expertise to craft a new, innovative hybrid product. This upcoming creation will uniquely blend plant-based proteins with cultivated fat, showcasing a pioneering approach to meat alternatives (Swiss Food & Nutrition Valley, 2022). This partnership grants Mirai Foods access to the market intelligence and established consumer base of Rügenwalder Mühle, marking a strategic move to expedite the production, marketing, and distribution of cultivated meat within Germany and potentially beyond.

Mirai Foods has received an initial seed funding of $6.9 million (Crunchbase, 2023b), signaling confidence in its vision and potential. While currently operating in Europe with a pilot production plant (Ellis, 2021), the company's strategic partnerships, innovative approach, and progressive developments position it as a rising star in the cultivated meat sector, showcasing promise for expansion and future success.

Alife Foods stands out as an innovative startup focused on the development of cell-cultivated schnitzel, utilizing cutting-edge stem cell technology. Established in 2019 (Crunchbase, 2023a), this company has quickly gained traction with its unique approach to creating cultivated meat products.

Alife Foods achieved a significant milestone with the introduction of its pioneering cultivated meat prototype, a schnitzel—a breaded cutlet—crafted in collaboration with LabFarmFoods (vegconomist, 2022), an esteemed US-based cellular agriculture company known for its dedication to sustainable and authentic meat production. LabFarmFoods specializes in cultivating the skeletal muscle component of meat and supplying high-quality muscle fibers as a raw material ingredient (f6s, 2023). This strategic partnership not only provides Alife Foods access to premium raw materials essential for its cell-cultivated schnitzel but also establishes a pathway for market entry into the United States, leveraging LabFarmFoods' expertise and resources in the American market.

Additionally, Alife Foods strategically aligned with the Fuchs Group, the largest European spice manufacturer renowned for its global spice expertise (Fuchs Group, 2023). This partnership enhances the flavor profile of Alife Foods' cultivated schnitzel, integrating premium spice blends and seasoning expertise, crucial elements in crafting an authentic and appealing product.

Currently, the product is in the midst of taste trials and sensory evaluations, marking an essential phase in its developmental journey. Alife Foods aims to present a fully realized prototype to potential investors soon, setting the stage to become recognized as the 'cultivated schnitzel company' upon releasing its products to the market (vegconomist, 2022).

The company has received seed funding from 2b AHEAD Ventures, an Accelerator/Incubator (Pitchbook, 2023). Though the specific amount of investment remains undisclosed, this backing demonstrates confidence and support for Alife Foods' vision. With a strategic focus on the German and European markets, the company aims to capture the attention of consumers seeking alternative meat options. However, at present, Alife Foods does not possess a production facility, indicating a phase of development focused on product refinement and future scalability.

Indirect Competitors (Substitutes)

In examining the **plant-based market**, plant-based poultry and beef alternatives are among the most frequently consumed items in Germany, with a consumption rate of at least 20% once a week. The market size of meat substitutes in Germany is reported to be €273 million, as highlighted by the Heinrich Böll Stiftung and BUND (Heinrich-Böll-Stiftung; Bund für Umwelt und Naturschutz Deutschland; Le Monde Diplomatique, 2021). This substantial figure underscores the growing significance and market traction of meat alternatives within the country's food industry. When compared to other countries under analysis, German consumers display a higher inclination to pay more for plant-based meat compared to animal-based meat. Approximately 26% of German consumers are willing to pay a premium for plant-based products that replicate the taste and texture of animal-based meat, while in Poland and Spain, the corresponding figures are 23% (ProVeg International, 2022b; ProVeg International, 2022c). In the United Kingdom, 18% of consumers express a similar willingness to pay a premium for such products (ProVeg International, 2022d).

An intriguing statistic reveals that nearly 42% of German consumers plan to reduce their meat consumption within the next six months. Sales of vegan and vegetarian meat alternatives in Germany reached an impressive €357 million in the last period, with more than half of the sales attributed to vegan products (€181 million/51%), as depicted in the accompanying figure (ProVeg International, 2022a).

Within this segment, plant-based refrigerated meat products such as burger patties, nuggets, and mince represent the most successful category in Germany, generating €123 million. Notably, the plant-based frozen meat segment, encompassing items like burger patties, nuggets, and minced alternatives, exhibited the lowest sales value at €12 million. However, it experienced the most significant growth rate, surging by 403% in the latest period (ProVeg International, 2022a).

Discount stores play a pivotal role in the German plant-based meat sector, accounting for 30% of sales value and 35% of sales volume. Sales in discount stores primarily focus on plant-based refrigerated meat (€38 million), although other segments have also seen an increase, now collectively contributing to almost two-thirds of all plant-based-meat sales in German discount stores (€16 million) (ProVeg International, 2022a).

Consumers predominantly cite "Good source of protein" and "Healthier than meat" as their primary reasons for choosing plant-based options (GFI, 2022b). Notable brands in the market include Rügenwalder Mühle, boasting a brand awareness of 75%, along with the Vegetarian Butcher and Beyond Meat, each with 35% brand awareness. These companies will be included in the Conjoint analysis and Perceptual map in the subsequent sections of this thesis (Statista Consumer Insights, 2023b).

The **traditional meat market** in Germany significantly overshadows the market for meat alternatives. In 2019, the meat market's size was approximately 147 times larger than that of substitutes, constituting a combined market worth about 40.4 billion euros (Heinrich-Böll-Stiftung; Bund für Umwelt und Naturschutz Deutschland; Le Monde Diplomatique, 2021). Germany is positioned to emerge as the largest meat market in Europe. Sales of meat products in the country are projected to reach €56.9 billion by 2026, marking an annual increase of 1.1% from €53 billion in 2021 (ReportLinker, 2023).

From 2013, the German market has experienced a consistent year-on-year growth of 3.1%. Following in the rankings, France, Spain, and Italy represent subsequent markets for meat products, respectively. Forecasts predict that German meat consumption is anticipated to reach 6,370 thousand metric tons by 2026, indicating a year-on-year decline averaging 0.4%. Since 2017, there has been a 0.2% annual decrease in demand within the country (ReportLinker, 2023). The total consumption of meat in Germany is estimated to be approximately 6.5 million tons in dressed weight. Per capita consumption of meat in Germany stands at 52 kilograms. This figure underscores the significant role meat plays in the German diet and dietary habits (Statista, 2023).

Moreover, in the slaughter and meat processing industry in Germany, foreign sales contribute to approximately 15.4% of the market share. This denotes the substantial involvement of foreign markets and export activities within the country's meat industry, underlining its global interconnectedness and trade relations.

In 2020, the most popular brand of ready-made sausages and meat products in Germany was Rügenwalder, with 31.4% of respondents to the survey confirming they had consumed products from this brand in the preceding four weeks (Statista, VuMA, 2023). This observation is particularly noteworthy considering Rügenwalder Mühle is also the brand with the highest brand awareness in the meat substitute market. Following Rügenwalder, Herta secured 20.3%, and Gutfried held 18.9% as leading brands of ready-made sausages and meat products consumed in the last four weeks in 2020. This data highlights the strong market presence and consumer preference for these traditional meat brands in Germany (Statista, VuMA, 2023).

2.2.2 Potential Customer Base

The potential customer base for cultivated meat in Germany is diverse and multifaceted. It encompasses individuals driven by ethical considerations, environmental concerns, health-conscious preferences, and those seeking innovative and sustainable food choices. Moreover, the flexitarian and vegetarian segments of the population present potential target markets, as cultivated meat serves as a bridge between traditional meat consumption and plant-based diets.

According to a study conducted in Germany, women, middle-aged individuals, and well-educated consumers show a greater tendency to purchase environmentally and socially sustainable products, which suggests that they may be more receptive to cultivated meat (Mohr & Schlich, 2015). On the other hand, younger males appear to be more accepting towards cultivated meat if they are meat-eaters, from progressive countries, reside in urban areas, with a left-wing/liberal political orientation and higher education, and are from an affluent background (Bryant & Barnett, 2020). However, in the expert interview, Ivo Rzegotta highlighted that consumer research indicates fluctuating acceptance rates, influenced significantly by survey methodology. Empirical data underscores that factors such as taste, price, and convenience wield more influence over consumer choices compared to ethical or sustainability arguments (Appendix C.2 – Ivo Rzegotta). In this regard, the FMI's Power of Meat 2022 report revealed that appealing to meat-eating consumers (excluding vegans, vegetarians, and pescatarians) is critical, as they constitute the largest demographic and ultimate target for cultivated meat products (FMI, 2022). Generational differences are also notable. Younger generations tend to express a higher likelihood of trying and purchasing cultivated meat compared to older generations according to Ivo Rzegotta (Appendix C.2 – Ivo Rzegotta).

Consumer awareness and familiarity with cultivated meat play a pivotal role in shaping their preferences. A recent study in by the GFI and Embold Research revealed that just 32 percent of respondents had heard of cultivated meat before, underscoring the significant gap in consumer education and exposure. Baum, Bröring, & Lagerkvist (2021) generated findings of a sample of 617 German consumers and their purchase evaluations, and Bryant, Nek, & Rolland (2020) compare consumption and purchase intents between German and French consumers.

Preliminary findings are mixed with regard to the openness to cultivated meat, underscoring the significance of the factors ethics, especially animal welfare and sustainability for consumers (Heidmeier & Teuber, 2022; Weinrich, Strack, & Neugebauer, 2020) , as well as the usage of antibiotics and food safety (Bryant, Nek, & Rolland, 2020; Weinrich, Strack, & Neugebauer, 2020). Cognitive drivers such as information on environmental impact, animal welfare, and health and nutrition of cultivated meat suggest the potential to positively influence purchase intentions (Baum, Bröring, & Lagerkvist, 2021).

However, it's essential to acknowledge that further research is needed to gain a comprehensive understanding of the demographics of potential customers and their purchase intentions for cultivated meat in Germany.

2.2.3 Regulatory Environment

The regulatory landscape plays a pivotal role in shaping the cultivated meat market in Germany. Under the general framework of food regulations in Germany, most food products can be placed on the market without prior authorization. However, an exception to this rule is observed in the case of novel foods (Bundesamt für Verbraucherschutz und Lebensmittelsicherheit, 2023). Novel foods are subject to consistent EU-wide regulations, designed to achieve a dual purpose: upholding a high standard in safeguarding human health and ensuring the seamless operation of the internal market. Consequently, any novel food must undergo a health assessment by the European Food Safety Authority (EFSA) before being authorized for sale (Bundesamt für Verbraucherschutz und Lebensmittelsicherheit, 2023). If the evaluation outcomes are favorable, the European Commission, working in conjunction with representatives from EU member states, holds the authority to grant final approval. These approvals extend across all EU member states. The entire process is estimated to span between 18 months to three years for completion (GFI, 2022a). The Cultivated B, a subsidiary of the German food manufacturer Infamily Foods, became the first company globally to register a cell-cultivated meat product with the EFSA. The preliminary process for approval is currently underway. Ivo Rzegotta anticipates that regulatory approval in the EU will likely be secured by 2026, but there is a high potential of delays and uncertainties in the process (Appendix C.2 – Ivo Rzegotta).

The subject currently undergoing the ongoing approval process involves the production of hybrid hotdogs, skillfully crafted from a combination of vegan ingredients and pork derived from cell-cultivated sources cultivated in specially designed bioreactors. According to Ramona Weinrich, this is because hybrid products are more easily producible at this stage of research. Meanwhile, the Netherlands has authorized, at least on a governmental level, public tastings of "laboratory-produced meat and seafood" through an alternate pathway. Under strict regulations and limited participation, this direct customer engagement offers companies in Europe an early interaction with consumers, potentially invigorating the entire sector. Worldwide, the public sale of cultivated meat has so far only been permitted in Singapore and the USA (Hufelschulte, 2023).

3 Results and Analysis

3.1 Expert Interviews

After conducting the interviews, all recordings were carefully transcribed via the intelligent verbatim transcription approach. An intelligent verbatim transcription, also known as clear transcripts, is especially convenient when the content itself should be in the focus rather than how it was said. Thereby fillers and repetitions that are distracting were extracted to emphasize the actual content (Gläser-Zikuda, 2015). After having transcribed the interviews and translated them to English (Appendix E – Expert Interview Transcriptions), the insights were categorized into thematic groups.

The interviews unveiled recurring themes providing valuable insights into Germany's as well as the European evolving cultivated meat landscape. Key areas addressed include market readiness, consumer acceptance factors, production challenges, collaboration dynamics among industry players, and the pivotal role of brand strength and communication strategies.

Market Readiness in Germany: Monica Röntgen, Florentine Zieglowski, and Ramona Weinrich highlighted Germany's pivotal role in the emerging cultivated meat market. The divergence in perspectives became apparent when considering the timeline for market entry. Monica Röntgen and Florentine Zieglowski anticipated potential market entry in Germany in the next few years. Ivo Rzegotta even posited the possibility of regulatory approval by 2026. However, Ramona, adopting a more circumspect stance, suggested that Germany remained distanced from immediate market entry, emphasizing the varied opinions and uncertainties surrounding the timeline for the integration of cultivated meat into the German market.

Consumer Acceptance Factors: Insights garnered from interviews with Monica Röntgen, Kerstin Gerke, and Ivo Rzegotta shed light on the intricate factors influencing consumer acceptance within the cultivated meat landscape. Ethical considerations, pricing, and sustainability emerged as pivotal determinants, with Monica Röntgen highlighting the ethical dimension, Kerstin Gerke placing emphasis on openness to new experiences, and Ivo introducing the influential factors of taste and convenience. Furthermore, Kerstin Gerke and Ivo Rzegotta presented divergent perspectives on the factors that shaped consumer acceptance. Kerstin Gerke directed attention towards the significance of openness to new experiences and the effective framing of sustainability information. In contrast, Ivo underscored the dominance of taste, price, and convenience in shaping consumer preferences, downplaying the role of ethical and sustainability arguments to a secondary level. Adding to this, Ramona Weinrich underscored that sustainability was perceived by many as a luxury consideration, underscoring that a majority of German consumers tended to prioritize price in their purchasing decisions. This variation in perspectives among interviewees highlighted the nuanced nature of consumer preferences within the cultivated meat market.

Challenges in Cultivated Meat Production: Monica Röntgen, Florentine Zieglowski, and Detlef Exner provided a comprehensive exploration of the challenges inherent in the cultivated meat production landscape. Monica Röntgen drew attention to concerns related to antibiotic use, contamination, and the competitiveness of production costs. Florentine Zieglowski shed light on technological challenges, particularly those associated with transitioning to large-scale processes, highlighting the need for careful consideration in this transition. On the other hand, Detlef emphasized the critical need for innovative technologies in sensor equipment to enhance the efficiency of cultivated meat production. This dual perspective from industry experts underscored the multifaceted nature of technological challenges within the domain.

Global Landscape and Market Dynamics: Florentine Zieglowski and Ivo Rzegotta both underscored the pivotal role of collaboration within the cultivated meat industry, each offering unique perspectives. Florentine Zieglowski emphasized the necessity of collaboration specifically in the realm of raw material production, recognizing the interconnectedness of various stages in the production process. On the other hand, Ivo Rzegotta highlighted the need for synergistic partnerships between companies operating within the industry, emphasizing the importance of collective efforts in driving advancements. Turning to the realm of market dynamics and pricing, Ivo Rzegotta and Ramona Weinrich presented divergent viewpoints. Ivo anticipated an initial premium pricing strategy, driven by the limited number of players and high demand in the market. In contrast, Ramona emphasized the strategic importance of competitive pricing as a means to secure a significant market share, reflecting the nuanced considerations in navigating the pricing landscape. In discussions about political decisions, Florentine Zieglowski and Ivo Rzegotta provided distinct insights. Florentine delved into the influence of political decisions on aspects like research funding and overall industry development, recognizing the interconnected relationship between governmental policies and the trajectory of cultivated meat initiatives. Ivo Rzegotta, in contrast, shed light on the cautious approach to public funding in Germany relative to other countries, emphasizing the need for strategic financial considerations in the industry. Ivo Rzegotta's focus was on the competitive dynamics and potential import scenarios in a global context, providing a broader understanding of the industry's interconnectedness. Simultaneously, Ramona Weinrich highlighted Germany's attractiveness to companies, emphasizing the market size as a key factor contributing to the nation's appeal. These cross-cutting themes wove together diverse viewpoints, offering a comprehensive view of the industry's global and regional dynamics.

Brand Strength and Communication: Monica Röntgen, Kerstin Gerke, and Florentine Zieglowski consistently highlighted the pivotal role of brand strength and effective communication in securing consumer acceptance within the cultivated meat market. Monica Röntgen emphasized the critical need for introducing a reputable product, underlining the foundational impact of the first product's image on consumer perceptions. Kerstin Gerke advocated for a differentiated approach grounded in an understanding of diverse motivations for consumption, acknowledging the multifaceted nature of consumer preferences and focusing on the communicative aspect, placing importance on delivering positive information that fosters a favorable consumer mindset. Florentine Zieglowski delved into the strategic realm of media campaigns and information dissemination, recognizing these efforts as instrumental in shaping public perception and understanding. On the contrary, Ivo Rzegotta built upon this perspective and underscored the paramount importance of portraying cultivated meat as a natural and sustainable process. He accentuated the need for a narrative that resonates with environmental consciousness and ethical considerations. In emphasizing this viewpoint, Ivo Rzegotta highlighted the critical role of aligning the communication strategy with broader societal values, positioning cultivated meat as an environmentally responsible and ethically sound choice. This perspective aligned with the growing awareness and concern for sustainability, positioning cultivated meat not just as a technological innovation but as a conscientious and ethical alternative within the broader food landscape.

Understanding Consumer Segments: Monica Röntgen and Ivo Rzegotta delved into the intricacies of understanding diverse consumer segments. Monica Röntgen directed her focus towards most of the population that did not adhere to a vegetarian or vegan diet, recognizing the importance of catering to this significant demographic. In contrast, Ivo Rzegotta shed light on the variations in consumer acceptance that manifested across different demographics and generations, underscoring the nuanced nature of preferences within the broader consumer landscape. Concurrently, Ramona Weinrich explored cultural factors influencing market acceptance and drew attention to disparities in food culture and the varying degrees of openness to new foods, highlighting the need for a nuanced understanding of local preferences.

3.2 Consumer Interviews

After conducting the interviews, all recordings were carefully transcribed using the intelligent verbatim transcription approach (Gläser-Zikuda, 2015), similar to the method employed for expert interviews. Following the transcription and translation of the interviews, the core analysis of the expert interviews was carried out. In this process, the coding approach for qualitative research, as introduced by Mayring (1994) served as guidance, given that his approach has proven to be an effective method for analyzing qualitative data thus far (Appendix F – Consumer Interview Transcriptions).

As a second step, deductive categories were formed corresponding to the general structure of the interview guideline. Based on the key questions, we identified two main categories, namely purchase decision factors and familiarity with existing brands. Those categories served mainly as a reference and the purpose of reflecting a first structure of the data. All interview transcriptions were carefully examined in the next step, and fractions of the text, namely codes, were assigned to the deductive categories.

Participants were subsequently asked about the most relevant purchase factors. Appendix A.1 Frequency Distribution of Purchase Decision Factors depicts by how many interviewees the respective code was mentioned. The following analysis will focus on the five most frequently mentioned factors in this context.

The first factor brought up by 88% (7 out of 8) interview partners was brand. Interviewee #2 explained that if she were buying for the first time, she would go for a brand she is already familiar with. Interviewee #5 added that brand does play a role for him but mainly if he had positive experiences with this brand in the past. The second factor which was mentioned by 75% (6 out of 8 interviewees) was sustainability. Interviewee #4 stated: "Unfortunately, most vegan alternatives aren't much better and only slightly more sustainable, but still not 100% sustainable. It's also important that the patty isn't excessively packaged in plastic, and that the production doesn't waste water or release harmful chemicals into the environment".

Another factor mentioned by 75% (6 out of 8) interviewees was animal welfare. Interviewee #4 elaborated that she does not support or purchase products from factory farming or meat imported from abroad. In fact, she tries to avoid factors farming and only chooses regional products so that when animals are slaughtered, they are not transported long distances. She further explained that animal welfare should include humane treatment of the animals, no overuse of antibiotics, and avoiding pure stall housing. Interviewee #8 also understood animal welfare as how the animals lived. He explained: “So there are in Germany here the different types of animal husbandry and that's already important to me. the animals were not kept in factory farming “.

The next factor, taste, was brought up by 63% (5 out of 8) interviewees. Interviewee #3 pointed out that, because she does not know how cultivated meat tastes, it is difficult for her to select that option. Thus, she suggested having in-store tastings in supermarkets for consumers to try out the product. This would help her to overcome her barriers and if it tastes good, she would also be willing to buy that product. This was confirmed by Interviewee #2, who added: “so to me the taste would be very important. It must not necessarily taste completely like meat, but it must taste good and not be such a vague mass …., therefore, I would [buy cultivated meat]… if I had tasted it before”.

The last factor addressed by 63% (5 out of 8) interviewees was price. Interviewee #2 considered price the most relevant factor and believed it would become one of the most significant factors for a lot of people. She imagined that it would be quite difficult to convince people to buy cultivated meat if it were more expensive than regular meat. Interviewee #5 had a different perspective on price, since he considers price to be relevant, but only after other factors. He added: “The price is also not crucial unless the product is extremely expensive; then, I wouldn't buy it at all”. Lastly, participants were asked about their familiarity with existing vegan or vegetarian, or meat burger patty brands. Appendix A.2 Frequency Distribution for Burger Brand Familiarity below gives an overview by how many interviewees the respective brands were mentioned. The by far most well-known brand was Rügenwalder Mühle with 6 out of 8

(75%) participants mentioning this brand, followed closely by Beyond Meat and Garden Gourmet. We consequently concluded that the aforementioned brands must be included in the conjoint and the perceptual map survey.

3.2.1 Preference Share Simulations

In this section, the Conjointly preference simulation was employed to model and analyze consumer preferences for various market offerings. According to Conjointly, preference shares are only an approximation of market share due to factors such as availability of products (for instance, not available in all geographies), shelf space (in case of fast-moving consumer goods). Before the simulation estimated the percentages of preferences for these offerings, the previously most preferred levels per brand were preselected. An overview over the inputted levels can be found in Appendix B.1 Selected Attributes for Simulation. The simulation further allows to simulate new product launches (NPD), in this case the cultivated meat patty by Mosa Meat, to see the redistribution of preference and revenue in the simulated market after the launch. **Error! Reference source not found.** shows the preference shares and revenue projections per brand both for the baseline scenario and after the launch of the NPD.

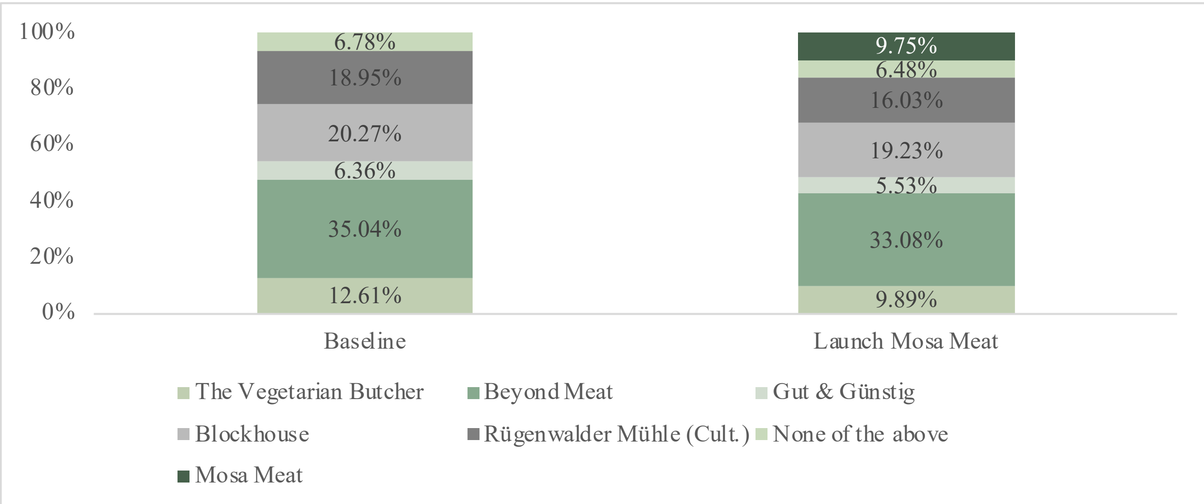

Figure 2: Preference Share Simulation

In the baseline scenario, Beyond Meat (35%) has the highest preference shares, followed by Rügenwalder Mühle (18.9%) and Blockhouse (20.3%). Gut&Günstig tends to have the lowest share (6.4%). After its launch, Mosa Meat managed to acquire a 9,7% share in the market. This is a quite optimistic view given that its competitors are well-established players in the market and the product itself completely new to the customer. As a result, all companies lose between 4% and 22% of their previous share (see Appendix B.2 – Market Share Loss in Preference Share Simulation). The Vegetarian Butcher experiences the most significant decline of 22% in market share, followed by Rügenwalder Mühle (15%) and Gut&Günstig (13%). In our simulation, Rügenwalder Mühle is a direct competitor, offering a similar product. In reality, however, Rügenwalder Mühle is a traditional meat producer and has a much broader product portfolio. The drastic loss in share can therefore be considered as rather unrealistic. Ultimately, Mosa Meat as a start-up should aim for around 1% to 5% of market share as a realistic goal for the first few years. Unless Mosa Meat is first to market with its cultivated burger patty and there are only few or no existing competitors.

3.2.2. Cluster Analysis and Segmentation

To derive deeper insights from the raw data and discern potential customer segments for Mosa Meat to tailor marketing strategies to personas, a cluster analysis will be conducted. Initially, a hierarchical approach will determine the optimal number of clusters, followed by a non-hierarchical method (k-means). Subsequently, these clusters will be characterized to uncover significant trends among consumer groups sharing similar preferences for cultivated meat.

The cluster analysis serves to categorize objects, such as respondents or products, based on a defined set of characteristics known as clustering variables. The resultant clusters aim to display substantial internal homogeneity within each cluster and distinct external heterogeneity between clusters. If successful, objects will be presented within clusters in close geometric proximity with notable differences in separate clusters (Hair, Babin, Anderson, & Black, 2018).

The objects in this case are the participant IDs assigned to each respondent. The chosen clustering variables encompass various characteristics: Brand Preference, Age, Gender, Highest Education Level, Personal Income, Dietary preferences, Likelihood of Purchasing Cultivated Meat, and Meat Substitute Purchasing Behaviour. The primary aim was to establish connections between demographic data and purchasing behaviours alongside brand preferences. The categorical variables were transformed into metric variables using coding. For brand preference, the most popular brand was determined based on participants' purchasing decisions in the Conjoint. Participants who did not express a preference for any of the listed brands were excluded from the clustering process since their data was not pertinent to the desired segments. Thus, the initial sample size of 148 was reduced to 138. The variable 'Likelihood of Purchasing Cultivated Meat' was evaluated on a Likert scale ranging from 1 to 5. A score of 4 or higher denoted individuals categorized as potential first buyers, coded as a binary number. Scores of 3 or lower classified participants as not likely buyers, also coded as a binary number. Since the entire dataset was on the same scale, standardization was deemed unnecessary as it would not impact the final similarity level (Hair, Babin, Anderson, & Black, 2018, p. 208). Among these distance measures, the Euclidean distance stands out as the most widely acknowledged and utilized measure, often described as the straight-line distance (Hair, Babin, Anderson, & Black, 2018). This method was chosen due to its versatility in extending beyond two variables, making it an ideal choice for the analysis of the dataset in this thesis. The Euclidean distance gauges similarity well, aiding in assessing relationships and patterns across various dataset variables. (Hair, Babin, Anderson, & Black, 2018, pp. 206-207).

Hierarchical Cluster Procedure

The hierarchical cluster procedure forms a tree-like structure through n-1 clustering decisions, combining observations. It uses repetitive clustering iterations to identify similarities and generates a dendrogram—a diagram illustrating potential clusters. This framework assists in comparing configurations and determining the optimal cluster count. The chosen approach was agglomerative, starting with individual clusters for each object and merging the two most similar clusters until only one cluster remains (Hair, Babin, Anderson, & Black, 2018). Ward's method, chosen as the clustering algorithm, uniquely calculates cluster similarity by summing squares within clusters across all variables. It selects cluster pairs to combine by minimizing within-cluster sum of squares. Importantly, it often produces clusters with similar observation counts, making it ideal for this analysis. This feature contributes to the method's effectiveness in creating well-balanced and distinct clusters within the dataset (Hair, Babin, Anderson, & Black, 2018, p. 212ff.). The described SPSS analysis led to a dendrogram (see Appendix B.3 Hierarchical Cluster Procedure Dendrogram) (Cleff, 2019, p. 212ff.).

Following the visualization of the hierarchical cluster procedure, four clusters were deemed appropriate. After observing the hierarchical structure and patterns within the data, the four primary clusters encapsulate the variations and relationships among the dataset's observations. This sets the stage for a non-hierarchical clustering method, specifically a k-means cluster analysis with the aim of generating four clusters. Among non-hierarchical clustering algorithms, k-means stands as one of the most widely used methods in contemporary analyses. It functions by dividing the data into a user-defined number of clusters and subsequently reassigning observations iteratively until meeting a predetermined numerical criterion. The criterion employed by k-means revolves around minimizing the distance between observations within a cluster while maximizing the distance between clusters. The name 'k-means' arises from defining each of the k clusters with their respective centroids. This approach endeavours to create clusters where the observations within each cluster are as close to the centroid as possible while ensuring distinct separation between different clusters (Hair, Babin, Anderson, & Black, 2018, p. 218). As illustrated in the Appendix B.4 K-Means Cluster Analysis – Number of Cases each Cluster, the total sample size (138) is distributed among the clusters as follows:

Cluster 1 comprises 27 cases, Cluster 2 includes 22 cases, Cluster 3 encompasses 55 cases, and Cluster 4 comprises 34 cases. The four final clusters can be found in Appendix B.5 K-Means Cluster Analysis – Final Cluster Center. To assess the variation across clusters concerning each variable, an analysis of variance (ANOVA) was conducted. While most significance levels indicate low variation, particularly suggesting minimal differences across clusters, exceptions arise in the variables "Gender" and "Likelihood of purchasing cultivated meat," as displayed in Appendix B.6 – K-Means Cluster Analysis – ANOVA Table. These variables show higher significance levels, indicating more noticeable differences among clusters in relation to gender and the likelihood of purchasing cultivated meat. However, the analysis still emphasizes the objective of minimizing variation within clusters and maximizing differences among distinct clusters. Given that the variables were initially encoded for analysis purposes, they now need to be decoded to their original format for further investigation.

Cluster 1, labeled as **Traditionalist Meat Enthusiasts**, displays a preference for the brand Blockhouse, known for its traditional meat products. This cluster primarily consists of individuals aged between 47 and 56, predominantly male. They hold a master's degree, earn an income ranging from €3,000 to €5,000, and do not follow a vegan or vegetarian diet. Members of this cluster indicated an unlikelihood to purchase cultivated meat in the future and did not buy meat substitutes in the last 12 months.

Cluster 2, dubbed **Cultivated Meat Sceptics**, favors the brand Rügenwalder Mühle, although it is pretending to offer cultivated meat in the Conjoint analysis for the purpose of this research. This cluster is primarily comprised of individuals aged between 37 and 46, predominantly male, with an apprenticeship as their highest education level. Their income ranges between €3,000 and €5,000, and they do not adhere to a vegan or vegetarian diet. Similar to Cluster 1, they display an unlikelihood to purchase cultivated meat in the future, although they did buy meat substitutes in the last 12 months. Ambiguity arises within this cluster, given their preference for cultivated meat by Rügenwalder Mühle while expressing reluctance to try cultivated meat. This contradiction might stem from various factors. Primarily, their preference for this option could be due to sustainability considerations, as it is the more sustainable choice and likely served as the decisive factor in their decision-making. Additionally, their choice may be influenced by the trust in this well-established brand, known for its popularity in Germany. Another potential explanation could be their lack of recognition that Rügenwalder Mühle offers a cultivated meat patty in this case which might have affected decision-making during the Conjoint analysis.

Cluster 3, named **Alternative Diet Explorers**, exhibits a preference for the brand Beyond Meat, known for its meat substitute offerings. This cluster primarily includes individuals aged between 27 and 36, mostly female. They hold a bachelor's degree, earn an income between €3,000 and €5,000, and do not follow a vegan or vegetarian diet. Similarly, they also display an unlikelihood to purchase cultivated meat in the future, yet they did buy meat substitutes in the last 12 months.

Cluster 4, termed **Young Innovators**, showcases a preference for the brand Mosa Meat, a cultivated meat startup. This cluster consists mainly of individuals aged between 17 and 26, primarily male, holding a bachelor's degree. Their income ranges between €3,000 and €5,000, and they do not follow a vegan or vegetarian diet. They express a likelihood to purchase cultivated meat in the future, and they have previously bought meat substitutes within the last 12 months. This cluster represents a younger demographic keen on adopting cultivated meat and open to experimenting with alternative meat substitutes.

To enhance the validity of the cluster analysis and support target segment selection, an additional investigation into respondents' preferences for the brand Mosa Meat was conducted. This analysis utilized the coded demographic data derived from the Conjoint analysis. The average values of the coded demographic data were calculated for respondents who expressed a preference for Mosa Meat in the Conjoint analysis, as illustrated in **Error! Reference source not found.** below.

	⌀ Demographic Value	Decryption
Brand preference	Mosa Meat	
Age	1,38	27-36 Years
Gender	0,55	Male
Highest education level	1,89	Master's Degree
Personal income category	1,15	3.000 – 5.000€
Dietary preferences	0,80	No Specific Diet
Likelihood of purchasing cultured meat	0,45	Likely to try Cultivated Meat
Meat substitute purchases	1	Bought meat alternatives

Figure 3: Demographic Respondent Profile with Mosa Meat Brand Preference

The analysis reveals that this segment bears a notable resemblance to the "Young Innovators" identified in the cluster analysis. The sole distinction lies in the slightly older age range of 27 to 26, and a prevalence of individuals holding master's degrees as opposed to bachelor's degrees in the cluster analysis. Consequently, in subsequent considerations, this segment is recommended to be adopted as the target segment for Mosa Meat.

4 Summary of the Findings and Comparison to Literature

Nr	Hypotheses	Result
H1	In a choice between cultivated, plant-based, and conventional burger patty products, consumers prefer to buy plant-based products	√
H2	Product variants that are more animal-friendly and sustainable are preferred over other products by consumers	√
H3	Consumers in the German market are willing to pay a premium for cultivated meat products compared to vegan and traditional burger products	×
H4	Mosa Meat’s brand is perceived to be less tasty than other established plant-based, and conventional meat brands	√
H5	Cultivated meat products from a well-known brand are more attractive to consumers than stand-alone products	√

Table 2: Overview of Results for Hypotheses

In accordance with previous literature, the primary research of this study on the research question “Factors Influencing Consumer Purchase Decisions for Cultivated Meat: An Analysis to Inform Effective Marketing Strategies for Mosa Meat” dives into the multifaceted field of consumer acceptance of cultivated meat.

Echoing the sentiments of Fu, Zhang, Whaley, & Kim (2023) and Stephens, et al. (2018), our expert opinions of the primary research pointed out challenges arising from the intricate technological and social science aspects of cultivated meat production (Appendix E – Expert Interview Transcriptions). Further aligning with the findings of Kouarfaté & Durif (2023), the expert interviews emphasized the complexity of commercialization and of the factors shaping consumer attitudes on cultivated meat (Appendix E – Expert Interview Transcriptions). In line with Bryant & Barnett (2020), the cluster analysis indicated that younger males who eat meat, enjoyed higher education, and have higher salaries are willing to try cultivated meat.

H1: *In a choice between cultivated, plant-based, and conventional burger patty products, consumers prefer to buy plant-based products*. The conjoint results depicted a dominance of vegan, vegetarian, or cultivated meat products as the first 14 combinations ranked highest in consumer value. Besides, the ideal product composition according to consumer value was a plant-based *Beyond Meat* burger patty to the price of *2.99 €*, with water consumption of *1.050l per kg meat substitute* (93% less than for conventional meat production), *2,8kg CO2 emissions per kg meat substitute* (92% less than for conventional meat production), it is *slaughter-free* and has a *meat-like, plant-based* taste and consistency. Hence, H1 could not be rejected.

H2: *Product variants that are more animal-friendly and sustainable are preferred over other products by consumers*. The ranking of factors generated from the consumer perceptions survey aligns with literature's emphasis on taste, quality, price, and animal welfare as critical factors (Van Loo, Caputo, & Lusk, 2020; Bryant & Barnett, 2020). Further, in the conjoint, consumers mostly decided according to price. However, price and taste being the decisive factors as perceived by consumers in the ranking contradicts with some of the literature stating that animal welfare and sustainability are the strongest drivers of purchase decisions (Bryant & Barnett, 2018; Weinrich, Strack, & Neugebauer, 2020; Van Loo, Caputo, & Lusk, 2020). Although this research did not entirely validate these findings, there is, however, an indication that sustainability and animal welfare do play a role in decision making. The conjoint results showed that product compositions with highest sustainability and animal welfare levels provided the highest value for customers and thus were preferred to conventional meat products and hence confirmed H2. Further, the perceptual map results also indicated that sustainability and animal welfare are relevant, while not the primary factors, ranking at position 4 and 5 out of 8, respectively. A quantitative analysis of the consumer interviews shows that when asked about the most important purchasing factors, consumers consistently highlighted sustainability second only to brand. Animal welfare was found to be the most relevant competitive advantage for the brand Mosa Meat in the MOCA analysis, whereas Mosa Meat's sustainability benefits were perceived to be less relevant.

H3: *Consumers in the German market are willing to pay a premium for cultivated meat products compared to vegan and traditional burger products*. In agreement with Bryant & Barnett (2020), our primary research underscores the pivotal role of price in determining market success due to the highly price sensitive purchase decisions in the conjoint. Consistent with Van Loo, Caputo, & Lusk (2020) findings, the conjoint analysis suggests that consumers are not willing to pay a premium when presented with different options. H3 was thus rejected. The preferred price point emerging from the study was 1.99€, corresponding to the lowest price point presented to participants. The perceptual map results further reveal that the perceived value for money for Mosa Meat is a competitive disadvantage, similar to that of its competitors Beyond Meat and the Rügenwalder Mühle. However, Mosa Meat in particular performs worse in this regard than Blockhouse and Rügenwalder Mühle. Finally, the quantitative analysis of the consumer interviews substantiates the significance of price, ranking it as the third most frequently mentioned factor in purchase decision making.

H4: *Mosa Meat's brand is perceived to be less tasty than other established plant-based, and conventional meat brands*. Another significant acceptance factor addressed by literature was taste (Bryant & Barnett, 2018). Several studies have proposed that taste holds a considerable importance in predicting purchase intent. Findings of this research are ambiguous. The significance of the factor taste compared to other burger patty characteristics cannot be derived from the conjoint analysis which may be attributed to the facts that attribute levels were not tiered, the study was not experimental in design, and taste is rather subjective to consumers. A quantitative analysis of the consumer interviews, however, shows that taste was the third most frequently verbally mentioned buying factor out of 13. Likewise, consumers overarchingly ranked taste as the most important burger patty brand characteristic in the perceptual map survey. However, taste, similarly to quality, emerged as one of the competitive disadvantages for Mosa Meat compared to Rügenwalder Mühle and Beyond Meat according to consumer perceptions on the MOCA. Combined with the perceptual map results, H4 was thus rejected.

H5: *Cultivated meat products from a well-known brand are more attractive to consumers than stand-alone products*. This conjoint analysis mirrors the literature's stance on brand importance (Li, 2020) and confirmed H5 with the insight that cultivated burger patties from established brands such as Rügenwalder Mühle would be more likely purchased than a novel brand such as Mosa Meat. The study, however, unveils a more nuanced perspective, insinuating that Mosa Meat, as an unknown brand, holds considerable potential since it was preferred by consumers over Blockhouse and Gut&Günstig. Additionally, the perceptual map revealed that consumers seem to recognize Mosa Meat's brand as conscious, meaning animal friendly, sustainable, and healthy. However, Mosa Meat, comparable with the Gut&Günstig, is also perceived as much less reliable, the dimension encompassing taste, trustworthiness, quality, and visual appeal, by consumers than the competing brands Blockhouse, Rügenwalder Mühle, Beyond Meat, the Vegetarian Butcher, and Garden Gourmet.

This research validates and contributes to existent literature by bridging the gap between acceptance theory and practice through developing practical marketing strategy recommendations tailored to a pioneering start-up in the cultivated meat space, Mosa Meat. With previous literature having explored mostly cultivated meat in general, this study specifies actual German brands as well as the respective burger patty products, with real-world product attributes rendering the study subject at hand tangible to consumers. Hence, this conjoint analysis investigates factors relevant to purchase decisions mimicking the German retail environment to deliver in-depth insights that are crucial for a launch of cultivated burger patty products in the German market. In essence, this study creates a more nuanced understanding of consumer purchase decisions of cultivated meat burger patties drawing conclusions for the factors sustainability, animal welfare, price, taste, and brand in the German market.

5 Strategic Recommendations and Managerial Implications for Mosa Meat

In this section of the thesis, the findings from diverse analyses were incorporated into a comprehensive marketing strategy for Mosa Meat. To vividly illustrate the potential implementation, a brand book was crafted. This document not only portrays the strategic implications but also functions as a practical implementation guide (Appendix D – Bonus Part: Brand Book).

5.1 Consumer Segments and Personas

Building upon the four identified clusters and the target segment from the averaged analysis in Chapter 5.4.6, Figure 4: Persona Overview for Mosa Meat presents the delineation of four distinct personas.

Cluster	Traditionalist Meat Enthusiasts	Cultivated Meat Skeptics	Alternative Diet Explorers	Young Innovators
Name	Thomas	Michael	Emma	Nick
Description	Thomas enjoys the hearty offerings of Blockhouse. As a non-vegetarian, Thomas appreciates the rich taste of traditional meat products and is hesitant to embrace cultured meat, finding comfort in the familiar and time-tested culinary experiences.	Michael favors Rügenwalder Mühle, showcasing a unique blend of skepticism and preference. Sustainability considerations or a deep trust in the brand could be influencing his decision, making his culinary choices a nuanced exploration.	Preferring Beyond Meat for its meat substitute offerings, Emma is not bound by a vegan or vegetarian diet. She enjoys exploring alternative diet options and has a palate inclined towards the diverse and innovative flavors of meat substitutes.	Nick, part of the younger demographic, is drawn to the innovative approach of Mosa Meat. Open to experimenting with alternative meat substitutes, Nick expresses a keen interest in the future of food and is enthusiastic about embracing cultured meat as part of his progressive and open-minded culinary journey.
Gender	Male	Male	Female	Male
Age	50 years old	41 years	32 years	27 years
Brand Preference	Blockhouse (traditional meat)	Rügenwalder Mühle (cultivated meat)	Beyond Meat (plant-based meat)	Mosa Meat (cultivated meat)
Education	Master's Degree	Apprenticeship	Bachelor's Degree	Master's Degree
Income Range	€3,000 - €5,000	€3,000 - €5,000	€3,000 - €5,000	€3,000 - €5,000
Diet	Omnivore	Omnivore	Omnivore	Omnivore
Perspective on Cultivated Meat	Unlikely to buy	Unlikely to buy	Unlikely to buy	Likely to buy
Meat Substitute Consumer (last 12 months)	✗	✓	✓	✓

Figure 4: Persona Overview for Mosa Meat

In this strategic approach to targeting specific segments for the introduction of cultivated meat, Thomas and Nick were identified as our primary target segments. The selection of these segments is grounded in the following considerations.

Thomas serves as a crucial target due to the immense potential within the traditional meat market in Germany. This market, which dwarfs meat substitutes by a factor of approximately 147, constitutes a combined market worth about 40.4 billion € which provides a vast consumer base with deeply ingrained preferences for classic meat products (Heinrich-Böll-Stiftung; Bund für Umwelt und Naturschutz Deutschland; Le Monde Diplomatique, 2021). It thus represents an immense opportunity for Mosa Meat. Thomas, at 52 years old with a monthly income between €3,000 and €5,000, embodies the characteristics of a consumer who finds comfort in the familiar and time-tested culinary experiences of traditional meat. However, it is important to note that convincing Thomas to embrace cultivated meat poses a significant challenge. His resistance to change and hesitancy towards the unfamiliar make it critical to develop a compelling strategy to not only persuade him of the benefits of cultivated meat but also to encourage him to take the initial step of trying it. By directing our efforts towards Thomas, we aim to address the significant market share occupied by conventional meat products, strategically positioning cultivated meat as an alternative within this well-established market.

On the other hand, we have identified Nick as a key target for specific reasons. Nick, a forward-thinking 27-year-old with a monthly income of €3,000 to €5,000, represents the future-oriented demographic that actively seeks and embraces innovation in food choices. His interest in the innovative approach of Mosa Meat aligns with the growing trend toward sustainable and ethical food consumption. Importantly, our cluster analysis based on Conjoint indicates that Nick is the only segment willing to try cultivated meat. By focusing on Nick, we position ourselves at the forefront of the evolving food industry, appealing to a segment that prioritizes environmental concerns and actively explores alternative, sustainable protein sources.

In summary, Thomas allows us to tap into the vast potential of the traditional meat market, introducing cultivated meat to a consumer base deeply rooted in traditional preferences. Simultaneously, Nick represents the future of food consumption with a focus on innovation and sustainability, making him a key target for the introduction of cultivated meat products.

5.2 Product

Product Differentiation: Mosa Meat's cultivated burger patty stands at the intersection of innovation and sustainability, offering a unique actual alternative with many benefits for consumers compared to existent plant-based patties and particularly conventional meat.

Thomas, the target persona representing the traditional meat enthusiast segment, indicates to be unlikely to purchase cultivated meat and has not purchased meat alternatives in the last 12 months. Hence, he can be assumed to place high importance on meat taste and quality in product development, as these were the two most decisive burger patty brand attributes for consumers in the perceptual map survey. For Thomas' cluster, Mosa Meat should thus aim to offer a high-quality burger patty that not only mirrors the familiar meat taste he cherishes but exceeds traditional options by prioritizing animal welfare. Additionally, the ranking and the conjoint results showed a general significance of animal welfare for consumers and the MOCA revealed animal welfare as Mosa Meat's only clear competitive advantage. So, this must be leveraged to carve a distinct niche that convinces Thomas to change his stance on cultivated meat. This strategy positions Mosa Meat as a compelling alternative to brands like Rügenwalder Mühle as well as Blockhouse, Thomas' preferred brand, differentiating from traditional meat products as advantageous to organic meat with improved farming. Further, according to the MOCA, quality is currently a competitive disadvantage in consumer perceptions compared to Rügenwalder Mühle and Beyond Meat and should consequently be part of branding efforts.

For Nick, the innovation enthusiast, it is decisive to emphasize the cutting-edge, sustainable nature of the Mosa Meat burger patties to appeal to his environmental concerns and his openness to novel food. Contrary to Thomas, Nick’s cluster will not need as much convincing since his segment showcases a preference for the brand Mosa Meat anyways. This cluster will be the early adopters of the Mosa Meat cultivated burger patty. Yet, in Nick's age segment, Mosa Meat's taste enhancement, attributed to its authenticity as "real meat" when compared to plant-based alternatives such as Beyond Meat, remains crucial for differentiation. This is particularly pivotal given the MOCA findings that currently highlight taste as a perceived disadvantage compared to Rügenwalder Mühle and Beyond Meat. Combined with the conjoint research of Beyond Meat as the generally most preferred brand by consumers, Mosa Meat must reinforce their taste superiority to turn the competitive disadvantage into an advantage.

For now, Mosa Meat is not advised to develop different product lines for the two target personas to render a successful launch as a first mover feasible. However, considering the supplementary findings on product type, a future strategy could include introducing “cultivated mince” to cater to both target segments, as can be seen in (Appendix D – Bonus Part: Brand Book). Considering the ideal product composition as the conjoint outcome, Mosa Meat should rather focus on technologically improving their water consumption and CO2 emissions as well as developing a fully slaughter-free laboratory process. This way, Mosa Meat could better compete with the sustainability and animal welfare levels of plant-based products, as these were shown to be the preferred attribute levels for burger patties. This could be accomplished with a product development strategy of introducing hybrid products at first, similar to the plans of the direct competitor Mirai Foods. To enhance Mosa Meat's market position, a strategic collaboration with Gutfried, a key player in the German poultry market, holds substantial potential. By jointly developing a hybrid product that merges Gutfried's traditional poultry expertise with Mosa Meat's cutting-edge technology, the companies can pioneer a unique offering in the industry.

Gutfried's 64% brand awareness in the German meat category (Splendid Research, 2023) provides a solid foundation for building consumer trust in cultivated meat. By following the model of Mirai Foods and Rügenwalder Mühle as described in Chapter 2.2.1, this alliance is strategically designed to bridge the gap between conventional meat preferences and the emerging market for cultivated alternatives, to also attract customer segments like Thomas. This strategy has the potential to accelerate the achievement of the market share goal of 5%.

Branding: Taking into consideration the analysis results of the conjoint and literature findings of the significance of established brands for purchase decisions, branding will become an essential tool to Mosa Meat to establish consumer acceptance, and finally gain sales. For Thomas, the familiarity and time-tested culinary experiences associated with traditional meat must be revoked when it comes to the branding of Mosa Meat's burger patties, positioning cultivated meat rather as a natural evolution than a drastic change. For Nick, a forward-thinking and exciting communication style, perhaps even utilizing humour, aligns with Nick's interest in innovation and novelty. Accentuating the good value for money ratio can also be assumed to appeal to both target personas due to the product being biologically "real" meat but with the supplementary benefit of animal welfare and sustainability. Further, branding efforts are crucial to overtake Beyond Meat's current competitive edge over Mosa Meat on the aspect of animal welfare. Also, the perceived reliability of Mosa Meat, as it is a novel brand, must be improved with branding to compete especially with Rügenwalder Mühle as shown in the perceptual map. However, since a brand image of reliability will be a long-term effort, Mosa Meat should focus on consumer perceptions on the conscious dimension. This could also be improved to become a competitive advantage with branding efforts, to amplify consumer associations of Mosa Meat with animal friendliness, sustainability, and healthiness. Lastly, the word cloud associations highlighted the strong associations of consumers of cultivated meat with particularly future, lab, and unnaturalness making it apparent that branding should concentrate on fighting the more negative perceptions related to cultivated meat, namely the laboratory-based manufacturing process evoking the feeling of unnaturalness.

5.3 Pricing

By considering key insights from previous analyses, this section will provide clear pricing recommendations for Mosa Meat covering both launch and future strategy. This section will further delve into the pricing strategies implemented by the most relevant competitor, namely Beyond Meat. This company was chosen as it was perceived as the most popular brand in the survey. Additionally, Beyond Meat is a relatable case as the company faced the challenge of consumers skepticism regarding plant-based meat alternatives (Szenderák J, 2022). Drawing parallels with Beyond Meat, Mosa Meat will also most likely anticipate initial consumer skepticism, making the insights gained from Beyond Meats case highly valuable in creating a strategic pricing approach that addresses and overcomes barriers to consumer acceptance.

Beyond Meats' initial pricing strategy involved positioning its products at a premium level (Reinicke, 2019). The company was justifying its higher prices by impressing consumers with the quality of the products, its taste, and impact on the environment (Powell, 2020). However, Beyond Meat recently decided to adjust its pricing model, thereby slowly lower prices until its products are cheaper than animal protein products since cost conscious consumers were not buying its products (Coyne, 2022). The fact that new companies were entering the market also played a significant role in its shift in pricing strategy (Powell, 2020).

Following this dynamic pricing strategy, Mosa Meat is also advised to implement value–based pricing at launch, while long-term focusing on lowering its product prices, as can be seen in (Appendix D – Bonus Part: Brand Book). Implementing this price skimming strategy will help Mosa Meat to reflect not only its innovative nature of its products but also to signal safety and high quality to consumers. This positioning in the market can help build trust and confidence in a new product, especially in the early stages of market adoption. Implementing a premium pricing strategy will further leave room for decreasing prices and offering discounts.

At the same time, Mosa meat is recommended to invest heavily in technological advancements and operational efficiencies that will allow it to reduce its prices in the long run. The rationale behind adopting a long-term strategy of lowering prices stems from the anticipation that many companies, both established and start-ups, will enter the market with a similar product. The expectation is that, consequently, the room for price increases will diminish, leaving the company with no choice than to lower its prices in order to stay competitive.

According to the survey results, the ideal price point would be 1.99€ as average preferences for this price point were highest. However, we recommend a price point of 3.99€ at launch. The rationale behind this is that consumers tend to underestimate their willingness to pay in surveys which could lead to inaccurate estimations of WTP. According to Canavari (2019), consumers often either lack awareness of how much they pay, or they deliberately underestimate it. Moreover, this price point represents a crucial threshold for most brands, as it is the last point before average preferences turn negative. Additionally, as mentioned earlier, implementing a higher initial price leaves enough room for introducing discounts and price reductions in response to market dynamics.

5.4 Place

For Thomas, the traditional meat enthusiasts, it is crucial to address his hesitation in embracing cultivated meat and his comfort in familiar, traditional meat experiences. Hence, one approach would be to establish a presence in traditional grocery stores, thereby leveraging the existing distribution channels that this segment is regularly using to shop for their favourite meat products. In accordance with the premium pricing strategy, Mosa Meat should focus on selling its products mainly through the biggest German food retailers, namely Edeka and Rewe, and neglect discounters such as Aldi and Lidl in the short-term. Partnering with these retailers will help Mosa Meat to not only enhance its brand image and positioning since these retailers are often associated with high quality, but also to target more affluent customers that are willing to pay a higher price. Creative in-store promotions and tasting stands will ensure visibility and provides an opportunity to gain the segments' attention during their regular shopping routine.

Another option to reach out to this target segment would be to collaborate with speciality meat shops and butchers that offer a high variety of traditional meat products. Similarly, to grocery stores, Mosa Meat could provide in-store promotions or tastings to encourage this segment to try cultivated meat without completely disrupting their shopping habits (see promotion part).

For Nick, the young innovation enthusiast, it is crucial to choose a channel which is also appealing to his age group. Therefore, Mosa Meat could leverage online grocery shopping channels to also engage younger age groups in addition to the traditional channels already mentioned such as traditional grocery stores. A new study from Mintel found that almost half (45%) of Germans aged 16 to 24 have shopped online for groceries from a retailer with physical stores in the last six months prior to the survey, compared to only 31% of Germans overall (Maiseviciute, 2016). Mosa Meat should therefore strategically position its products on grocery online shops and popular delivery apps such as Glovo, Flink, or Gorillas. A collaboration with major online grocery platforms and delivery apps would ensure a seamless experience and would provide convenience to this segment, aligning this segment's preference for a stress-free and time saving shopping experience (see Appendix D – Bonus Part: Brand Book).

Since Nick is also characterized by its openness to new food experiences, another opportunity to reach out to this segment could be to partner with a range of restaurants attracting individuals more open and receptive to alternative dining experiences. An environment where innovation is already embraced will help Mosa Meat to introduce and communicate the unique benefits of its products to its target group and ultimately facilitate product adoption.

5.5 Promotion

Mosa Meat's positioning is meticulously crafted to align with the distinct preferences of both Thomas and Nick, as revealed through the comprehensive conjoint analyses, perceptual mapping, and the MOCA.

Positioning Statement: Mosa Meat, a pioneering Dutch startup in clean meat production, positions itself as the natural evolution of traditional meat, cultivating a new era of sustainable, high-quality burger patties. Pioneering a cleaner, kinder way of making beef, Mosa Meat is a food technology company dedicated to helping everyone take a bite out of a better future - starting with the world's kindest beef burger. With a commitment to animal welfare and a focus on taste that surpasses conventional options, Mosa Meat appeals to both traditional meat enthusiasts like Thomas, seeking familiar taste and superior quality, and innovation enthusiasts like Nick, drawn to cutting-edge, environmentally conscious food choices. All this is offered at a reasonable price, ensuring accessibility for consumers who value both taste and affordability.

Tagline: Crafting Tomorrow's Meat Today - Taste the Evolution at a Fair Bite!

Mosa Meat caters to traditional meat enthusiasts like Thomas by ensuring that the familiar taste they value is not compromised but elevated. By emphasizing animal welfare, Mosa Meat gains a competitive edge, setting itself apart from traditional and organic meat options. For innovation enthusiast Nick, Mosa Meat highlights its cutting-edge, sustainable nature with the tagline "Crafting Tomorrow's Meat Today." This addresses Nick's environmental concerns and positions Mosa Meat as a superior choice compared to plant-based alternatives. The closing tagline, "Taste the Evolution at a Fair Bite," appeals to both Thomas and Nick, bridging the gap between traditional and innovative consumer segments identified in supplementary questions on product type.

To effectively convey our defined positioning statement, a good communication strategy is essential, targeting two distinct personas—Thomas and Nick. To build brand awareness in the German market and expanding market share and customer loyalty in the long-run, Mosa Meat should employ a dual communication strategy, differentiating between short- and long-term measures.

In the pivotal stage of market entry, where the category of cultivated meat is still unfamiliar and Mosa Meat faces the challenge of being a relatively unknown brand, selecting the appropriate communication channels becomes paramount. For Thomas, who values familiar communication channels, TV and radio advertisements would be effective, as 35% of the target audience expresses a preference for these traditional mediums (Burstein, 2015). This channel allows Mosa Meat to connect with numerous potential customers and build trust through traditional communication methods. Despite being relatively costly, particularly for a startup like Mosa Meat, the effectiveness of this channel makes it an essential investment.

Nick, a forward-thinking 27-year-old, is highly influenced by social media. Instagram and YouTube emerge as pivotal channels, with 34% of Gen Z favoring brand communication on Instagram and 33% on YouTube (Model B & Opinium, 2021). Mosa Meat should prioritize creating visually compelling and informative content on these platforms, highlighting the innovative and sustainable aspects of its products. Leveraging these digital channels right from the start is imperative. Establishing partnerships with influencers in sustainability and food innovation adds authenticity to the brand message, particularly given the 46% of individuals aged 25–34 who appreciate influencer marketing (Model B & Opinium, 2021). A selection of potential influencers and sample social media post formats can be explored in (Appendix D – Bonus Part: Brand Book).

Moreover, in-store promotions and tastings offer tangible experiences to overcome Thomas' hesitancy, positioning cultivated meat as a viable alternative within the established traditional meat market. Real-world tastings, inspired by successful practices in the wine industry, provide a dynamic way to engage and persuade consumers like Thomas. Free samples trigger the reciprocity principle, instilling a sense of obligation and potentially prompting further exploration (efmp, 2023). Educational aspects, similar to wine tastings (Olenski, 2017), become crucial in this context, enhancing the overall tasting experience and showcasing the broader culinary possibilities cultivated meat offers.

Especially in the short term, applying price discounts is relevant for both Thomas and Nick. For Thomas, discounts help overcome resistance to change and act as a powerful sales promotion tool, making cultivated meat more affordable. Reduced prices contribute to customer acquisition and loyalty. Similarly, for Nick, strategic price promotions drive engagement and adoption of cultivated meat, making the progressive culinary journey more appealing. Discounts, especially through loyalty programs, enhance brand loyalty for Nick.

As 76% of consumers aged 45 to 54 prefer email as their primary marketing channel (Burstein, 2015), Mosa Meat should employ personalized email campaigns to resonate with Thomas as part of its short- and long-term communication strategy. Potential email templates have been created to exemplify the envisioned communication, as outlined in (Appendix D – Bonus Part: Brand Book).

The overarching strategy involves maintaining a consistent brand message across all channels. A/B testing will be implemented to refine content based on audience response, ensuring ongoing optimization of the communication strategy. Mosa Meat aims to effectively communicate with both Thomas and Nick, utilizing data-driven insights to foster awareness, acceptance, and preference for its innovative and sustainable burger patties in the German and European markets.

6 Limitations and Further Research

The exploration of cultivated meat within literature has uncovered a noteworthy limitation: A lack of research addressing purchase intention and buying behavior from a psychological and biological perspective. While considerable attention has been devoted to consumer acceptance, the intricacies of purchase intention remain insufficiently examined. This deficiency adds a layer of intrigue to this thesis, as it sheds light on purchasing intentions through the application of conjoint analysis amongst further statistical analyses.

The interview segment of the research encountered challenges despite earnest efforts. Securing an adequate number of interviews proved elusive, exacerbated by the unavailability of interviews with Mosa Meat, the designated company for this study. The inherent niche nature and the relative novelty of the cultivated meat topic, coupled with limited public investment in research rendering the field highly competitive and confidential, contributed to the scarcity of responses, particularly from Mosa Meat. However, an insightful company perspective was gained through interviews with InFamily Foods and GFI Europe. Furthermore, expert interviews, while valuable, were subject to a lack of complete objectivity as professionals shared their subjective views on the cultivated meat industry. Additionally, the virtual format of these interviews, necessitated by practical constraints, hindered the establishment of personal relationships, potentially impacting the depth and quality of insights obtained.

The final consumer interviews faced a limitation in the form of a sample, drawn from the researchers' network. This introduced a potential bias, challenging the representativeness of the sample and potentially impacting the generalizability of the findings.

Shifting focus to the conjoint analysis, a notable limitation emerged due to the novelty of the product. Given that cultivated meat has not yet made its debut in the market, potential consumers lack real-life experiences with the product, leading to difficulties in grasping its distinctive characteristics. Further, the introduction of the brand in the survey shortly before questions on the brand could possibly have biased respondents', as suggested by the literature on priming and cognitive science entries (Schmidt, Haberkamp, & Schmidt, 2011). Furthermore, the complexity of these features, particularly when contrasted with more tangible attributes such as taste, introduced additional challenges in terms of consumer comprehension. Furthermore, hybrid products were not explicitly tested, despite the acknowledgment in Chapter 2 that they could represent a viable market entry strategy due to their cost advantages. This avenue warrants further investigation. Moreover, adherence to EU regulations prevented participants from physically experiencing the product, making it challenging to assess its taste, compounded by the absence of an opportunity for individuals to try it beforehand. A further limitation in the conjoint analysis stemmed from the unavailability of specific information about burger patties and their precise environmental impact. In the absence of such data, information related to cultivated meat production in general was employed, introducing an element of approximation.

Within the context of the generated perceptual map, a critical limitation surfaced due to limited information available about Mosa Meat. Ideally, consumers should possess prior knowledge of the company for meaningful interpretation, but the scarcity of information, particularly in Germany where the company is less known, hindered this ideal scenario. Similar to the conjoint, the introduction of the brand in the survey as a means of allowing questions on the brand could possibly have biased responses (Schmidt, Haberkamp, & Schmidt, 2011). In terms of the research design, another limitation arose with a non-representative sample for surveys, being skewed towards certain age groups, excluding certain age groups, and introducing potential biases, thereby limiting the study's applicability. Furthermore, the perceptual map, a pivotal analytical tool, suffered from an unequal representation of answers for each brand, affecting the overall balance and accuracy of the analysis.

In the context of the cluster analysis, the statistical nature of cluster analysis assumes no inherent knowledge of the market or consumer behavior, emphasizing the importance of interpreting and effectively using the output for successful marketing strategies targeting specific segments. This rationale led to the utilization of clusters as the foundation for the segments developed in Chapter 7.1, extending their application to other contexts. However, the intricacies of cluster analysis introduce additional layers of complexity. It is crucial to acknowledge that cluster analysis is descriptive, atheoretical, and non-inferential. Lacking a statistical foundation for drawing inferences from a sample to a population, it is widely considered an exploratory technique (Hair, Babin, Anderson, & Black, 2018). The absence of guaranteed unique solutions arises from the dependence of cluster membership on various elements of the procedure. Different solutions can be obtained by varying one or more elements. Furthermore, the creation of clusters assumes some underlying structure among the objects, but the mere identification of clusters does not inherently validate their existence. Meaningfulness and relevance are contingent on robust conceptual support and subsequent validation (Hair, Babin, Anderson, & Black, 2018, p. 193).

7 Conclusion and Outlook

In this research, the overarching goal was to investigate which factors are influencing consumer purchase decisions for cultivated meat in Germany and consequently to develop effective marketing strategies for the company Mosa Meat. To answer this research question, a mix of qualitative and quantitative research design was chosen. The qualitative approach involved conducting interviews with both professionals and potential consumers. The quantitative approach involved two surveys collecting data on consumer purchase decisions for burger patties applying a conjoint survey approach, and consumer perceptions of brands.

To answer the research question, five hypotheses have been derived from secondary research and were explored in the analysis. In line with H1, insights from our research imply that in a choice between cultivated, plant-based and conventional burger patty products, consumers prefer to buy plant-based products. Moreover, some evidence suggests that, in accordance with H2, product variants that are more animal-friendly and sustainable are preferred over other products by consumers. The research further shows, against H3, that consumers in the German market are not willing to pay a premium for cultivated meat products compared to vegan and traditional burger products. In agreement with H4, the results indicate that Mosa Meat's brand is perceived to be less tasty than other established plant-based, and conventional meat brands. Lastly, in accordance with our assumptions, H5 was accepted, insinuating that cultivated meat products from a well-known brand are more attractive to consumers than stand-alone products.

Overall, this research has both theoretical and practical implications. With previous literature having explored mostly cultivated meat in general, this study specifies actual German brands as well as respective burger patty products, providing tangible insights into consumer decisions regarding sustainability, animal welfare, price, taste, and brand preferences. Further, this research bridges the gap between acceptance theory and practical application, offering tailored marketing recommendations for Mosa Meat. By doing so, it offers imperative information to policy makers, industry stakeholders and marketers who are at the forefront of shaping the future of food production and consumption.

In conclusion, the research shows that consumer choices play a pivotal role in shaping the future of our food industry and highlights the importance of understanding and influencing these choices to pave a sustainable and ethically conscious path forward. The outcomes of this study serve as a foundational step towards unraveling the complexities of consumers acceptance, but also as a guide, pointing towards a future where informed consumer decisions lead the charge in mitigating the environmental impact of our dietary choices.

According to Santos (2023, p. 1), “[c]ultivated meat (CM) technology has the potential to disrupt the food industry—indeed, it is already an inevitable reality”. Recognizing that cultivated meat has the potential to disrupt the food industry, it becomes apparent that embracing this innovation is not merely an option but an inevitable reality. By doing so, we can collectively shape a future where our food choices contribute to the well-being of both our planet and ourselves.

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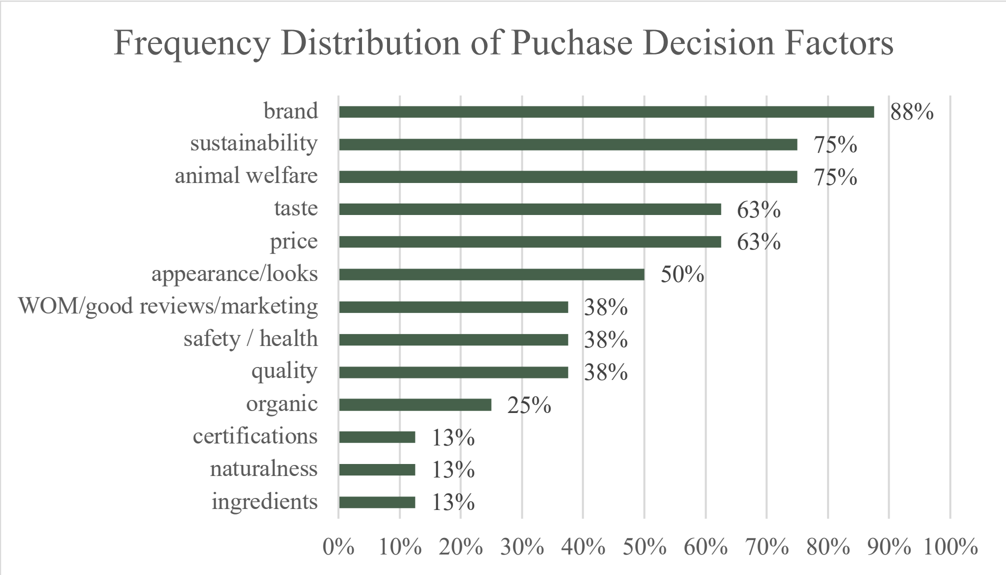
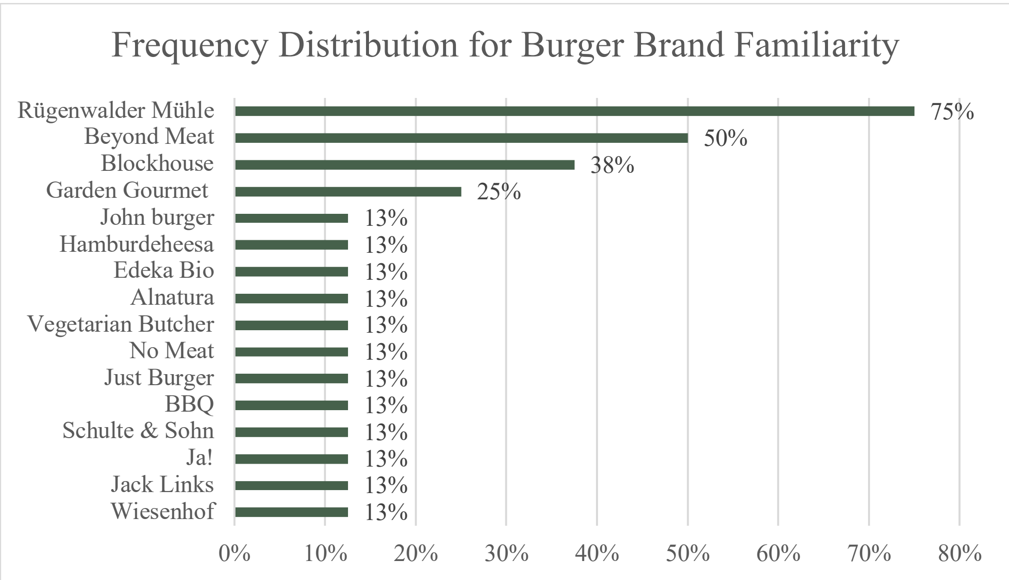
Appendix A – Consumer Interview Results and Analysis

A.1 Frequency Distribution of Purchase Decision Factors



A.2 Frequency Distribution for Burger Brand Familiarity



Appendix B – Conjoint Analysis

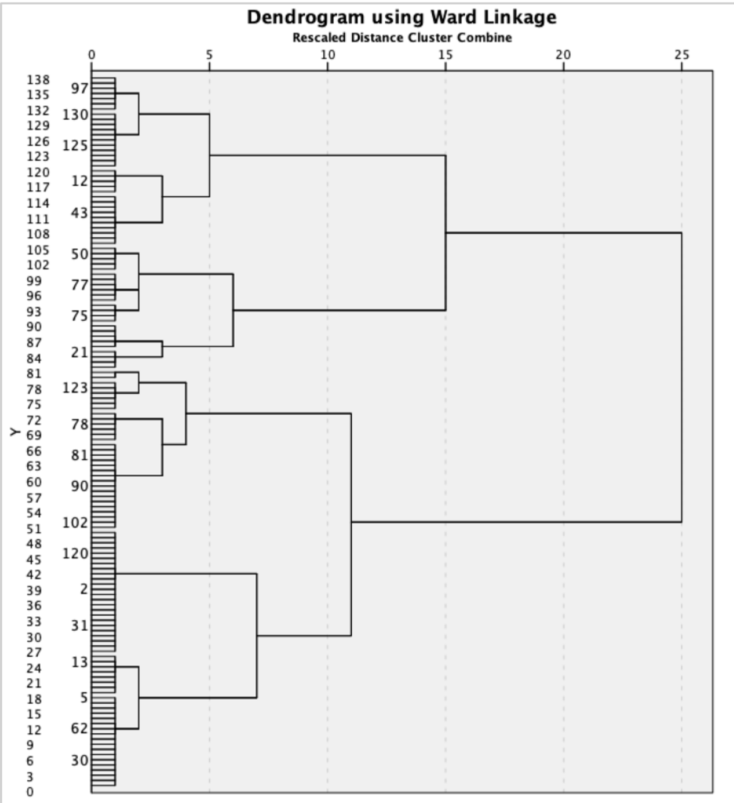
B.1 Selected Attributes for Simulation

Brand	Price	Sustainability – Water consumption	Sustainability – CO2 Consumption	Animal Welfare	Taste
The Vegetarian Butcher	1.99€	1,050 liters per kilogram of meat substitute (93% less than in conventional meat production)	2.8 kilograms of CO2 per kilogram of meat substitute (92% less than in conventional meat production)	Slaughter-free/no animal farming	Meat-like plant-based (taste and texture)
Beyond Meat	2.99€	1,050 liters per kilogram of meat substitute (93% less than in conventional meat production)	2.8 kilograms of CO2 per kilogram of meat substitute (92% less than in conventional meat production)	Slaughter-free/no animal farming	Meat-like plant-based (taste and texture)
Gut&Günstig	1.99€	15,000 liters per kilogram of meat (approximately 100%)	30.5 kilograms of CO2 per kilogram of meat (approximately 100%)	Premium rearing / free-range (organic meat)	Meat taste and texture
Blockhouse	3.99€	15,000 liters per kilogram of meat (approximately 100%)	30.5 kilograms of CO2 per kilogram of meat (approximately 100%)	Premium rearing / free-range (organic meat)	Meat taste and texture
Rügenwalder Mühle	2.99€	1,500 liters per kilogram of meat (90% less than in conventional meat production)	4.0 kilograms of CO2 per kilogram of meat (87% less than in conventional meat production) 30.5 kilograms of CO2 per kilogram of meat (approximately 100%)	Premium rearing / free-range (organic meat)	Minimal difference from traditional meat (taste and texture)
Mosa Meat	1.99€	1,500 liters per kilogram of meat (90% less than in conventional meat production)	4.0 kilograms of CO2 per kilogram of meat (87% less than in conventional meat production) 30.5 kilograms of CO2 per kilogram of meat (approximately 100%)	Animal farming and slaughter in rare cases	Minimal difference from traditional meat (taste and texture)

B.2 Market Share Loss in Preference Share Simulation

	Preference share		
	Baseline	**Launch Mosa Meat**	**Market Share Loss in %**
The Vegetarian Butcher	12.61%	9.89%	-22%
Beyond Meat	35.04%	33.08%	-6%
Gut & Günstig	6.36%	5.53%	-13%
Blockhouse	20.27%	19.23%	-5%
Rügenwalder Mühle (Kult.)	18.95%	16.03%	-15%
None of the above	6.78%	6.48%	-4%
Mosa Meat 1		9.75%	

B.3 Hierarchical Cluster Procedure Dendrogram



B.4 K-Means Cluster Analysis – Number of Cases in each Cluster

Number of Cases in each Cluster

Cluster	1	27.000
	2	22.000
	3	55.000
	4	34.000
Valid		138.000
Missing		.000

B.5 K-Means Cluster Analysis – Final Cluster Centers

Final Cluster Centers

	Cluster 1	2	3	4
Brand preference	4	2	1	3
Age	3	2	1	0
Gender	1	1	0	1
Highest education level	2	5	1	1
Personal income category	1	1	1	1
Dietary preferences	1	1	1	1
Likelihood of purchasing cultured meat	1	1	1	0
Meat substitute purchases	0	1	1	1

B.6 K-Means Cluster Analysis – ANOVA Table

ANOVA

	Cluster Mean Square	Cluster df	Error Mean Square	Error df	F	Sig.
Brand preference	80.649	3	.775	134	104.054	<.001
Age	45.985	3	.938	134	49.043	<.001
Gender	.444	3	.247	134	1.795	.151
Highest education level	68.011	3	.691	134	98.475	<.001
Personal income category	1.440	3	1.541	134	.935	.426
Dietary preferences	1.528	3	.137	134	11.172	<.001
Likelihood of purchasing cultured meat	.140	3	.254	134	.550	.649
Meat substitute purchases	1.460	3	.120	134	12.160	<.001

Appendix C – Expert Interview Transcriptions

C.2 – Ramona Weinrich

Interviewee: Ramona Weinrich

Company / Position: Tenure Track Professur for Consumer Behaviour

Interview Duration: 24:52 minutes

Interviewer [00:07] Hello. Thank you very much for making this expert interview happen today.

Ramona Weinrich [00:15] You're welcome.

Interviewer [00:15] My name is Allegra Baumanns, and together with Anja Held and two other fellow students, I am writing my master's thesis on the topic: " Factors Influencing Consumer Purchase Decisions for Cultivated Meat: An Analysis to Inform Effective Marketing Strategies for Mosa Meat". Anja and I will be conducting the interview today. We had already sent you the interview guide beforehand.

Ramona Weinrich [01:18] Could you briefly mention the university where you are studying?

Interviewer [01:25] Yes, we are at the Nova School of Business Economics in Lisbon. Both of us are pursuing a master's in Management, which is why our research question has a business focus.

Ramona Weinrich [01:45] Because I'm not familiar with it. Yes.

Interviewer [01:49] Okay. If it's convenient for you, let's start directly with the first question. Could you provide us with an insight into the current state of research regarding cultivated meat and consumer acceptance in Germany?

Ramona Weinrich [02:11] Summarizing the research state is challenging, as there are entire websites dedicated to it. If you want an overview, it would be best to look into the current literature. There are derivative versions available, keeping you up to date.

Interviewer [02:28] Okay. Literature review is already part of our thesis, but could you give us an insight into your specific research and how you have already dealt with the topic?

Ramona Weinrich [02:42] We are working on a hypothetical basis because the products are not freely accessible on the market yet. My team and I are researching consumer acceptance for the German market. In the future, we plan to examine it more specifically based on target groups. That's the next step. But as you may know, in the Netherlands, tastings are already allowed to some extent. They have different opportunities to work on the sensory aspect, not just hypothetically, as we can do in Germany.

Interviewer [03:27] Okay, understood. When you say the next step is target group-specific, how can we imagine that? What would these target groups look like?

Ramona Weinrich [03:37] Well, we will probably start with preliminary qualitative research, which is a bit broader. I believe there are many aspects, especially concerning customers, that allow for flexibility. Questions that can be asked include: What exactly concerns consumers regarding unnaturalness? This is reminiscent of the genetic engineering debate in Germany. Communication should not go the same way this time. But what exactly? This is something diffuse. We cannot precisely assess what actually scares consumers. We want to operationalize this question differently.

Interviewer [04:32] Okay, very good. To go back to acceptance factors, as this will be a significant part of what we want to examine and inquire about. Could you give us an insight into how you have tested this exactly?

Ramona Weinrich [05:11] Generally, one does not design the experimental setup oneself because one does not know if it is reliable and valid. What we found is what you generally refer to as sustainability, a global optimism. This is something that people cannot grasp. Somehow, there's this idea that in Asia and Africa, the demand for meat is increasing. Everyone has an average consumer in mind. It could be challenging if suddenly they want to raise the meat consumption to the level we have in Western Europe or in the western industrialized nations in general. And this could be a solution. So, it's a kind of global optimism. This could solve our sustainability problem because consumers cannot accurately assess it. I like to compare it in marketing to the usual cigarette consumption. If I smoke a lot today, I won't have lung cancer tomorrow. Similarly, if I eat too much meat, there won't be an environmental catastrophe tomorrow. We see it increasingly in the media, but as long as one is not directly affected, one can easily ignore it. These are psychological factors at play, and we see the same with diseases. Animal welfare is a different debate, not equally pronounced globally. It's a luxury problem; I must be able to afford it. We have a very high standard of living, a high meat consumption, and that's why these animal welfare debates arise, especially in the context of food consumption, where with increasing income, initially, as we observe in Asia, meat consumption increases. And eventually, one starts to think, is this healthy? Is it sustainable? We currently have the debate that cultivated meat cannot be produced without calf serum. As long as this problem is not solved, I think there's no need to discuss animal welfare. It's not really ethical. We cannot look into a crystal ball to see how meat production will look in 50 years. Will we have a large bioreactor? Will global food conglomerates dominate the market? Or will it be the case that farmers also adapt flexibly? Maybe set up a bioreactor in agriculture because the know-how is there. And 20 years ago, everyone said they couldn't generate energy; the farmer had nothing more to do. Nevertheless, today, biogas plants are standing there, producing energy, and the discussion has essentially been resolved. And that will be crucial in how we want to restructure agriculture in Germany.

Interviewer [09:00] Okay, very good. We briefly mentioned acceptance barriers, such as it being perceived as unnatural or sensory aspects. These acceptance factors and barriers need to be balanced somehow. From a business perspective, how can these barriers be minimized? For example, the issue of unnaturalness, is that something that needs to be addressed through clever corporate communication?

Ramona Weinrich [09:54] It needs to be considered more differentiated. There will always be a portion of consumers who say they don't want to eat it for various reasons. These can be different motives for not consuming it. They will always exist. And there will also always be consumers who say animal welfare is not crucial for me. I decide based on price because, from a differentiated perspective in Germany, we can say that this is a luxury problem. If I don't know how to pay for my groceries in the last week of the month, I don't care about the well-being of animals at that moment. I need to figure out how to consume calories, ensure my family gets fed, and no amount of communication strategies can change that. So, you will never reach all consumers, and that shouldn't even be the goal; it's unrealistic. But in terms of strategy, you need to look at how you communicate. It's interesting to examine what went wrong with genetic engineering back then. Why did we have such extreme aversion in Germany compared to other countries? Something went wrong in the knowledge communication. This has a lot to do with how the media portray production technology. Let me give you another example from our research: We also work a lot on waste management. It's a huge problem in my view that the media frame it as if plastic is bad, and paper is good because that's simply not true. I can use a plastic bag 30 times. They have all been banned from the market. There are only paper bags now; I use them two, maybe three times, then they break. So, in terms of ecological sustainability, the paper bag performs much worse than the plastic bag. Nevertheless, the media portray plastic as bad. That's a significant problem. It's crucial that all voices are heard, and popular media accurately represent such matters, and retailers relay that information correctly.

Interviewer [12:43] Okay, if we now look at the German market and how the situation currently stands with acceptance among Germans. How ready is Germany or German consumers from your perspective for cultivated meat? How would you estimate their reaction or acceptance upon entry?

Ramona Weinrich [13:10] Well, I think we are still far from the launch. The more interesting question, in my opinion, is how much trust is there in the approval process of the EFSA. That's much more interesting because the EFSA approves the product. Then it is safe and marketable like all other foods we have in Europe. I find that the more intriguing question. Why is there a lack of trust in the authorities when they evaluate it? And then, of course, we also have the conventional meat industry, which also has a strong lobby in Europe. And that will also be the question of how to deal with that. They are, of course, as you have seen in your research, involved in many startups and contribute with capital accordingly. But this will also tax the market.

Interviewer [14:02] How would you assess it? What do you think it will be like? Will there be a few big players in the market or more local farmers?

Ramona Weinrich [14:20] That cannot be said. Anyone making a prediction at this point is not credible. It's too far away, and the technology is simply not mature yet. There are many questions that still need to be answered. In my opinion, a reliable forecast cannot be made at the moment.

Interviewer [14:37] Okay, and do you think it can already be said where the price of cultivated meat will approximately be when it eventually enters the market? Or is that also something that is still pending?

Ramona Weinrich [14:53] Yes, everyone is free to offer the product at whatever price they want. But if you want to gain market share, I strongly believe that we can only reach, at most, the price of conventional meat or even have to be below it. This is already being played with, sometimes with what I consider to be significantly unrealistic numbers, such as needing 99%

fewer resources for production. I simply don't believe that. I still have energy input; I can't reduce that to 1%. So, according to consumers' logic, the price should actually be even lower if I see it as an inferior product, perhaps not in quality, but in consumers' logic. If less money is spent on production, I should pay less afterwards. And depending on how the economics of scale progress, the price will also decrease.

Interviewer [16:05] Okay, let's imagine we are on the verge of market entry. What do you currently see as the biggest challenges?

Ramona Weinrich [16:22] As I said, there are still many technological challenges. I don't think we can currently consider it only from a social science perspective; a lot needs to happen in production first. You have surely read that the products are already approved in the US and Singapore, but not as pure products but as hybrid products. So, it is currently not technologically possible to achieve the size and stability of conventional products and make it scalable. Other scientists are currently more in demand to advance this. As I said, we can only work hypothetically and cannot conduct tastings. And, as I mentioned, the Dutch might be a bit more pragmatic than us.

Interviewer [17:25] To get back to the whole topic of acceptance. We are focusing on the German market now, but in other interviews, we have also heard that, for example, the Netherlands is very interesting because the startup culture there is said to be a bit different. How do you assess the acceptance compared to other European countries, and does it make sense, from your point of view, to focus on Germany, or would you do it on an EU level?

Ramona Weinrich [17:50] As a company?

Interviewer [17:51] Yes.

Ramona Weinrich [00:17:55] Just from its size, the German market is, of course, super interesting because there are simply many people. So, the market is much larger. I have to look more at the economies of scale in my sales markets. Generally, there are also indices where you can see how open cultures are to new foods. The Germans are certainly not at the forefront. Look at the food shelf in the Netherlands! They are always a step ahead of us. We also saw it with the topic of insects; they simply took advantage of a regulatory gap. The Netherlands is certainly a bit more pragmatic in many areas, but so is the production level. Farmers say that regulations are getting stricter in Germany. Sometimes it is just flippantly said that not much is complained about; instead, I will look for alternative solutions and produce something else, like insects. And even in Germany, we have providers offering it on a modular level. But it has to do with culture. Ultimately, if I'm an entrepreneur, I also have to look at how I can make money.

Interviewer [19:31] Okay, very good. From your perspective, are there still gaps that can be filled with future research? Or are there particularly interesting topics to look into?

Ramona Weinrich [19:51] A lot is already being done on the European level. It will undoubtedly be a big question: which term will prevail? I was at a big conference in America three weeks ago. The term "Lab meat" will not catch on there. It's already becoming apparent. Will a German or English term prevail in the German language context? These are still issues that are not clarified. I can still work a lot hypothetically, but until the products are on the market, it's difficult to test willingness to pay.

Interviewer [24:35] Yes, very interesting. Well, thank you very much for your time.

Ramona Weinrich [24:52] You're welcome. Good luck with your work.

C.2 – Ivo Rzegotta

Interviewee: Ivo Rzegotta

Company / Position: Public Affairs Manager at the Good Food Institute Europe

Interview Duration: 43:44 minutes

Interviewer [00:01] Good morning.

Ivo Rzegotta [00:05] Good morning.

Interviewer [00:12] How are you?

Ivo Rzegotta [00:14] Good. Good. Nice weather. The good appointments yesterday on a completely different topic than the meat on the topic. Whether we find 7% or 9% VAT on dairy products of plant nature in Germany. That is also such a perennial issue. We are now a bit hopeful that we will get something there. Maybe at the beginning of next year we will get something that will end this discrimination against plant products. But that is still undetermined.

Interviewer [00:52] Really exciting. In any case, first of all, thank you very much for your time. We really appreciate it and maybe we can start right in if you don't have any questions. I did send you the interview guide ahead of time. But we're just writing our brand thesis together and the other two are taking notes. And it's about cultivated meat and especially about purchase decisions and how to increase consumer acceptance in the future then. And we want to find out which factors are influencing consumer purchase decisions for cultivated meat. In general, I would say let's talk at the beginning maybe first about your position and then about cultivated meat products in general then purchasing decisions, regulatory aspects and positioning. Can you tell us a little bit about your position at GFI? And about yourself?

Ivo Rzegotta [02:08] I'll be happy to. You wrote 30 minutes. So, if it's going to be longer than 30 minutes with me, it's not bad. I don't have a follow-up appointment now. The institute is called GFI. It's a non-governmental organization. We are still a relatively young organization. And it's been around for seven years. It originated in the USA. The mission of the whole thing is that we say we want to create a sustainable, equitable and safe food system or nutrition system worldwide. And we don't think we can do that by re-educating people, but simply by making technology driven products better so that they also have more choices for sustainable products. And we see there the role of so-called alternative proteins, so cultivated in meat, but also precision, fermentation, plant-based products, all the solutions to these problems. The organization now has 180 employees worldwide. Here in Europe, we are 25 at the moment, working in the fields of policy, science and collaboration with industry. I myself have been with the Food Institute for a little over a year and a half and am responsible for our work here. In Germany, we now have a core team of two people, and I lead that. Here in Germany, I have a completely different background, actually from aviation, a topic that I am very interested in, and I am therefore very pleased that I have been able to promote it here in Germany for a year and a half, especially in the area of politics.

Interviewer [04:08] Yes, it's exciting that this interaction between business, science and politics is mega exciting for us right now, because it covers all aspects of our work. So it's definitely great that we can talk to them. And then the next question would be about cultivated meat products in. What is your assessment of the current status of development, especially of research? And when do you think the market launch will take place?

Ivo Rzegotta [04:38] Yes. Does that refer to Germany or worldwide?

Interviewer [04:42] We are primarily interested in the German market, but also in Europe in general. But of course it's also super exciting if you can classify that in comparison to other countries, the US or Israel for example.

Ivo Rzegotta [04:56] Basically, cultivated meat is something that has been around for 100 years or so in terms of the idea, so the idea is to sort of turn cells into a process outside of the animal to sort of grow tissue out of it. And that's being seriously pursued, so to speak, to produce really cultivated meat. This has been going on for about ten years. There was this moment in 2013, where the first burger was tasted in August, a little more than ten years ago, which at that time still cost 250,000 €, the equivalent of a citizen in the production. Since then, a lot has happened. So now we have about 150 160 start ups working on the issue, worldwide. We have x large meat corporations that have said, we want to look at that, that should not pass us by. The trend and invest or specifically went in this area and worldwide. And we are slowly reaching the point. A lot of innovation has been achieved in recent years. Unfortunately, a lot of basic research, which should really take place in the state sector or in the public sector at universities, has migrated to start-ups and taken place there. But that's why it took ten years. But now we are slowly getting to the point where the leading edge companies, the ones that are really at the forefront of development, are now leaving the R&D phase and entering the validation phase, i.e. the proof of concept, is there, and it works. You can already taste it in some places, buy it in some places. Now the question is, how can I scale it so that I can actually bring it to market? Because it's still incredibly expensive. We're a long way from having a product like a burger that somehow still costs €250,000 now, but we're nowhere near having that kind of quasi cost, compatibility and cost equality. In Singapore, where it is already approved for sale, you can get a chicken skewer for 14 US dollars. But that is not the production price. That is still highly subsidized. Now to the market launch. So the big question is when, when and how do I get the price down so that I can put it on the supermarket shelf? Yes, we think it's the end of 2023, that it's going to take a while. Because it's really about building factories around the world now. Production capacity, because that's the only way and the only way I'm going to get the cost down is by scaling. There are other levers as well. I'll say that if I get even further in a medium, in research so to speak, to make it cheaper for the medium, that also reduces prices. But that's going to take quite a while, so we're assuming that an actual launch in the broad market probably won't be visible until the end of the decade, so it will then get unprecedented margins and market share. I know that sometimes you get a different impression when you see one or two press releases from a start up is of course a different logic because they have to convince investors that they will be in the market in two years. If we are at the moment opposite a market, then that is first of all at the market be in the sense of one begins to introduce it over high-priced restaurants then to get also consumer feedbacks that not the day X sales it admitted. Now it's all coming into Rewe. That's going to take quite a while. There we are in the point what see is first approvals worldwide and we have since December 2012 the approvals in Singapore. We have 2023 now approvals for the first two products in the U.S. and also a more recent development that the last month and a half. We now have first approval applications in Switzerland and in the UK, here in Europe, not yet in the EU.

Interviewer [09:21] Yes, yes, we've heard that before, that the EU is also a bit slower there and also a bit more cautious, but generally super exciting. And yes, there are definitely still a lot of technological challenges. But basically it makes sense to start with research on consumer acceptance now, because we have already talked about the example of genetic engineering, where such a huge mistake was made in terms of acceptance in Europe in particular. What would you say is the target group for cultivated meat? And what customer segments are there that are more or less open to the products?

Ivo Rzegotta [10:05] And cultivated meat is, after all, recognizable as meat in terms of character. What we grew up with, one more, the other less. And that is a product, what I from the whole strategic goal not to vegans or vegetarians and the vegetarians. This group comprises 12% in Germany currently, which eat vegan or vegetarian. And occasionally it is communicated that this group grows. This is statistically not at all empirically provable. Actually we already determine that in the last ten years not really what happened. There I believe, a point of vegetarian to vegan shifted. That is it thus I say times, in the newspaper reads one, gets one another impression. But actually that is not so and if one wants to change now what at the nourishing system, then one must find a way around the 88% to reach, which do not nourish themselves vegetarian and vegan and it to a large portion that it has itself actually what done. There's a large percentage of people who claim to have flexitarian diets, whatever that means. I think there's a wide divergence of definitions there. So even those are, I say, I don't get them affected, I don't get them with tempeh and I don't get them with such a I don't know, such a vegetable burger as there was maybe 15 years ago. I can only get them with products that come very close to the animal original. That's where we've seen technical leaps. We are also interested when I look at the Beyondburger or the Impossible Bürger, which is not yet approved in the EU. These are products that come very close, but not yet close enough for us to have a really significant market share. In the meat sector, we have a market share of 1.5 to 2% in Germany. You get the wrong picture when you see these big shelves in REWE, it's actually a damn small market share. And the consideration is that with cultivated meat, with more sense you get these people much more likely. And that can be proven statistically as well. There is, I'll say, not much, but there is a little bit of consumer research on the topic and there you see, for example, that the topic is much more receptively received by people who eat meat. And then there are correlations there as well. Men have a greater acceptance for cultivated meat than women, whereas with these plant products it's the other way around. So there are already initial indications that this product is reaching people who are not being reached so well with the plant-based alternatives that are on the market today and that may come onto the market in the near future, so to speak, that we are more likely to do so with cultivated meat.

Interviewer [13:06] Yes, that's interesting. We have already read that in the literature. Just because it Good Food Institute yes already has a lot of insights in research, we would also be interested, is there any consumer insights, acceptance or purchase decisions? What would you say? How do you get these meat-eaters to buy cultivated meat products? So there are different factors. And which are the decisive ones?

Ivo Rzegotta [13:37] All right, now that was several questions in one. First of all, there is research on the topic, because research now not so much, but I say, I say also you may not like this now, but it is so. We are at the moment still in the phase where, I say, consumer research is not the most important research in the field. We are still in the area where bringing forward the technical, so how do we get the costs down and the like. The priority is the results that we have in empirics. There are different results. I'm only talking about Germany now. If you look at it, we ourselves did a survey last year on this topic - I don't know if you have it, but I'd be happy to send it to you afterwards. We did a survey that came to the conclusion that 57% here in Germany would say they would buy cultivated meat if it were the market today. It's interesting when you break it down a bit like that. It also shows what I just said, that it is more pronounced among men than among women. Above all, however, there are stark differences between the generations. 57% of the general public, that is actually only said by people under 25. The figure there is 82%, which is incredibly high. Other studies show similar results. The University of Osnabrück came to the same conclusion. Forsa has come to the conclusion, the University of Bath in England, which has also conducted research in Germany, has come to the conclusion. They are all in the tunnel between 50 and 60%, which would say buy, If you look now times the first half of the year 2023, you will find in the press also other things. There were also some who said no, we have measured acceptance here in Germany at 30%, some even at 12%. But there is a decisive difference, and we are working very hard on the issue of acceptance, research, communication, etc., namely in the methodological design. The studies I have listed for you. Our study by the University of Bad Osnabrück, Forsa, they all did one thing. They asked people in a representative sample: What is actually happening in the process? And then they said: Would you eat that? And then we come out with 50 to 60 %, while those who arrived at significantly lower results here simply asked in Germany: Would you eat lab meat? Yes, and that makes the difference. People want food, not lab products. And if I say to them, okay, we have real meat, which is presented differently, where the same process that otherwise takes place inside an animal is done outside an animal, so to speak. The whole thing takes place in containers that are more reminiscent of a brewery than a laboratory. Then they say: Yes, I would taste, I would buy. But when I say yes, meat from the lab. And then there are the associated images of petri dishes and blue gloves. People are somehow reluctant, especially when it comes to this topic. In this respect, there are these. There are these surveys and they make us feel very positive that in other countries it is similar, in Spain it is similar. Similar in the UK. In Italy it's a little bit less and in France it's only 33% instead of 57. But you have to say. The question "How do I actually get people there now? I don't think communication is the relevant question. When I have a new technology, I always have early adopters here. I'm not even taking the price, the value of Germany, this 50%, the 33 in France. That's still a very good value until we will be able and have built the infrastructure to produce cultivated meat for 33% of the population here. We are so far into the 2030s there. So it's really a matter of building up a complex supply chain here, so that we can, as it were, increase production worldwide, i.e. the acceptance that is there at the moment is completely sufficient for a market launch, completely out of our so that the demand is very, very much higher than the offers that can be made at the beginning. And the question is how acceptance will then develop. Are there people who will still say in 2040, "I don't want to know anything about this, I want my slaughtered animal, etc."? From my point of view, these questions are not yet so clear in 2023. The question as to which factors contribute to this, we say relatively strongly, this contradicts a bit the thesis that you said at the beginning, that people have conscious ethical questions, sustainability questions. The core questions antibiotics etc. They've heard it all before. Are they also reminded of it occasionally. But when they are already standing on the supermarket shelf or when you are sitting in the restaurant and have everything in front of you, then I say, our research and that is actually our Theory of Change as an organization, that what becomes action guiding in the end is: The price, the taste. That has to be both a pair, so to speak, and also availability. If I have to order the first thing online in a complicated way, that's not attractive either. We believe that this narrative of price convenience is extremely important in getting people. So we have to deal with ourselves until we believe that we have to make the meat either taste as good or taste better and that it has to cost as much or less and that only then will it really become a factor that will get us beyond a few euros then that we can actually transform the system with that.

Interviewer [20:16] Yes, okay, interesting, but as I also heard earlier. So there are also influencing factors like for example that you provide information and that the customer is then just more willing to try it. If, as I said, you only talk about laboratory meat, then that could be more of a hurdle, because then the customer perceives it as very unnatural. But if you then provide information about the process and possibly also that it is better for the environment and ethics, then that could lead to more people buying meat.

Ivo Rzegotta [20:56] And yes, so of course, communication has a huge influence. But we just believe first and foremost that in terms of communication, you have to avoid taking this narrative of supposed unnaturalness. So it has to be in the communication, what will be relevant to whether people actually buy the food etc. will be that we portray how it's really produced he in such a setting, that we make it clear that it's not unnatural, that it's a natural process that's just not inside the animal but outside the animal and where the product is. That's relevant. The question where we are more skeptical is that it will actually have a very large practical relevance, whether we educate to the fact that it will save x million or billion animal lives. We are a bit more optimistic on the climate change issue. That's why we put that in the foreground and not the animal issue. A bit more optimistic. But we still believe that this is more of an argument, which is also of great interest to us and others. That it does not fit however with individual consumption decisions the taste. If the price does not fit, then the topic ethics does not become sufficiently, as it is with purely that it is also a derived factor. Not so that the does not play a role, but it plays a somewhat subordinate role compared to the others.

Interviewer [22:36] Yes, okay. And hypothetically, let's say it's 2030 or 35, the products are already on the market. They cost the same as conventional meat. And taste is also good if there are then different players in the market. How could a company then stand out? So how could a company then convince the consumer to buy its cultivated meat products?

Ivo Rzegotta [23:08] That's of course, that goes a long way into business administration, I have limited expertise in that. But there is of course in the area, so I can move a little bit away from just replicating a product one to one, which product I just want to replicate. And I suppose once, a burger patty or something, then the possibilities to differentiate in the market are limited, of course. then that's kind of a commodity good. But basically yes this this area cell cultivation gives you more possibilities. For example, one could replace unhealthy saturated fatty acids in a meat product with healthy omega three fatty acids. Research is being done on this, for example in the publicly supported project in Spain. There are many who are simply working on the topic of cultivated fat. Of course, I can name completely different things. I can do the whole thing there, of course. I can somehow introduce some species that don't even exist anymore, something like a mammoth, or I don't know if that's really something that should be in demand on the market. I do think that people are trying to maintain their current dietary patterns and that's what you can do with beef and chicken. That's where that will help to differentiate in the market. Otherwise, of course, there are means such as marketing, which plays a huge role here. And there will be companies that clearly position themselves in such a way that they say okay, we have a huge benefit here for animal welfare and for the environment and sustainability, etc. But there should also be some that decidedly don't do that. Because what we have seen here in recent years is that large meat companies are also getting involved in this area. In Germany, we have the situation that the largest company currently active in this area, the CULTIVATED B from Heidelberg, is more or less a spin-off of the company that produces bear sausage, and of course they will not do anything to say in their communication that meat is not sustainable. But we are now coming up with a sustainable product. So they will approach the whole issue very differently. Yes, otherwise. Yes, I think a lot will come from marketing. And otherwise it will still be exciting with the whole area of meat products, meat products, I have quasi the unstructured and the structured products will see. And even in 2030, we're still going to be talking about unstructured products that can stick together like everything that I do so meat. The question when I have every first T bone steak from cell cultivation is a different one. We're talking about completely different time horizons there. Can you do a lot kind of with 3D printing or something. But those are both solutions. It's going to take time before you really think about products like that. And that's also something where you can differentiate yourself from the competition, of course, if you're somehow the first to come up with such products, that's also exciting.

Interviewer [26:44] Yes, okay, I see. And when we just talked about big brands, they would say existing meat producers such as Rügenwalder Mühle and Cultivated B, for example. Those are the ones from Family Foods, as far as I know. Do you think they will catch on as well? As the first largest cultivated meat products manufacturer? Or do you think that it's more likely to be smaller start-ups that specialize in this and could then also advertise with sustainability and ethics, for example?

Ivo Rzegotta [27:20] That is an absolutely open question. And in order to even begin to answer this question, you have to get political. At the moment it's the case that in Germany in particular there is an extremely great reluctance on the part of politicians to provide public funding in this area, to go in there, to do research funding and so on. Worldwide, too, but worldwide we see that this has changed a bit in the last two years with us. The Netherlands is spending 60 million, the U.S. is spending an incredible amount. Israel is spending an incredible amount in this area. In Germany, there is a lot of restraint. So here, people are focusing on other issues, such as ecological animal husbandry, etc.. And why does this point come to mind now? Because it makes the difference in the end. If I use public basic research that is open access and the results don't disappear behind a wall like that, if I use it to lift the foundation, so to speak, if I use it to answer certain fundamentals, technical fundamentals of this industry, for example, how do I get a sustainable, inexpensive medium, then the basis for start-ups will be completely different. Then many more people will decide to say okay, then I'll go into the startup now and can concentrate my efforts to develop a product out of it, which I can push through in the market and which I can also get from others, if that. At the moment it is so that every single after basic research and in between there are everywhere, that is so work in silos, everything unfortunately in each case in the same topics and events.

Interviewer [29:11] Then you can't learn from each other.

Ivo Rzegotta [29:13] Exactly. You can't learn from each other. You don't have a base to go out to. And that, of course, incredibly favors the big companies that are at a huge advantage. That is, as long as that's the case, that the state doesn't recognize that as a research priority as well, to go in there like they did or however that implies, as long as that's the case, there's some danger that that ends up going home with just Nestle, Unilever, et cetera. The issue, that is so! That is, that's where the state now in 23 24 actually has to answer the question, What kind of commercial landscape would I have later on the subject? Quite apart from the question that if this is all developed in the USA, etc., then it can of course also be that this then becomes a pure import story in the end. And that is of course not nice from a German point of view.

Interviewer [30:12] Maybe just from this political point of view. Then do you think that cultivated meat is approved in the EU?

Ivo Rzegotta [30:21] There is currently not a single application for approval in the EU. There has been though before. A week or a week and a half ago it was reported that Cultivated B is now in this process. In some media. If you read through the press releases, it is not the case that they are now in a preliminary procedure. There are others in there too. But not many. A single-digit number of companies are also in there. And these, that means that no official dossier has been submitted yet. If a dossier is submitted, then there is a rule process and the process takes 18 months. That means that no matter what happens now, nothing will happen here before 2026. Experience shows, however, that this is unfortunately a particularly thorough procedure in the EU, which unfortunately also tends to become a bit bureaucratic at one point or another and therefore experiences delays. Experience shows that even in the case of very uncontroversial products, this can take sometimes. 24 months and 30 months can take. That it can take longer, which means an exact prediction in the sense of on day X an application is submitted we get then and then out is not possible here. That means it will still take a little while and at the end of this procedure there is also a very large uncertainty factor, because after the competent authority, that is the EFSA, has checked whether it is a safe product and has said: It is a safe product. This is followed by another step. Then it goes to a rather political committee. This is called the PEF Committee and all 27 member states sit there and in the end a vote has to be taken and a qualified majority has to be reached. And that is actually the biggest hurdle, but there is usually not simply voted, but there is already the idea that the vast majority agree. And sometimes it happens that people say that there is still a need for discussion, "We'll postpone that for another six months. And so it's very, very difficult to predict what a very big problem is and what a reason for it is. Because you're surprised that German start ups are trying their luck here in Singapore and in the US first of all. And also looking with one eye on the UK. There are reasons for that. And they lie in this.

Interviewer [33:02] Yes, yes, we have already heard, the meat lobby is of course also very strong. And when you say for example that in the in the EU Germany is already a very interesting market, or is it rather maybe Netherlands or another country?

Ivo Rzegotta [33:22] I would say that in the EU, Germany is the most interesting market, so the most interesting sales market definitely. We see that Germany is the biggest market for plant-based alternatives by a huge margin. By a huge margin. And also while last year I say the rates growth rates were not good in UK, Netherlands, in Sweden, in Spain, they were 11% in Germany and not 30% as we used to have, but 11%. Germany is the most populous country. Germany produces some of the highest approval ratings in these surveys. That means Germany is incredibly interesting as a sales market in terms of production. In the sense of where are the most startups? It has to be said that the Netherlands is a country. It's about the size of North Rhine-Westphalia, but it's better positioned than we are. And okay, there's still some catching up to do there, too. Where things look good again is in the companies that provide the industrial base, so to speak, that produce the ferments. And here, of course, Germany is extremely well positioned as an industrial and export location with all these companies. Sartorius, GEA, CULTIVATED B, in other words, the industry that is behind them and that ultimately forms the backbone of the entire industry. I could imagine that Germany would want to play a very, very leading role in this.

Interviewer [34:56] Interesting, You need a lot of collaboration, so from different sides. May I ask, I also read at Good Food Institute that they also collaborate with production companies or startups. Which ones are those?

Ivo Rzegotta [35:14] I'll confidently say all of them. Here are 180 worldwide and I am in very good contact with all the companies that exist in Germany on this topic, or at least those that have identified themselves as such. In this area, you always have the phenomenon that a few companies first start and start and only later say: Now we are so far and now we are also quite far. So the companies that somehow demonstrably already have something to do with politics, with the meat and what, we have a lot to do with them and they also come to us as a rule and not really who there already, I think in the whole area yes have a role that is seen.

Interviewer [36:06] Really interesting. And there's one there for Germany in particular that has especially great potential. Or even several perhaps.

Ivo Rzegotta [36:17] In Germany, the situation is that the companies for cultivated meat are very... There are not many. It's already indicated here, with Netherlands and yes, the UK. I think the ones that are closest to the whole launch issue are the ones, CULTIVATED B and Bluu Sea Food. Those are, I think, the ones that are just very close and the ones that are actually looking at an end product now, so big companies that are suddenly working on end products. Otherwise, in Germany we usually have companies that are not working on their products at all, but on either just machines for it or on, I'll say solutions, so something like if you look at Innocent Meat from Rostock. They want to market their own product, but they want more of an industry solution, because they say they supply people who want to produce a ferment, a cell line, a medium. And that then such a plug in complete solution and they can then join that is insofar the top provider and offers them, they essentially in Germany. In fact Bluu Sea Food and Alife Foods are also working on a B2C approach. But they are still very far away.

Interviewer [37:52] Yes, we have already been in contact with Cultivated B, and also with Alife Foods. We find that interesting, but unfortunately nobody has answered us yet.

Ivo Rzegotta [38:03] Well, that happens with the companies, it's there a bit. Otherwise, I think it's particularly exciting to really look at the industry behind it in Germany. So the role that a GEA can have there as well, which is Merck Industries. Merck industries is an absolute pioneer in the field worldwide largest are from Darmstadt, which I think since at least 2019 working on the topic to all possible, So development of cell lines. And I think, so, when it comes to the international ecosystem not so much about what you lie in the German supermarket, these are the Companies.

Interviewer [38:53] Yes, interesting. Because we're looking at more B2C, so also the product for the end consumer, so that's why it's also a little bit hard, but definitely super interesting insights. I might have one last question from me regarding pricing. If it should be the case that at the time of market launch there is a higher price than for conventional meat on the market. How could companies justify this to consumers? What would be the main arguments that could persuade consumers to buy the product anyway?

Ivo Rzegotta [39:35] I'll say, if I really want to hear the great breadth of society at the end, that I then can't help but undercut this price if necessary. But in the beginning, we're talking about early adopters. That is yes, I say, in the plant based area there we are yes also clearly above the prices, clearly still with the prices, so even more so if you compare that on its 100 gram basis and not wrong, where I somehow get 20 chicken legs and in return I get quasi a small pack. Nuggets of Planted and stuff . And as long as I move in the area, where it is not at all about to convince here quasi the last somehow, as from Germany somehow still the last 30% at the end to the acceptance get. As long as I think I'm doing well and I think I even have to go over the sustainability track and say for this product so and so much less percent greenhouse gas emissions have been emitted plus land requirements, so I can also come over the topic of purity of the product. So I can also say, has been produced without antibiotics, without hormones of any kind, because yes cultivated meat is produced in a controlled environment. So there will be arguments in this segment and how they turn out in the end to pay for sustainability. We would have to see what it looks like when the process is scaled up. But there are already initial studies. I don't know if you know the one from the study that says we will at least with beef minus 92% greenhouse gas emissions are possible. With pigs and with chicken it is then not so good. With pigs it's still so about minus 40% or 60 or so and with chicken it's even so, that's the report, so pretty much nothing at all, at least in terms of greenhouse gas emissions. So with all the other factors that are mentioned and built for that air pollution, water consumption or so? There it all still looks very good. So I also see that you can do something with sustainability factors and there will certainly be individual companies that get into this topic via the ethical question. But based on the target group analysis that we talked about at the beginning, that will not be the consequence. Because we must not forget that at this point in time, in four to five years, this plan will be much broader than it is today. And that means that many, many people for whom this is so important will probably already have solutions with the animals.

Interviewer [43:00] Yes, so vegetable is then in no way a substitute, but rather still a supplement. so thank you very much first. Do you two have any more questions? Then really many, many thanks. It was super many interesting insights that we can use very well further. We are still writing our thesis until the middle of December. That means we can send you the final thesis if you are interested. Great, then really 1000 thanks and still a very nice day.

Ivo Rzegotta [43:38] And I thank you too.

Interviewer [43:40] Thank you.

C.3 – Florentine Zieglowski

Interviewee: Florentine Zieglowski

Company / Position: Co-Founder Respect Farms & General Manager CellAg Germany

Interview Duration: 33:50 minutes

Interviewer [00:51] Thank you so much for your time, first of all, we highly appreciate it. And we actually just talked to Monica Röntgen as well, who said we should talk to Respect Farms. So I think you might know her.

Florentine Zieglowski [01:08] Yes. The world is small. Yes.

Interviewer [01:14] So that was already really interesting. But of course, we looked at your profile, and I think you have super interesting insights for us as well. So just to give you a brief introduction, we are writing our master thesis currently about more of the business perspective. So consumer acceptance, especially which factors are influencing consumer purchase decisions for cultivated meat and we are looking at the German market.

But the research question can still change a bit depending on what we find out during the expert interviews. And yes, so this is why we just kind of want to get a big picture in the interviews first and maybe also hear what you have to say regarding your insights. And maybe we could just start with you telling us a bit about yourself and what you're doing at Respect Farms and what you are learning so far.

Florentine Zieglowski [02:19] So I came into the cultivated meat industry, not necessarily through Respect Farms. I led the nonprofit organization CellAg Germany for the past year, and I think that's also how you came across my profile. I'm not sure, but I thought I was acquired by my CellAg email, but, yes, that's what I did for a year. So a lot of public policy work also a little bit like lobbying for cultivated meat in front of key policymakers in Germany, but also on a European level. I was working with CellAg on a European and international level. And then, of course, I wanted to be well, actually, that was before, but I really, really wanted to work in the cultivated meat sphere. And I also wrote my Master Thesis about cultivated meat, decentralized cultivated meat production. And, yes, through some context, I came to a woman called Ira Van Eelen, that is the so-called daughter of the godfather of cultivated meat because he was the first one getting patents on cultivated meat, but also to getting public access research on the topic in the Netherlands. And then, I was invited to join her in Amsterdam and then I did. And what I experienced regarding your question, a lot of openness inspiration, experimentation for the field. A lot about this and that' a little bit my background. So at Nova, I'm coming from a completely different field, politics and I thought it would be a great idea to also have management background to start a career in cultivated meat. So, that's what I did and it's working really well. We are, as respect farms, the only ones or sort of the only ones working on a decentralized approach. So not having the big production facilities, but more like a regional approach, decentralized approach to cultivated meat production. We also believe that it's an alternative to the production and we can ask for premium prices for our products because we have the sustainability approach in a different kind of way, like short transportation kilometers or local cell feed, these kind of things. And you can also add a little bit of a regional taste profile to your end product. So I think that maybe also regarding to your research, what I experienced or what we believe could work and how we can differentiate from other companies.

Interviewer [05:57] Interesting. So does that mean you think that the future will have many different approaches to cultivated meat production because you said alternative or do you think this is a decentralized production is the way to go and it's the only way it could be implemented?

Florentine Zieglowski [06:19] No, it's definitely not the only way to go. I hope it's not, to be honest, because the meat demand will increase by 3% over the years until 2050. So there's a lot of demand that we cannot deliver with only decentralized. But I like to compare it a little bit with the beer industry. So we had in the 1930s to 50s we had a consolidation of the market. So a lot of big players playing in the market and there was a decrease in breweries in the world and actually brewing beer is similar to cultivated meat production. And these taste profiles of beer became quite boring to people. So therefore, craft beers were invented and these work best in smaller breweries. And also you also get this regional taste profile and a little bit more specialty beers. And so nowadays we also have Heineken and we also have craft beers and they coexist and actually they're not even targeting the same market, same part of the market. So I really do believe there will be a coexistence of the different approaches.

Interviewer [07:56] Interesting. If I understood that correctly, is it more that respects farms is more B2B, helping farmers and existing meat production farming companies choose which. And I also saw that you did some research. Did you also do some research on consumer acceptance on this kind of site or only farmer acceptance?

Florentine Zieglowski [08:28] We only did farmer acceptance. If you're interested about current literature, then I would recommend you to go to GFI. Most of the research is done by them and they have a really broad approach and results. So, we really focus on farmers acceptance because we are more the B2B people. We see ourselves as system integrators. So, we think that in collaboration also with other cultivated meat companies we can really make this happen. We are on the production side of the value chain, and others might supply parts of the technology. Some might provide parts of the cell medium, the growth factors. There's a lot to be done, and no one can do everything by themselves. And I think most of the companies have realized that, and we are trying to bring everything together.

Interviewer [09:40] Very interesting. And what would you say are the biggest challenges? Are those more operational or are those also related to the branding side? How do companies then communicate to the market?

Florentine Zieglowski [09:59] I think the challenge is, on one, the technological side and getting a process done. At the moment, everything is on lab scale. Also, the big companies that you see out there, because, simply said, the equipment doesn't exist yet to produce cultivated meat at large scale. So, to get a process done that is in itself automated, where you really where it's a process of not having a petri dish and then putting that into a bigger petri dish, and then maybe into a small bioreactor, and then manually transferring that to a bigger bioreactor. So that's not how manufacturing works. That's how research works. But we have to bring that out to manufacturing companies, farmers really being food producers, and scientists being on the innovation side of things. So, I think that's the biggest obstacle. Yes, maybe branding as well, but companies are not so much focusing on that.

Interviewer [11:24] And in terms of feasibility and maybe also price points and costs, do you have any insights on how long it will still take to get the products to the market and if there's already knowledge about it, how much it will cost?

Florentine Zieglowski [11:49] Yes, I do think it's going to be a premium price. Even if you have price parity, there will be only a few players in the market at the beginning at least. And because of supply and demand, these companies will be able to ask for a premium price. I also think cultivated meat doesn't have to be price on price parity because it provides all the sustainability goals that a lot of consumers have. It uses much less land. It uses much less water. It will be energy efficient if we use renewable energy. So that's also the goal of a lot of companies. So, first of all, I don't think it's necessary at the moment. In Singapore, a cultivated meat dish costs $23. But I don't think that it's covering all the costs at the moment. But that's how they sell it. They're also not very transparent on how much it actually costs. I think at the moment, it's maybe €60 per kilogram, but that's really a rough number. So there are a lot of different numbers out there, and they might not actually be true or based on few assumptions, because at the moment, no one can produce. So, all the cost calculations are of course based on assumptions or based on the assumption that you would be able to use a bigger bioreactor. But you don't have that bioreactor yet. But I mean, since 2013, it has already come down from

250,000 to, let's say under €100. So that's in ten years a big difference. And I really think that in the next ten years, it's only a matter of a few years.

Interviewer [14:17] And in that regard, from your perspective, what would you say are the biggest promising markets? Is it of course probably the US and Singapore, but in terms of the EU, we've heard before that Germany might not be the best, but the Netherlands might be better for producers. Or would you look at it rather from a European perspective?

Florentine Zieglowski [14:49] I would look at it from a European perspective. So if you access the market in Europe, you can sell everywhere, which is great. So let's say the cultivated meat company, Mosa Meat will get a product to the market. Then they will be able to partner with a German meat manufacturer, for example. Well, actually they're working with a Singaporean, but let's say they would. So, I think the Netherlands has a huge advantage in terms of their innovative culture. They're just more open to it. They have a startup culture and there's a lot of innovation happening there. On the other hand, the bioreactors, for example, that are currently used, most of them are German. So, in the supply chain, bioreactors equipment, also growth factors, Germany has a lot of knowledge from the farmer industry and that could be easily applied in the cultural meat industry. So I see a lot of potential in partnering between startups and bigger ventures.

Interviewer [16:18] Okay, Yes, interesting. And I've seen you also partner with Mosa Meet, so would you say this is one of the potential big players in the next years?

Florentine Zieglowski [16:32] Yes, definitely. I think Mosa Meat is the biggest player in Europe on meat. And there's of course also Aleph Farms. They handed in Dossier in Switzerland, which is also an interesting market because they are in Europe, but they're independent. But yes, I think Mosa Meat, Aleph Farms, GOOD Meat also these are the big players. But that has a lot to do with investments and capacity to research.

Interviewer [17:16] Okay. Because actually in our research, we also would like to work more closely together with a company, but unfortunately none so far replied. So if you have anyone from Mosa Meat to be interested, then we would be more than willing to talk to them because then we can also find out what they would be interested in terms of market research for consumers and maybe work a bit together with them.

Florentine Zieglowski [17:50] I would love to, but I can already tell you it's probably going to be a no, because for them it's a lot of effort to work with students on thesis just out of experience because I also tried that. But maybe that changed over the past two years. Could also be but I'll ask.

Interviewer [18:22] Thanks. Yes, it would also be like not close collaboration, but already one interview would be great. Yes. And what else do I want to ask? So do you have any insights on what would be the biggest target population or target consumer group? Would it be like depending on education, demographics.

Florentine Zieglowski [18:52] You mean like in the world?

Interviewer [18:56] Maybe in Europe?

Florentine Zieglowski [19:03] I think it depends on whether you're targeting a bigger market or differentiation in your product. I do think Germany is a big market. Well, it's the biggest country. It's one of the biggest in agriculture. And yes, Germans are eating less and less meat and turning to alternatives. But yes, that's for animal welfare. That's for sustainability reasons. That's for health reasons. So I do think Germany is a big market for differentiated products, but also, of course, for cheap products for the commodity market. Italy, I don't know whether you've heard of the things going on on a political level in Italy that they are trying to ban cultivated meat. But I'm, for example, doubting that that would be a great market. If already politics are against it, then talent and companies go abroad. And I also think it's a more traditional market.

But Yes, Germany, the Netherlands, all these big countries, but they are quite similar in acceptance.

Interviewer [20:41] Okay. And would you say because when we were looking into the research, we found that sustainability and ethics are probably the most important factors for consumers to maybe even pay this premium price? Would you agree with that or do you see any problems in terms of maybe taste or perceived unnaturalness?

Florentine Zieglowski [21:07] I don't really see with acceptance, I I'm quite always quite confident. To me, the more or what I experienced, the more information people got on cultivated meat, the more they were in favor of it. But of course, if there's a lack of information, people also see it unnatural. If someone tells me that is from a lab and that sounds already unnatural and maybe then that sounds unhealthy because it's unnatural. And while it's the complete opposite of it, it's actually a very clean product. So I don't really think that there is a big issue, although information and also media campaigns really matter in that respect.

Interviewer [22:08] Yes and then you would probably say with regard to the decentralized production, that things like sustainable production and also branding from a company perspective are selling points. For instance, if you can say, for instance, you have shorter transport times, as you said before. So this would have to be communicated.

Florentine Zieglowski [22:36] Yes. And branding in that sense is a big part. Although, of course, let's say the brand Aleph farms, but also the brand Mosa Meat. It's not a trusted brand. That's also a big reason why, for example, Rügenwalder Mühle was a big asset for us, not only for us as a company, Respect Farms, but for the whole field, because the brand awareness of this meat company is huge. And if you look at the history of Rügenwalder Mühle, they are now having higher sales in plant based than in conventional meat. And that brand, I think, will make a big change. So, yes, cultivated meat companies, but of course, conventional meat companies have, let's say, history of 150 years, and they build up on that trust. So I really think that trusted brands like these are essential.

Interviewer [23:44] Yes, maybe that would be a good strategy, as you said a couple of times, collaboration wise, coming together with bigger brands. And we've heard before that it might also be that you start into the market with hybrid products, plant-based, mixed with cellular products in one product and build trust that way.

Florentine Zieglowski [24:13] Yes, for sure. That's one part for the brand, it has many benefits of taking hybrid. Not only that, it's a combination of plant-based and cultivated. And let's face it, plant-based is still more sustainable ecologically than cultivated meat. So that would be an additional sustainability factor, but it's also a cost factor. So plant based is cheaper than cultivated meat. And you could enhance the taste and the texture and the smell with cultivated fat, for example, and improve plant-based products in that way and also reduce the ingredients list of plant based products. So, Yes, there's a lot and that would also increase, I think, consumer acceptance on plant based or hybrid.

Interviewer [25:14] Yes, okay, thanks so much. And maybe one last question. Are you also currently, with Respect Farms, are you also looking into ways on how to make cultivated meat, like cleaner with, for instance, I don't know very how do you say clean environment when producing? And for instance, do your partner still use fetal serum for the cells?

Florentine Zieglowski [25:53] I'm not sure what exactly you mean with clean, because we had whether we mean the same thing, because in the culturated meat space, there's actually a discussion going on whether calculated meat is too clean. But on the latter part, we are not using FBS. That's mostly due to our partner Mosa Meat. So they're not using that anymore. The plant-based medium is not as productive as FBS, but we're getting there. So they are currently improving and improving and you see already that they're making good job on it over the years and it will get there, but at the moment it's not as productive. But you can already exclude FBS out of the process. The clean question, I'm not sure Yes.

Interviewer [27:00] This part you answered with the FPS and about clean, I meant like I heard that antibiotics are still maybe an issue and also questions on non GMO maybe. Do you have any take on that?

Florentine Zieglowski [27:18] Yes, that is a trade off that you have to make. So antibiotics are used for sterility reasons. So you want to make sure that your batch is not contaminated by bacteria, for example. And for that, antibiotics are used. I mean, that is also used widely in the pharma industry, but that's the reason why you use it. So at the moment, the industry is trying to, of course, exclude it. And you can you don't always have to have to do it, but you have to make a system that is a closed system, so there's no bacteria coming in, so antibiotics will be excluded out of the equation. But as I explained, it from the petri dish to a bigger to a bioreactor, and that's open. So there are a lot of parts where things could get contaminated. So you just have to be very careful. But once it gets into a closed process, that won't happen anymore. And then you also don't need it. And the other question was the GMO question. So there I can say that it depends what kind of cells you use. So if you take a biopsy from yourself from or from an animal, it doesn't matter. So tissue, then you have, let's say ten more, but let's say ten different cell types in there. And some cell types have the potential to become immortal. And some cell types are just stopping to grow after 30 doublings around that time. And there are different companies working on different things. So with immortal cell lines, you can imagine that if you have 1 million cells in the beginning and you have a doubling time of 30 hours, then that 1 million doubles every 30 hours. And you can continue with this process basically for forever. And from a process point of view, that's perfect because you don't have to use batches, so therefore you also don't have the cleaning costs, which makes the process cleaner, more safe. So there's actually no disadvantage for it. But in Europe, we think that GMO is bad, and it's also actually harder to get regulatory approval with GMO. So therefore other companies, such as Mosa Meat are working on non GMO cell types. So, Yes, after 30 doublings or so, there's just stop and then you have to continue or you have to do it again. But that also means that you have to go back to the animal. So with an immortal cell line, you don't have to do that. So that's a trade off between GMO or an ethical point of view, whether that animal feels pain from a biopsy. So, Yes, there are different ways to go about it. Mosa Meat is an example of non GMO, and Meatable is an example of GMO, and there are different approaches.

Interviewer [31:15] Thank you so much. This was very interesting and super helpful.

Florentine Zieglowski [31:21] Sorry to add, but just today I got a paper sent on GMO and consumer acceptance of GMO in Germany, and there was not cultivated meat, but it was on precision fermentation. And precision fermentation is under the head of cellular agriculture. So maybe you want to have a look at that.

Interviewer [31:51] Yes, of course. Can we find it in the Internet?

Florentine Zieglowski [31:56] Yes, maybe I have it still open. Yes, sorry, that just came to my mind, thought maybe it's interesting for you.

Interviewer [32:14] No, that's great. Super helpful. Thank you. Thanks a lot. Yes, of course. We will also send you our final paper if you're interested. Maybe it helps sometime in the future.

Florentine Zieglowski [32:29] Yes, for sure.

Interviewer [32:32] Okay, great. And Yes, thanks a lot again and if you know anyone who'd be willing to talk to us, we would be super happy to talk to them. But Yes, thanks for your time.

Florentine Zieglowski [32:45] Yes. How many interview do you still need and what kind of company? So you mentioned Mosa Moat? Is there any other type of company or something like that?

Interviewer [32:59] I mean, if you have contacts, that would be great. But Yes, just any startup would be super helpful because I think the business perspective itself would be great. But so far we have four interviews now, which is already a good start and very different perspectives, just I think the business perspective is still missing a bit. So if you know anyone but any interviewee is super helpful.

Florentine Zieglowski [33:31] Okay, great.

Interviewer [33:32] Good to know.

Florentine Zieglowski [33:33] Yes.

Interviewer [33:35] Okay then we will stay in touch and thanks a lot again. Have a nice day.

Florentine Zieglowski [33:41] Thank you.

C.4 – Detlef Exner

Interviewee: Detlef Exner

Company / Position: CEO at Exner Process Equipment

Interview Duration: 30:36 minutes

Detlef Exner [00:12] That's good. Yes, fine, then I would be interested first in the topic of the master's thesis, what it's really about in the first place, and you might do a short introduction. And then, of course, you may ask as many questions as you like.

Interviewer [00:30] Yes, you're welcome. Thanks again for being so proactive in writing to me.

Detlef Exner [00:42] This is a very modern topic. We've actually been dealing with it for some time now. But of course in a completely different perspective. We come more from the process area: How is it manufactured? How can you bring the format from a lab application in the pilot application into the production process at some point? And in the laboratory, it has been about such stories for a relatively long time. How do the cells grow? How do I control the whole thing and so? And it's a topic that we've been working on for quite some time now and we're finding that it's picking up more and more speed. And that's why I'm very interested there and that's why I was surprised when I read your link or read your post from LinkedIn and had taken the time to really read through it.

Interviewer [02:10] Yes, with pleasure. So our master's thesis is more from the business perspective, as I said. We're looking at how to influence customer acceptance and also purchase decisions. So very much from the business perspective and very much from the end consumer product. And we are looking at the German market and probably also the European market, because we have already heard in several interviews that the market should probably be viewed holistically as the European market. Ultimately, this is a product that we develop marketing strategies for a specific company that produces these products. We then take the company that from our perspective will probably be the most successful. We also have to consider all perspectives for the paper in general. And we have already had interviews with biologists, so we are definitely still missing the technological perspective. In our interview guide, we have several areas: generally cultivated meat products, the market view, regulatory purchasing decisions, and then also an outlook. And therefore, if we start with the introduction, it would probably be quite helpful if you could tell us a little bit about your position in the company and also perhaps about one of the products, i.e. the optical sensors, so that we can better understand the product and what you are doing there.

Detlef Exner [04:29] Yes, I am a shareholder and managing director at Exner Process Equipment Company, which has been in existence for 20 years now and we have been dealing with sensor technology, with optical measurement technology in liquids for about 15 years. Yes, and we have found that we can also measure cell growth elements, quite normal cells and the last few years then actually a cell growth for products are also possible. And this process must be controlled with several parameters. These are, for example, temperature and of course the PH value of such a liquid and oxygen content, depending. These are living organisms that reproduce in there, these cells, and one sum parameter, I would simply like to say, is ultimately this optical measurement technology, which ultimately measures light loss. That is, we measure via a certain path how much light we can imitate, how much still arrives on the other side and the less light ultimately arrives on the other side that is a measure of how the cells grow in there. So we can find out about this generally called turbidity from measurement. Are the cells growing in this process as they should from theory or from other applications? Or is something interfering with the process? And then the biologist can respond to that. That's basically what we do. The special feature here is perhaps that we have sensors that can be used both in the laboratory area, i.e. are relatively small and thus already work in the first tests, and can then also be added to or designed in such a way that they can then also be used afterwards in large processes, in large companies. This gives the customer the advantage that they will always find the same measured values in the same processes. And that is what is actually a specialty is a niche, you have to say. And this is where we have worked our way in over the last few years and are actually already a little bit known.

Interviewer [07:10] Okay, interesting. And how long have you guys been doing optical sensors for cultivated meat or their research now?

Detlef Exner [07:17] You can't really say that exactly, because we often don't even know what the customer is using our sensors for, especially in the initial phases of such developments. That is, development labs don't tell you what they're working on at the beginning. They say we want to measure here and there. and is that possible with your sensors? We can't say. But we have noticed that requests for so-called high cell densities, i.e. where a very, very large number of cells are growing. And that is actually an indicator, as we know in the meantime, that this can often also be about cultivated meat, that they have increased in the last three or four years. I assume that we are not everywhere in it, I do not want to say that now. We are not a market leader now, I don't want to say that either. But I will say that the trend in this direction is perhaps too possible in the last 3, 4, 5 years. And that is what we also notice. There are more and more congresses in this direction, there is exchange between scientists and the market seems to develop in the last years.

Interviewer [08:32] Okay, okay. So that means that you haven't exactly branded the product itself as a sensor for that, but they do that themselves. And at the moment your customers are, of course, you can't say that exactly. But here, for now, only development labs and then possibly in the future also larger meat producers and the like.

Detlef Exner [08:58] Yes, that's exactly where we are right now. In these developments, you also have to say, we sell relatively much again through other partners, that we now also do not directly notice where it goes. In other words, there are companies that actually manufacture these small development ferments and then sell them in larger quantities. And they often include our sensors in their products and sell them directly. So we don't know exactly. However, we have noticed that we also manufacture sensors for the food industry, where we have direct end customers, dairies, breweries and so on. Furthermore, the plant manufacturers for these, dairies and breweries, and for example the company GEA is a large plant manufacturer, are setting up projects to develop pilot plants for their customers and also to sell them afterwards. And we are trying to get involved at the moment. So we've made contact with them and that's starting to happen now. From my perspective, I see that the trend is now very slowly starting to move from the actual laboratory sizes to pilot plants. And the next step is then from the pilot plant to the production plant. And then, if necessary, plant manufacturers are now trying to build up their know-how. How do I have to make such a pilot plant? I have to advise my customers, i.e. we have to advise our customers, on what measuring equipment they need behind the scenes, and so on. I see the trend quite clearly.

Interviewer [10:45] Okay, exciting. And can you also estimate how long that will take until it then goes to the production facility?

Detlef Exner [10:55] And that's difficult. That's so, that's now reading crystal ball. That's really the hard to say. That has of course also something to do with your topic, namely with the customer acceptance,. How is it accepted afterwards? Who will buy it later? From our perspective here, I can see that the trend is more prevalent in Asia than here in Europe. We are always very conservative in our approach. We have large regulations down here. In Asia, especially in Singapore, they are already much further along and are already selling some of it. That has to be said clearly. So we have these industry reports here, which I can send you later.

I'm sure they'll be interesting for you, too. Then he'll certainly get a lot of data on how they see the trend. I'm sure they know more than we do. I know it's going really high here. It's only going to take five years in Europe or maybe even ten.

Interviewer [12:08] That would also be exciting to see if there are any projections of how big the market is estimated to be perhaps.

Detlef Exner [12:17] That's quite different in the Industry Reports that I have here. Then I can give you, I'll give you on.

Interviewer [12:24] Stands together and times okay, um, can you maybe also tell a little bit about what are the main challenges and constraints from your point of view? That cultivated meat products are then available soon, so in the next few years, maybe also from a technical point of view or also from another point of view.

Detlef Exner [12:47] That I think the big challenge will probably still be in the price and the production is certainly CO_2 reduced compared to normal meat. It's probably ethically better as well. Is from my point of view no question at all. But the price is not even foreseeable at the moment. The production costs will be at the moment still relatively high for at the beginning, it must also be said, as I see it, relatively inferior or low-quality meat from the from the point of view of the consumer rather inferior meat, because of course there will not be a steak, as I see now perhaps an Argentine steak somewhere on the plate. And there is already out for a meat consumer and there won't be. At the moment, I think we are at a stage of development where we can possibly get a reasonable fish stick, which is really fish. Yes, and maybe some small meatball or something. Like that or chicken meat. So I believe that from a technical point of view, you can really get a comparable piece of meat to what a normal piece of meat looks like today. That will still take a long time. And that's why with the current production costs in the quantities or on the scale that it's being produced at the moment, it's simply too expensive. And that's why you also need a very high market acceptance and somebody has to want that. That's how I see it at the moment. And if at some point large-scale plants are built, blah, blah, blah, then maybe it will become cheaper at some point or than if normal meat is charged a CO2 price at some point. Then you might get into regions where the other will be interested, but that will still take a while.

Interviewer [14:50] Okay. So then acceptance in aggregate is the lever to get the big guys to accept the high price? Yes, and what would you say are the opportunities to differentiate yourself as a producer of cultivated meat products? Is it then only this price lever or are there possibly other possibilities?

Detlef Exner [15:17] You mean the ones from the cultivated flesh that stand out from the normal?

Interviewer [15:23] Or also from other manufacturers? Yes.

Detlef Exner [15:26] So for example from a very normal, so from vegetarian made substitute.

Interviewer [15:34] Exactly.

Detlef Exner [15:35] So a cultivated meat versus other meat is clearly in my eyes an ethical point of view and of course also a point of view, you have to say clearly, if you produce it much more environmentally friendly. Ultimately cultivated meat versus other vegetarian substitutes for example. Then I think the cultivated meat is a very good complement. Yes, I also see that from the fact that Rügenwalder, for example, is already starting to invest in this direction here as well. That was yes with the first, which have risen on the vegetarian track then for people who do not want to eat purely vegetarian or vegan, that they say okay, now I can also take additional cultivated meat to feed me, as before also. Ultimately. That's why I think that could be a good lever and is a good demarcation.

Interviewer [16:37] Yes, and then you would also think that the target group is also more likely to be meat eaters.

Detlef Exner [16:46] I'm not quite sure about that. Actually, you have to answer that as a vegan. Whether that has an effect on the target group or not, everyone has to answer that for themselves. It depends on why people make the decision not to eat meat. If the decision comes along purely for ethical reasons, I would such animals is in the foreground for me. And then I think it's already a target group for the question, if you've been vegetarian for a while, whether you're still comfortable with the meat consistency at all. Like in the beginning. If I switch already from meat consumption to vegetarian, I think. So I think that's my thing. When I try from time to time the meat substitutes from my daughter, I always think only about the consistency, it is not so right and the taste is also a bit different not so right. Proper replacement it is not. But I also realize that once you've done that for a while, you get used to the consistency and taste. And then the change back is probably just as difficult. And that's why the question is: That's something that I can't answer, that then someone who actually goes vegan or vegetarian has to answer. Then I would go back to my original habits or or not.

Interviewer [18:17] Well, to come back to the price, I don't know if you can estimate that, but if now from the whole technological point of view everything is made as effective and efficient as possible, will, then from the price, if you can estimate that, will it be equal to equally expensive organic meat, right? Or do you estimate it will still be very much above that.

Detlef Exner [18:48] So I think if, but then we're talking maybe in ten years or so, when the technology is more and more advanced and the plants have been optimized and also run for a while, then I can well imagine that the price would actually have to go so determined direction organic products. In particular, I believe that if one would have to include a CO_2 price in the normal meat production at some point, then that can not be completely neglected in the future.

The world is on the way there, it takes time, but it is on the way. And if you take that into account, the cultivated meat will probably become cheaper at some point.

Interviewer [19:38] that makes sense. And then to come back to the customers, do you already have, yes, maybe customers who could then use your sensors later in the production environment. So are there any efforts already there by you guys to recruit a customer? And if so, I don't know if you want to say which ones.

Detlef Exner [20:03] Of course, they don't exist yet. But there are some nice startups in Germany, as I like very much. I made a note of Bluu Seafood. Then maybe you should take a look at it. Yes, that's one of those start ups that just raised a lot of money again and are now actually trying to invest in larger facilities. And we're not part of that yet, they don't know us either.

Interviewer [20:44] Yes, okay.

Detlef Exner [20:48] We go a bit the other way. That is, we go via the plant manufacturers. That's easier for us than approaching end customers, because we only bring a very small part of such a system. We only bring a small sensor part, which is why we can't advise customers on the entire system.

Interviewer [21:06] Yes, that makes sense. Um, exactly. But in general, in your estimation, would you say in Europe, Germany is so the most attractive market or are there other markets that are more attractive? Or do you really have to look at it as the European market?

Detlef Exner [21:26] That's also hard to say in Germany. But that's really just a belief now. I do believe that Germany is an attractive market because we are always relatively fast leaders in such modern things and equipment. But overall for the sales market, we have to look at Europe as a whole. I think so, and I wouldn't try to differentiate.

Interviewer [21:55] Okay. Um. Right. Maybe we can go into that then. Regulatory. What's the status there. I don't know to what extent you are dealing with that, because again, you are providing sensors and not ultimately then producing the end product. But that's the status at the moment. And when can you expect the sale to be approved in the EU?

Detlef Exner [22:26] But I have to say quite honestly, I actually can't tell you much at all. I haven't really dealt with that yet. I know that the EU is lagging behind a bit. As is often the case with approvals. As I said, in the USA and also in Singapore or in Asia back there, the whole thing goes much faster and they are much more courageous. And it's really getting underway here in Europe.

Interviewer [22:55] Say Yes, yes, that really hard to assess too. Exactly. Do you have any other idea for trends that maybe could be leveraged to create increased customer acceptance or interest? So for the cultivated meat products.

Detlef Exner [23:21] So probably afterwards, when the products are there or when the first products are there, where there will probably be just pure marketing actions. So I think. Yes, I don't think so. The marketing as I said can only start with ethics and the environment and ultimately maybe price or simplicity or something. That can also be and probably but I would not know it, how one should put a lever there that it becomes all at once completely great.

Interviewer [23:57] Yes, would you think that health might play a role? Because we've already had biologists tell us that theoretically you could also genetically modify the meat, but, for example, with less fat content and so on, and that it would ultimately be much healthier because of antibiotics. Would that also convince you?

Detlef Exner [24:22] That is of course a good point, that one must already say, because one can model the meat yes probably already in such a way, as one would like that is determined from the fat content quite guaranteed, which is of course then also always a taste carrier, which one does not have to. The taste of the makes but otherwise simply times itself. And naturally medicines, which get the animals otherwise and accumulate in the meat, are naturally with such a motivated meat also not present. One must say that also times. That is with security also and will probably become increasingly important in the future in factory farming, the more drugs are used.

Interviewer [25:12] Okay. Are there any research areas in general that you would find interesting right now? If we were to look at those in more detail? And then finally also the question: Would you try and eat cultivated meat yourself?

Detlef Exner [25:29] The final question yes in any case I would be very interested. So I would always try it. Haven't had the opportunity so far unfortunately and where the research should go and I can't say that in the end. That's actually up to the biologists to decide. They know better what they can do or not.

Interviewer [25:53] So okay, thank you very much in any case. So those were all our questions for now.

Interviewer [26:09] Is there anything else that interests you?

Detlef Exner [26:13] Yes, indeed. I would actually be interested in your opinion. Would you try that or would that go? A vegetarian or vegan setting? Yes.

Interviewer [26:28] Yes. Yes. So, I always liked meat mega. That's why I'm actually happy when that comes up. And ethically and environmentally speaking, it's much better and that's why I find the topic really exciting myself and it could also be really healthy.yes, that's why it's definitely interesting.

Detlef Exner [26:59] I think that's good. So yes, I've also heard other opinions, from there. But there is also is also often so that people do not deal directly with the topic and then also quickly give their opinion, only meat and then maybe not convinced. But if that is really on the market, it will be seen how that goes.

Interviewer [27:25] Yes. We have actually already seen that in the interview. That many are then so concerned about the topic of clean or that this was then somehow bred in the laboratory. And I think, however, that will probably be clarified now also in our question. And I think that's also an in old generation topic, who is then nevertheless ready to sit there perhaps also or not. I had me again. And in the literature, interestingly enough, we have also read that the target group is probably not the vegetarians and vegans, because I believe that some people also forgo the taste because they find the feeling disgusting. But I think generally for the acceptance is already the biggest problem this that it comes from the laboratory and that especially in Europe we have this very strong nonGMO attitude. And it's also completely banned. And I think that will be one of the most difficult things, to get away from the fact that it is so unnatural.

Detlef Exner [28:46] Yes, I think so too. The laboratory always sounds kind of spooky, things happen that you don't know yourself and that's why it has a bad image. That's true, although the processes are actually much more controllable than in nature. And the question is of course always, why do I have to breed or raise a whole cow, only to want to eat the meat from it? That is of course already actually is. It is a stupid attitude of people, if I, if we now get the opportunity to do otherwise. That's why I could imagine that this will catch on. And yes, that will, that will take a generation. Well, that's me too.

Interviewer [29:32] Yes, and we also read that it definitely gets better with more information. Probably with the acceptance. So let's see what it was like with us. It comes of course also very gladly. Then our factory farming, when that's done then, that will be in English, but.

Detlef Exner [29:49] That's not all. Is good. Exactly. I'll send you our industry reports right here. So you already have last year and you could look in there. And there's a lot in there about the market, how they see it. And so on.

Interviewer [30:09] Very interesting and anyway thank you very much for your time, which is not so easy for me to find interview partners. That's why we are very, very grateful there.

Detlef Exner [30:19] No problem, if he has further questions. Simply report after yes. Wish you good luck!

Interviewer [30:28] Thanks.

Appendix D – Bonus Part: Brand Book

BRAND BOOK

for Mosa Meat

Anja Held
Allegra Baumanns
Anna-Maria Huber
Agostina Hübscher

Group 2

Mosa Meat

TABLE OF CONTENTS

TARGET SEGMENTS

THOMAS

Traditionalist Meat Enthusiasts

Thomas enjoys the hearty offerings of Blockhouse. As a non-vegetarian, Thomas appreciates the rich taste of traditional meat products and is hesitant to embrace cultured meat, finding comfort in the familiar and time-tested culinary experiences.

CHARACTERISTICS

- Male
- 50 Years
- Highly Educated
- Omnivore

! HARD TO ATTRACT BUT STRATEGICALLY INDISPENSABLE

NICK

Young Innovators

Nick, part of the younger demographic, is drawn to the innovative approach of Mosa Meat. Open to experimenting with alternative meat substitutes, Nick is enthusiastic about embracing cultured meat as part of his progressive and open-minded culinary journey.

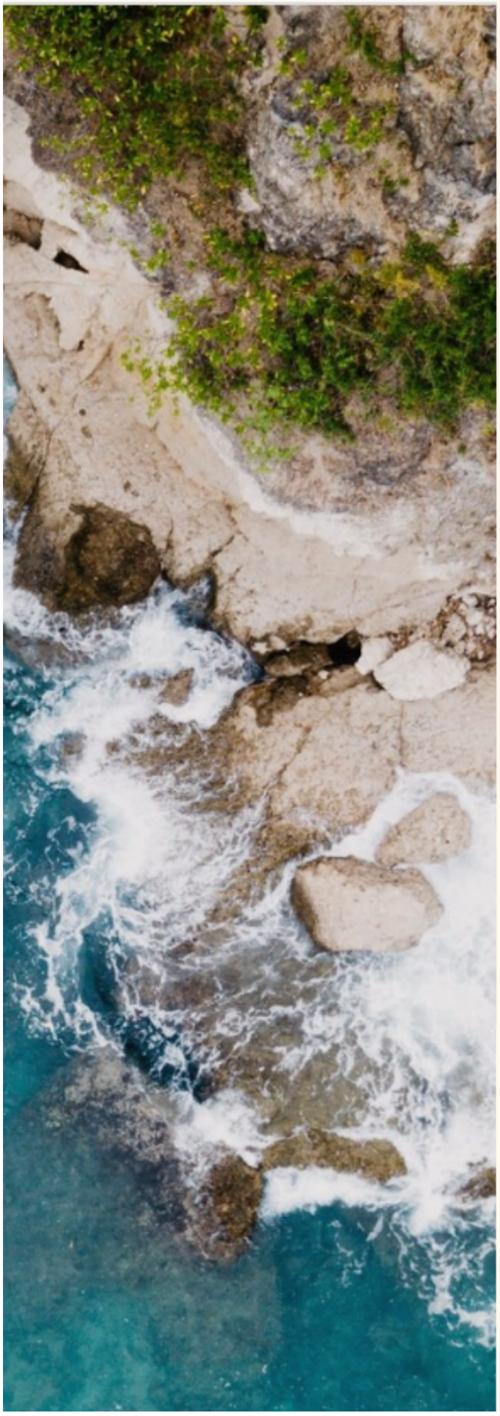
CHARACTERISTICS

- Male
- 27 Years
- Highly Educated
- Omnivore

! EASY TO ATTRACT BUT STRATEGICALLY LESS RELEVANT

Addressing the diverse interests of the target segments presents a **challenge**, given the contrasting profiles of Thomas and Nick. Nick, as an **early adopter**, is eager to try cultivated meat and embraces food innovations. However, Thomas, representing the larger and more **lucrative market**, is a traditional meat eater.

To succeed, the marketing must resonate with Nick's adventurous spirit and Thomas's traditional preferences, ensuring a comprehensive approach that **maximizes appeal across these distinct consumer segments**.



BRANDING

POSITIONING STATEMENT

Mosa Meat, a pioneering Dutch startup in clean meat production, positions itself as the **natural evolution of traditional meat**, cultivating a new era of sustainable, high-quality burger patties.

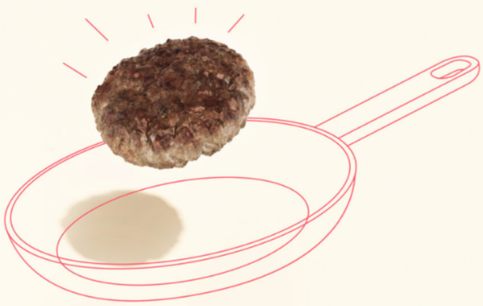
Pioneering a **cleaner, kinder way of making beef**, Mosa Meat is a food technology company dedicated to helping everyone take a bite out of a better future —starting with the world's kindest beef burger.

With a commitment to animal welfare and a focus on taste that surpasses conventional options, Mosa Meat **appeals to both traditional meat enthusiasts** like Thomas, seeking familiar taste and superior quality, and **innovation enthusiasts** like Nick, drawn to cutting-edge, environmentally conscious food choices.

All this is offered at a reasonable price, ensuring accessibility for consumers who value both **taste and affordability**.

TAGLINE

Crafting Tomorrow's Meat Today - Taste the Evolution at a Fair Bite!



VISUAL IDENTITY

LOGO

Mosa Meat

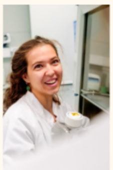
COLOR PALETTE

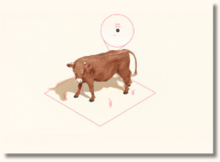
HEX Color: #FF576A

HEX Color: #000001

HEX Color: #FFF9F0

IMAGERY & GRAPHICAL ELEMENTS





FONT

Poppins:
Is a geometric sans-serif with a fairly high x-height. It supports both Latin and Devanagari chararacter sets.

Questography
HAVANA PLYWOOD
Château d'Yquem
hamburgevontpids
Högertrafikomläggningen
difficult waffles

VERBAL IDENTITY

POSITIVE AND OPTIMISTIC:

The language used in the text conveys a positive and optimistic tone. The brand emphasizes the benefits of their approach, from environmental impact to animal welfare, creating a sense of hope and positivity.

INFORMATIVE AND TRANSPARENT:

The brand communicates in an informative manner, providing details about their processes and principles. Transparency is a key element, with a commitment to sharing information about the production of their meat.

INCLUSIVE AND COMMUNITY-ORIENTED:

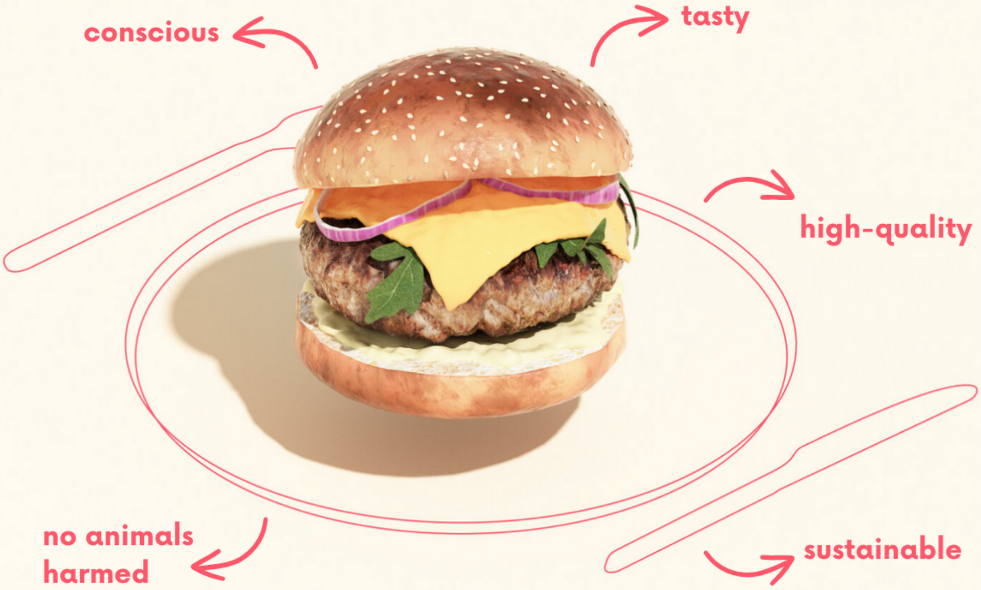
Mosa Meat adopts an inclusive tone, referring to themselves as a "growing team of problem-solving food-lovers" with members from diverse backgrounds. The brand seeks to build a community around responsible eating.

COMPASSIONATE AND EMPATHETIC:

The brand expresses a compassionate view toward animals, particularly cows, highlighting their emotional sensitivity. This adds an empathetic touch to the communication, fostering a connection with the audience.

PRODUCT

THE PERFECT BURGER TASTES LIKE MEAT, IS MEAT AND IS KIND



PRODUCT DEVELOPMENT

Mosa Meat should **prioritize technological advancements** in water consumption, CO2 emissions, and the development of a fully slaughter-free laboratory process. This will enhance competitiveness in sustainability and animal welfare, aligning with the preferred attributes for burger patties.

A potential future strategy involves introducing cultivated mince as a **line extension** to appeal to both target segments. This action should only be undertaken once the business is **firmly established** and has achieved **significant scale**.

!

A **strategic alliance with Gutfried** offers significant market advantages. Collaborating on a **hybrid product**, blending Gutfried's traditional poultry expertise with Mosa Meat's technology, allows them to **earn trust, drive cost savings, expedite market entry, and improve product characteristics**.

PLACE

LET CONSUMERS TRY BEFORE THEY BUY

FOCUS ON BIGGEST RETAILERS

Mosa Meat should focus on the **biggest German food retailers, namely Edeka and Rewe** and neglect discounters such as Aldi and Lidl.

Partnering with these retailers will help Mosa Meat to not only enhance their brands' image and positioning since these retailers are often associated with **high quality**, but also to target more affluent customers that are **willing to pay a higher price.**

IN-STORE PROMOTIONS & TASTINGS

In-store promotions and tastings offer tangible experiences to **overcome customers' hesitancy.**

Real-world tastings, inspired by successful practices in the wine industry, provide a dynamic way to **engage and persuade** hesitant consumers.

Free samples trigger the reciprocity principle, instilling a **sense of obligation** and potentially prompting further exploration.

PLACE

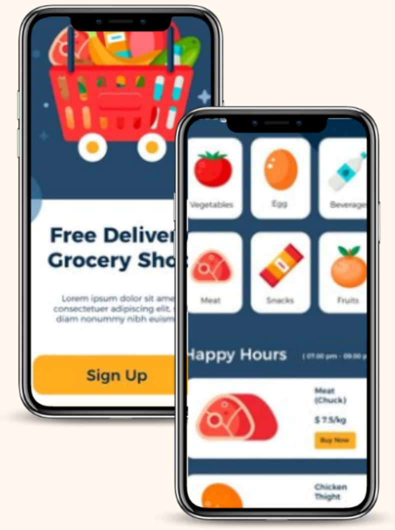
Focus

ONLINE GROCERY CHANNELS

A new study from Mintel found that **almost half (45%) of Germans aged 16 to 24** have shopped online for groceries from a retailer with physical stores in the last six months prior to the survey, compared to only 31% of Germans overall (Maiseviciute, 2016), making online grocery channels highly attractive for our younger target group represented by Nick.

POTENTIAL PARTNERS

ADVANTAGES



TIME-SAVING

Online grocery shopping eliminates the need to physically visit a store, stand in queues, and navigate through crowded aisles. This time-saving aspect is especially appealing to younger individuals who may have hectic schedules.

CONVENIENT

Younger customers often have busy lifestyles, with work, studies, and social activities. Online grocery shopping provides the convenience of ordering from anywhere at any time, saving them time and effort.

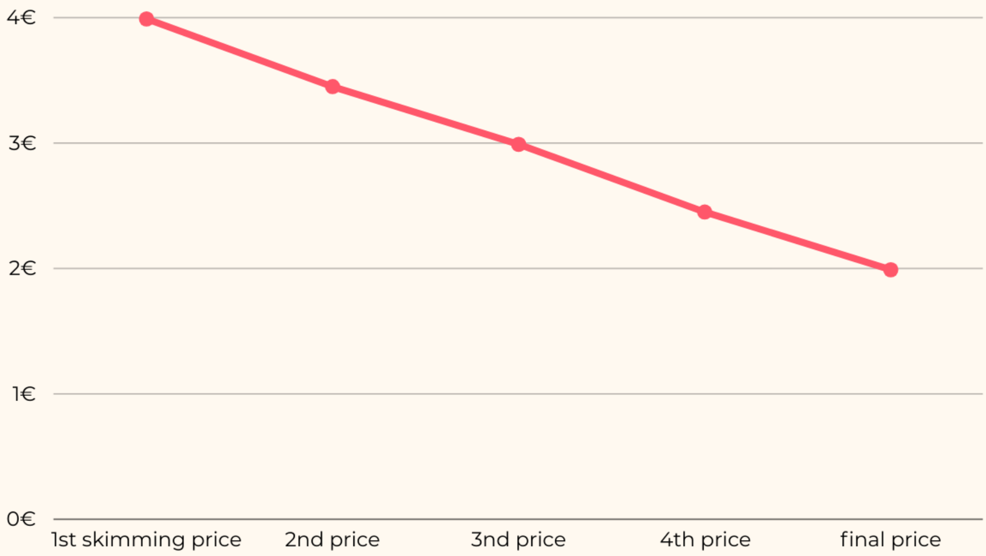
TECH-SAVVY

Younger generations are generally more tech-savvy and comfortable with online platforms. Using mobile apps or websites for grocery shopping aligns well with their digital habits, making the overall experience seamless and enjoyable.

PRICING

PRICE SKIMMING STRATEGY

Mosa Meat is advised to follow a price skimming strategy. This approach allows to set an initial high price at launch, gradually lowering it over time.



SHORT-TERM STRATEGY

Mosa Meat is advised to implement a **value-based pricing at launch.** This strategy will help Mosa Meat to reflect not only their innovative nature of their products but also signals safety and high quality to consumers.

This positioning in the market can **help build trust and confidence** in a new product, especially in the early stages of market adoption.

Implementing a premium pricing strategy will further leave room for decreasing prices and **offering discounts.**

LONG-TERM STRATEGY

Mosa meat is recommended to **invest** heavily in **technological advancements** and operational efficiencies that will allow them to reduce their prices in the long-term.

The rationale behind adopting a long-term strategy of lowering prices stems from the anticipation of **fierce competition.**

The expectation is that with that development, the room for price increases will diminish, leaving the company with no choice than to **lower their prices** in order to stay **competitive**.

PRICING

DISCOUNT STRATEGY EXAMPLES

01. % - DISCOUNT

Deductions of the price for a limited period of time

IDEAL FOR FIRST-TIMERS

By offering a % - discount, Mosa Meat can adjust prices while still **maintaining** the **perceived value** of the product.

Consumers often perceive percentage discounts as a **more significant value** compared to fixed amount discounts.

02. BUNDLE DEALS

Get 2, but only pay for one

This type of promotion can **attract price-sensitive consumers**, who already tried out the product in the past.

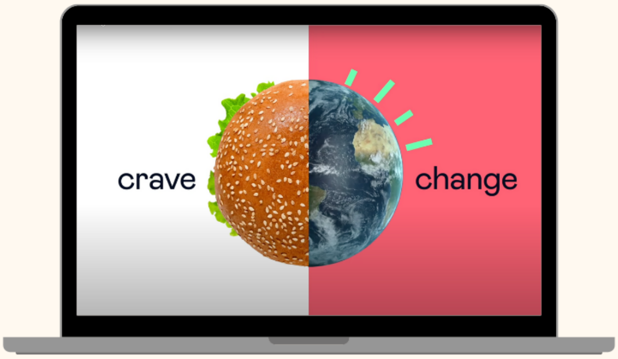
This deal often appeal to **impulse buyers** who are swayed by the idea of getting something for free.

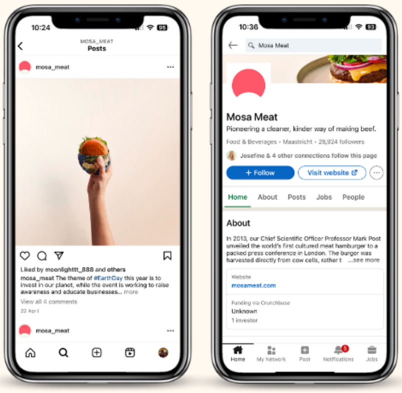
PROMOTION

SOCIAL MEDIA

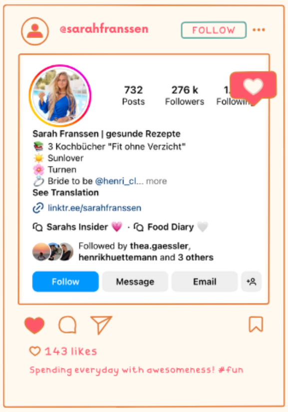
Focus

RELEVANT PLATFORMS



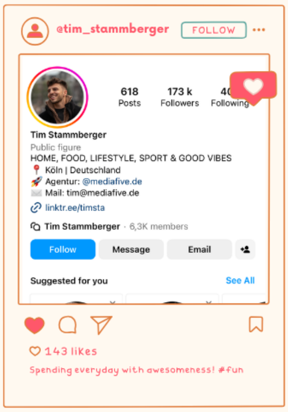


INFLUENCER SELECTION



KPI:

Follower: 276k
Engagement: 5.2%
Comments per 1,000 likes: 108.4
Price Feed Post + Story: $500-$5k

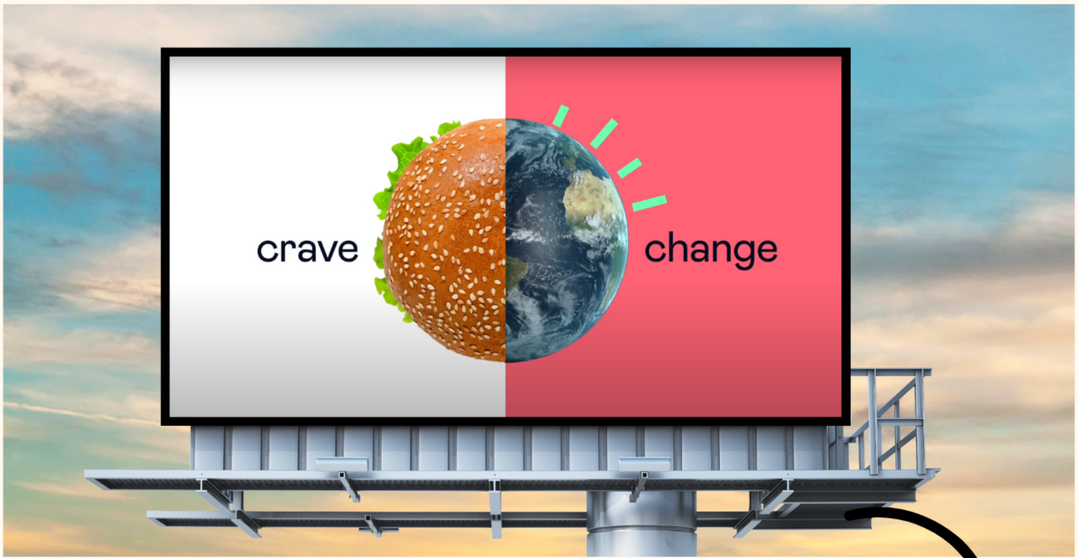


KPI:

Follower: 173k
Engagement: 6.1%
Comments per 1,000 likes: 5
Price Feed Post + Story: $500-$5k

PROMOTION

OFFLINE LAUNCH CAMPAIGNS



BILLBOARD ADVERTISING

Billboard advertising is **essential** for **Mosa Meat's launch** of cultivated burger patties.

It captures **attention**, **educates** about the innovative product, and **generates anticipation**.

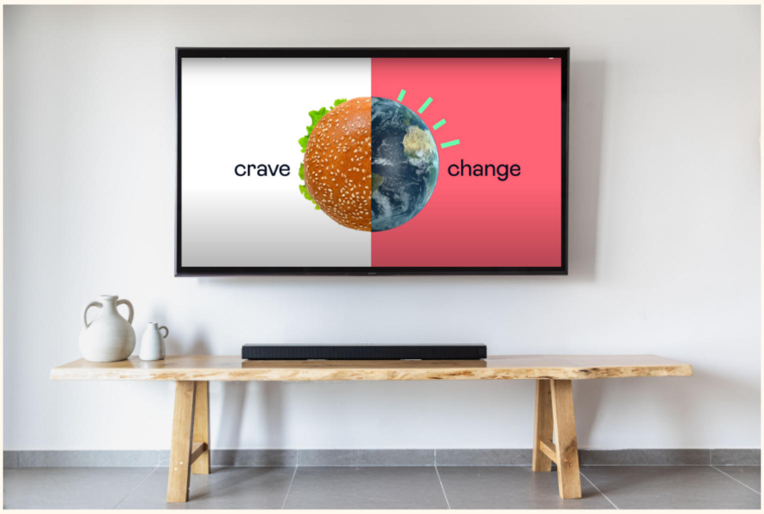
Placed strategically, billboards act as powerful tools to establish **brand presence**, **fostering recognition** for Mosa Meat's mission of sustainability and ethical food production.

PROMOTION

TRADITIONAL MEDIA

T V

Focus



TV stands as a pivotal medium for building **brand awareness.**

Particularly during the launch phase, given its **expansive reach** that can **synergistically amplify** efforts across **various platforms** e.g. digital channels.

E M A I L

Email marketing remains the **preferred** mode of **communication** for consumers across all age groups.

Therefore, leveraging email as a pivotal touchpoint is essential for ensuring **robust brand awareness**.

Additionally, it serves as a valuable tool for **monitoring conversion rates** and **mitigating bounce rates**, making it a crucial component of a comprehensive brand strategy.

THANK YOU

Anja Held
Allegra Baumanns
Anna-Maria Huber
Agostina Hübscher