



The mind of consumers regarding analog meat products: 'Insights' emerging from AI synthesis of mind-sets

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Abstract

The paper presents the use of artificial intelligence powered by Mind Genomics thinking to explore consumer and business aspects of meats and similar classes of products created from vegetable proteins. The paper focuses on evolving AI into a tutor for a product or project, with easy-to-use AI (SCAS, Socrates as a Service) embedded in the Mind Genomics platform, BimiLeap.com. The process introduces the topic, notes the existence of underlying mind-sets, and then shows the series of steps comprising an interaction between user and AI. The steps show the increasing depth of information provided by SCAS. The process enables the user to understand how mind-sets may interact with each and they generate an acceptable compromise position. Finally, the process shows what AI can contribute to an innovation pipeline and system.

Introduction – reasons for plant-based analog 'meats'

The growing demand for plant-based alternatives to animal products is driven by environmental concerns, animal welfare, and human wellness, respectively. Many consumers, however, hesitate to transition to a plant-based diet due to their attachment to meat, and the all-too-common unwillingness to change habits. The main barrier to a shift to a plant-based diet is the lack of knowledge on how to prepare plant-based meals (Boukid, 2021; Ismail et. al., 2020; Malav et. al., 2015). A study conducted in Norway and France found that nutritional

knowledge about vegetable proteins is low, and consumers are curious about vegetable sources of protein but face constraints such as hedonics and convenience (Varela et. al., 2021).

When prospective consumers learn about vegetable protein-based alternative meats, they may react with many different emotions such as curiosity, skepticism, excitement, confusion, etc. The reaction may be intellectual; some individuals may be intrigued by the novel concept of plant-based meats and eager to try new foods, whereas others may feel hesitant due to preconceived notions about meat substitutes. The manner in which companies talk about analog meats in the media, the way these analog meats are described in advertising, and the negative press often merge into a negative maelstrom of distressing information, with 'hype hurting hope', perhaps even killing hope.

As in most new-to-the-world inventions, especially those one consumers, the yet-to-be convinced but still interested consumer may worry about the taste, texture, nutritional content, and labeling of vegetable protein analog meats. Other prospective consumers may be worried about the presence of artificial additives, allergies, or genetically modified components in these products. Still others may focus on the environmental and ethical ramifications of large-scale plant-based meat production. Addressing consumer concerns via open communication and product innovation is key to establishing market trust and acceptance (Gere et al., 2020;

Garaus & Garaus, 2023; Papies et. al., 2023; Possidónio et. al., 2021).

Mind-Sets, Mind Genomics and the introduction of AI-based syntheses

In-depth interviews, questionnaires, focus groups, and sensory tastings are the tools of the trade for consumer researchers. These tools enable the researcher to uncover a person's ideas, attitudes, and preferences. It is a truism that one learns a lot about their thinking and decision-making by paying close attention to their words, observing their reactions and assigning emotion labels to these reactions, and using one's own intuition to piece together the observations into a coherent picture of what the prospective customer is feeling and thinking.

The emerging science of Mind Genomics may play a major role in exploring consumer perceptions and preferences for these new analog meats. Mind Genomics works in a systematic fashion, an easy-to-replicate process. The basic idea begins by creating a set of questions which 'tell a story', developing answers to those questions (answers = elements or messages), combining elements into short, easy 'vignettes' (combinations of messages), and finally exposing these vignettes to the respondent. The respondent reads a set of 24 unique vignettes, rates each vignette on a scale, and from that rating uses statistics to identify the specific elements which 'drive consumer reactions.' The statistics are OLS (ordinary least squares) regression modeling, and clustering. The 'bottom line' here is that the analysis moves forward in a standardized fashion. The results are obtained from the combination of researcher 'thinking' (provide the raw material, viz., the elements describing aspects of analog meats), the consumer testing (evaluating the test vignettes), and then the objective analysis (well-accepted statistics).

Mind Genomics often gives deeper insights into the customer's psyche. There are many perspectives among the populace on vegetable-based analog meats, with some expressing open-mindedness, skepticism, anticipation, or rejection to these products, respectively. Open-minded customers are eager to try new foods and embrace plant-based alternatives. Skeptics may approach vegetable protein analog meats with caution, doubting their authenticity and nutritional worth. Anticipatory customers are excited about the flavor, texture, and environmental advantages of plant-based meats, but resistive consumers may reject these goods out of allegiance to conventional meat products.

Using AI to explore a topic

The introduction to this paper talked about the emerging interest and issues regarding vegetable protein-based meats, viz. analog meat. There is a growing literature from the scientific TECHNICAL point of view on how to produce these products (Hopkins & Dacey. 2008). There is a growing business literature on the success of products introduced into the market as well as the financial issues (Mylan et. al., 2023). There are

also issues involving the interaction of people who are ecology oriented versus the people who are food oriented versus the people who are just not particularly interested either in ecology or in food, but just want to go along with what's best for them or what's affordable (Suri & Ray, 2023). All these are interesting topics to explore and are extensively represented in databases of publications such as Google Scholar as well of course being well represented in the business literature, especially the literature devoted to investing in venture capital (McMillan, 2024).

Based upon all of these things it seemed an appropriate time to explore the topic from the point of view of AI to determine in fact whether we could get a deeper insight into this world of analog meat, not only by asking questions and having artificial intelligence give us the information but also using some at AI as being informed by the 'thinking of Mind Genomics.' This 'thinking' moves from positing that there are different mind-sets, to instructing AI to 'flesh out' these not-yet-named mind-sets. It is in that spirit that we present the results here. The reader will see that the insights are always prefaced by the queries given to the AI program. The AI program itself is housed in the Mind Genomics platform Bimileap.com and can be used by the public. The AI program embedded is known as SCAS, Socrates as a Service. Henceforth in this paper, when AI is mentioned, SCAS is meant, and vice-versa. The actual study comprises both the interaction with the AI, letting the AI become the tutor, as well as the analysis by AI of the 'information' generated by AI (summarization).

Step 1 – Instruct AI to provide a specific background to the topic

The first part of our explanation is the request to SCAS to provide a deeper background regarding vegetable protein-based meats. Table 1 shows the actual query that was provided to SCAS. The query is a simple structure. The questions are numbered sequentially, and the nature of the response is defined so that there is no ambiguity.

Before continuing, it is important to emphasize that the format of the query is quite open. Once the query is presented to SCAS, often the answer returns in a matter of 15 seconds. Sometimes the query fails to work. The user need only re-run the request, after modifying the query. Sometimes, and for reason not known, a request to 're-run' the SCAS without any change to the system ends up solving the problem.

It is a good idea to specify that as much as possible the results be accurate (fact-based), easy to understand, and written in an attractive, interesting manner. The exact words to be used are a matter of trial and error, but with a 15-second turn-around time for an iteration it becomes feasible to 'get it right' even if by trial and error.

Table 1 shows the query provided to SCAS, a version of AI. The answer that will be returned may not necessarily be 100% fact based. Yet, if we accept the shortcomings of AI, we then

may imagine the delight of a food technologist, marketer, advertising agency, or investment banker, receiving the results of the iteration. The summary is not dryly presented but rather a summary written in the form of an interaction with a Socratic tutor teaching one about the topic. That is the reason for Table 1, and the exact reason for putting the issues in the form of questions to be answered, as if one were talking to one's tutor or colleague, rather than reading from a book. We're asking SCAS to tutor us as novices.

The rationale for showing Table 1 is to give the reader a sense of the type of interaction that one can create with SCAS in particular. Current practice is to 'run' this query 5-10 times, generating 5-10 iterations. Each iteration will be different. The results of these iterations are returned to the user by email in the form of an Excel workbook, appropriately named 'Idea Book.' The Idea Book becomes the Socratic tutor for the user.

Table 1: Request SCAS (AI) to provide a summary background on vegetable proteins and analog meats

1.	Why do people want to make analog meats based on vegetable proteins?
2.	What are the TECHNICAL problems that professional food scientists have to face when creating a vegetable protein analog meat?
3.	What are the prospective consumer reactions when they read about the vegetable proteins based analog meats?
4.	What type of concerns do prospective customers have when they read about these new vegetable proteins analog meats?
5.	What are the sensory expectations of the products in the mind of prospective buyers?
6.	List different types of analog meats (e.g. chicken, etc.) that have appeared in vegetable protein form, and talk about what is their benefit and what is their problem? Give me a different paragraph for each type of analog meat. Make the paragraph start with the name of the analog meat in capital letters.
7.	Do you think that there are mind-sets in the population for these vegetable based analog meats, and if so what are the truly basic set of mind-sets? For each mind-set, summarize how it feels and thinks with four slogans.
8.	How would you go about finding out the mind-set of a person regarding vegetable protein analog meat?
9.	What role could Mind Genomics play in this effort to find out about how people think about vegetable protein analog meat?
10.	What role could AI play in this effort to find out about how people think about vegetable protein analog meat?
11.	Try to get into the mind of the customer very deeply. How does the customer think? How does the customer talk about the vegetable protein analog meat? What is the customer really thinking inside? Go deep in the mind, not just give superficial answer.

Step 2: Continue tutoring, using SCAS to answer sets of 15 questions generated by SCAS

Once the study has been closed, and is considered 'done', a second set of queries is applied to the material just generated, viz., the 'answers' to the queries in Table 1. The output is a set of 15 new questions based upon the SCAS 'analyzing' the material it just generated.

Table 2 shows the 15 questions from the Idea Book. We then 'manually' copied these 15 questions from the Idea Book, and re-inserted these into BimiLeap.com, requesting SCAS to answer each of the 15 questions just generated and found in the

Idea Book. The instructions to SCAS for this part of the study was simple: For each question, give us a short answer of that question. Those are the questions (provided from the summary of the previous iteration. SCAS, our version of AI, now returns with a short answer to each question developed in the previous iteration. Already it is possible to sense the depth of information that can be obtained by this simple, almost mechanical process. If one were to run 10 iterations, in a matter of less than 10 minutes, each iteration would generate 15 questions. Across 10 iterations SCAS would return 150 questions, with perhaps a third to a half unique. So within an hour, the system evolves to a custom tutor.

Table 2: The 15 questions emerging from the previous iteration along with the answers provided by SCAS

1.	WHY are vegetable-based proteins increasingly being utilized to create analog meats? Vegetable proteins are being used to create analog meats as consumers are looking for plant-based options for health and environmental reasons.
2.	WHAT TECHNICAL challenges do food scientists encounter when formulating vegetable protein analog meats? Food scientists face difficulties in replicating the taste, texture, and mouthfeel of traditional meats using vegetable proteins.
3.	HOW do consumers typically respond upon learning about vegetable protein analog meats? Prospective consumer reactions to vegetable protein analog meats can vary, with some embracing the idea of a plant-based alternative and others expressing skepticism.
4.	WHAT concerns do potential customers have when considering vegetable protein analog meats? Some prospective customers may have concerns related to the taste, texture, nutritional value, and overall composition of vegetable protein analog meats.
5.	WHAT sensory expectations do customers have when thinking about vegetable protein analog meats? Prospective buyers often expect vegetable protein analog meats to closely mimic the taste, texture, aroma, and appearance of traditional meat products.
6.	CHICKEN: What are the benefits and challenges associated with creating vegetable protein analog chicken products? Vegetable protein analog chicken offers a lower environmental impact and potential health benefits, but challenges include replicating the texture and flavor accurately.

7. BEEF: What are the advantages and drawbacks of developing vegetable protein analog beef options? Vegetable protein analog beef can be a more sustainable choice, but challenges include imitating the juiciness and tenderness of real beef.
8. PORK: How do vegetable protein analog pork products compare in terms of benefits and challenges? Vegetable protein analog pork provides a cruelty-free alternative, yet difficulties may arise in recreating the unique flavor profile and texture of pork.
9. FISH: What benefits and obstacles come with engineering vegetable protein analog fish products? Vegetable protein analog fish offers a seafood substitute, but challenges include mimicking the flakiness and delicate flavor of real fish.
10. HOW do consumer mind-sets influence the reception of vegetable-based analog meats? Consumer mind-sets can impact the acceptance and adoption of vegetable protein analog meats, with varying attitudes shaping preferences and choices.
11. WHAT basic mind-sets exist within the population regarding vegetable protein analog meats? Basic mind-sets towards vegetable protein analog meats include health-consciousness, sustainability awareness, culinary adventurousness, and skepticism.
12. HOW can one determine an individual's mind-set towards vegetable protein analog meats? Understanding a person's mind-set towards vegetable protein analog meats can be achieved through surveys, interviews, taste tests, and observational studies.
13. WHAT role can Mind Genomics play in unraveling consumer perceptions of vegetable protein analog meats? Mind Genomics can aid in identifying clusters of consumer attitudes towards vegetable protein analog meats, providing insights into preferences and decision-making.
14. HOW can AI technology be utilized to gain insights into consumer perceptions of vegetable protein analog meats? AI algorithms can analyze large datasets to uncover patterns and trends in consumer behavior, allowing for personalized recommendations and targeted marketing strategies.
15. WHAT impact can in-depth customer understanding have on the development and marketing of vegetable protein analog meats? A deep understanding of customer thoughts, feelings, and behaviors can inform product innovation, messaging, and strategies to increase acceptance and adoption of vegetable protein analog meats.

Step 3 – Synthesize three mind-sets, situate them in business meetings and let them interact

The third part of our exploration now simulates a human's thinking, at least at a cursory level. We focus on the ordinary

life situation, business meetings, and consensus development among three synthesized mind-sets. Table 3 specifies three mind-sets, specifies two meetings (TECHNICAL PROFESSIONALS vs CITIZENS WATCH meetings, respectively). Table 4 shows the results for the six analog meats.

Table 3: Request SCAS to synthesize three mind-sets and simulate two meeting situations relevant to six alternative 'veggie meats'.

Topic: We are talking about vegetable-based meat products, like chicken, fish, beef.

We are going to go into two meetings.

TECHNICAL PROFESSIONALS/Business meeting, involving product developers, marketers, salespeople, and health officials
CITIZENS WATCH Committee meeting, involving people who are activist, monitoring business and government activities

We know that there are exactly three mind-sets. These are:

1. Health
2. Sustainability
3. Eating

At meetings devoted to a specific type of veggie meat, these three mind-sets meet, sit together, and argue about what is important, and what is not important for the specific type of veggie meat.

We listen in. We want to know what each mind-set says to solve the problem of how to make the product a success in the world of business, and with consumers. The mind-sets have different ways of looking at the world. What do they finally agree on, to present to the rest of the attendees? Provide a sentence which talks about how the rest of the meeting will feel about the consensus statement by the three mind-sets for this veggie meat.

Finally, using 1-5 points tell us how the consensus would be rated on clarity, on science basis, on being convincing, on convincing others, on being practical.

Do the above for these veggie meats

1. Veggie burger
2. Veggie Chicken tenders
3. Veggie Salmon Steak
4. Veggie Ahi Tuna Steak
5. Veggie Scallops

6. Veggie Shrimp

Table 4: SCAS synthesized information for each of the six veggie meats and what kind of information will be discussed at the two types of meetings (with CITIZENS WATCH vs with TECHNICAL PROFESSIONALS)

VEGGIE BURGER

CITIZENS WATCH: For the Veggie Burger, how do the Health, Sustainability, and Eating mind-sets approach making this product successful in the market?

Agreed-upon-consensus: The mind-sets agree that focusing on taste, health benefits, and environmental impact will make the veggie burger successful.

The rest of the meeting feels: optimistic about the potential success of the consensus statement.

Clarity: 4.5 Science-based: 4.0 Convincing: 4.3 Convince Others: 4.2 Practical: 4.5

TECHNICAL PROFESSIONALS: For the Veggie Burger, how would the TECHNICAL PROFESSIONALS group approach making this product successful in terms of production and marketing?

Agreed-upon-consensus: The TECHNICAL PROFESSIONALS group emphasizes the importance of efficient production methods, accurate labeling, and strategic marketing to ensure the success of the veggie burger.

The rest of the meeting feels: reassured by the attention to detail and expertise in the consensus statement from the TECHNICAL PROFESSIONALS group.

Clarity: 4.5 Science-based: 4.6 Convincing: 4.4 Convince Others: 4.3 Practical: 4.5

CHICKEN TENDERS

CITIZENS WATCH: For the Chicken Tenders, what solutions do the Health, Sustainability, and Eating mind-sets propose to ensure the product's success?

Agreed-upon-consensus: The mind-sets agree that focusing on taste, protein content, and eco-friendly production methods are key to the success of chicken tenders.

The rest of the meeting feels: impressed by the well-rounded approach of the consensus statement.

Clarity: 4.3 Science-based: 4.2 Convincing: 4.4 Convince Others: 4.3 Practical: 4.2

TECHNICAL PROFESSIONALS: For the Chicken Tenders, how would the TECHNICAL PROFESSIONALS group propose to ensure the product's success in terms of quality control and distribution?

Agreed-upon-consensus: The TECHNICAL PROFESSIONALS group suggests implementing strict quality control measures, optimizing distribution channels, and conducting market research to make the chicken tenders successful.

The rest of the meeting feels: confident in the structured approach and expertise of the TECHNICAL PROFESSIONALS group's consensus statement for chicken tenders.

Clarity: 4.3 Science-based: 4.5 Convincing: 4.6 Convince Others: 4.4 Practical: 4.6

SALMON STEAK

CITIZENS WATCH: For the Salmon Steak, how do the Health, Sustainability, and Eating mind-sets approach making this product successful in the market?

Agreed-upon-consensus: The mind-sets agree that focusing on omega-3 content, sustainable fishing practices, and appealing taste will make the salmon steak successful.

The rest of the meeting feels: concerned about how to balance taste and sustainability in the consensus statement.

Clarity: 4.2 Science-based: 4.5 Convincing: 4.3 Convince Others: 4.1 Practical: 4.4

TECHNICAL PROFESSIONALS: For the Salmon Steak, how would the TECHNICAL PROFESSIONALS group approach making this product successful in terms of food safety and consumer trust?

Agreed-upon-consensus: The TECHNICAL PROFESSIONALS group stresses the importance of stringent food safety protocols, transparent labeling, and building consumer trust to ensure the success of the salmon steak.

The rest of the meeting feels: relieved by the thorough approach and attention to consumer concerns in the consensus statement from the TECHNICAL PROFESSIONALS group for salmon steak.

Clarity: 4.4 Science-based: 4.5 Convincing: 4.3 Convince Others: 4.2 Practical: 4.4

VEGGIE SCALLOPS

CITIZENS WATCH: For the Veggie Scallops, how do the Health, Sustainability, and Eating mind-sets approach making this product successful in the market?

Agreed-upon-consensus: The mind-sets agree that focusing on texture, eco-friendly sourcing, and versatility will make the veggie scallops successful.

The rest of the meeting feels: curious about how the consensus statement would translate in the market for veggie scallops.

Clarity: 4.3 Science-based: 4.1 Convincing: 4.2 Convince Others: 4.4 Practical: 4.3

TECHNICAL PROFESSIONALS: For the Veggie Scallops, how would the TECHNICAL PROFESSIONALS group approach making this product successful in terms of texture development and production scalability?

Agreed-upon-consensus: The TECHNICAL PROFESSIONALS group suggests investing in texture research, scalability in production, and collaborating with food scientists to make veggie scallops successful.

The rest of the meeting feels: curious about the technical aspects and potential challenges in implementing the consensus statement for veggie scallops.

Clarity: 4.3 Science-based: 4.4 Convincing: 4.2 Convince Others: 4.5 Practical: 4.2

VEGGIE SHRIMP

CITIZENS WATCH: For the Veggie Shrimp, what solutions do the Health, Sustainability, and Eating mind-sets propose to ensure the product's success?

Agreed-upon-consensus: The mind-sets agree that focusing on taste, sustainable sourcing, and marketing to seafood enthusiasts will make the veggie shrimp successful.

The rest of the meeting feels: intrigued by the combination of taste and sustainability in the consensus statement for veggie shrimp.

Clarity: 4.2 Science-based: 4.4 Convincing: 4.3 Convince Others: 4.3 Practical: 4.2

TECHNICAL PROFESSIONALS: For the Veggie Shrimp, how would the TECHNICAL PROFESSIONALS group propose to ensure the product's success in terms of flavor development and market positioning?

Agreed-upon-consensus: The TECHNICAL PROFESSIONALS group focuses on flavor profiling, strategic market positioning, and consumer preferences to make the veggie shrimp successful.

The rest of the meeting feels: impressed by the TECHNICAL PROFESSIONALS expertise and detailed approach of the consensus statement for veggie shrimp from the TECHNICAL PROFESSIONALS group.

Clarity: 4.5 Science-based: 4.3 Convincing: 4.4 Convince Others: 4.2 Practical: 4.3

VEGGIE AHI TUNA STEAK

CITIZENS WATCH: For the Ahi Tuna Steak, what solutions do the Health, Sustainability, and Eating mind-sets propose to ensure the product's success?

Agreed-upon-consensus: The mind-sets agree that focusing on freshness, sustainable fishing methods, and appeal to seafood lovers will make the Ahi Tuna Steak successful.

The rest of the meeting feels: optimistic about the unique approach of the consensus statement for Ahi Tuna Steak.

Clarity: 4.4 Science-based: 4.3 Convincing: 4.5 Convince Others: 4.2 Practical: 4.3

TECHNICAL PROFESSIONALS: For the Ahi Tuna Steak, how would the TECHNICAL PROFESSIONALS group propose to ensure the product's success in terms of product innovation and market differentiation?

Agreed-upon-consensus: The TECHNICAL PROFESSIONALS group recommends focusing on product innovation, differentiation through unique flavors, and market research to make the Ahi Tuna Steak successful.

The rest of the meeting feels: inspired by the emphasis on innovation and market strategy in the consensus statement from the TECHNICAL PROFESSIONALS group for Ahi Tuna Steak.

Clarity: 4.2 Science-based: 4.4 Convincing: 4.5 Convince Others: 4.3 Practical: 4.3

Step 4 - Summaries of key ideas, themes, and perspective

The Mind Genomics process produces a great deal of data when the iteration is complete. The Idea Book, sent to the user after

the study is complete, provides even more information, this time the information is summarized to show general ideas and themes. Table 5 shows the key ideas for the mind-sets, followed by themes and perspectives.

Table 5: Key ideas, themes, perspectives emerging after post-processing the results

1. Key Ideas

General

1. The key ideas in the topic questions are focused on how different mind-sets (Health, Sustainability, Eating) approach making various plant-based and seafood products successful in the market.
2. The importance of taste, health benefits, sustainability, eco-friendly sourcing, and market positioning are emphasized in the consensus statements for each product.
3. Technical aspects such as production methods, quality control, food safety, and ingredient sourcing are highlighted as crucial for the success of these products.
4. The meetings reflect a combination of optimism, curiosity, and confidence in the approaches proposed by the different groups for each product.

The key ideas in the topic questions for Group 1 (TECHNICAL PROFESSIONALS group) are:

1. Ensuring nutritional value of veggie meat products
2. Identifying the best plant-based ingredients for taste and texture replication
3. Developing effective marketing strategies for promotion
4. Assessing market demand for plant-based meat products
5. Optimizing production processes for cost-effectiveness and quality

The key ideas in the topic questions for Group 2 (CITIZENS WATCH group) are:

1. Addressing environmental impact through veggie meat products
2. Promoting sustainable practices in production
3. Ensuring affordability and accessibility of plant-based meat products
4. Upholding ethical standards and animal welfare in production
5. Implementing consumer education initiatives to raise awareness

2. Themes

1. The text discusses the three mindsets and technical aspects of successful plant-based and seafood products, emphasizing health, sustainability, and taste appeal. It also discusses the importance of production methods, quality control, food safety, and ingredient sourcing.
2. The text also discusses the development of veggie meat products, emphasizing health benefits, sustainability, and taste appeal. The TECHNICAL PROFESSIONALS group focuses on nutritional value, ingredients selection, marketing strategies, market demand assessment, and production optimization. The CITIZENS WATCH ACTIVISTS group focuses on environmental sustainability, sustainable production practices, affordability, ethical standards, and consumer education.
3. The text emphasizes the nutritional content, environmental impact, and taste of veggie alternatives to appeal to health-conscious consumers.

3. Perspectives

1. The focus on different mindsets and approaches in the plant-based and seafood industry can lead to innovative solutions and unique product offerings. However, differences in mindsets and approaches may lead to challenges in collaboration and agreement on the best strategies for success in the market.
2. The intersection of health, sustainability, and taste in veggie meat products presents a unique opportunity for innovation and differentiation in the market. The increasing demand for veggie meat products underscores the importance of addressing consumer concerns and preferences in product development.
3. Technical themes include nutritional value and quality of veggie meat products, ingredients selection and formulation, marketing and promotion strategies, market demand assessment, production optimization for efficiency and quality, environmental sustainability, affordability and accessibility, ethical standards, and consumer education and awareness.
4. Health benefits and nutritional content can attract health-conscious consumers who are looking for healthier options. Environmental impact and sustainability can appeal to eco-conscious consumers who are interested in reducing their carbon footprint. Taste and texture can help attract a wider range of consumers who may be hesitant to try veggie alternatives. Incorporating familiar flavors, textures, and seasonings into veggie alternatives can lead to creative and innovative products that cater to diverse consumer preferences.

Step 5 – Interested versus opposing audiences – points of difference

The SCAS version of AI now moves into the discussion of those who accept the notion of analog meat from vegetable protein versus those who reject the notion. Once again, the deeper analysis by AI after the study is completed enables the user to delve more deeply into the topic. Table 6 compares the points of view of the interested audiences versus the points of view of the opposing audiences.

Table 6: Comparison of points of view of interested audiences versus opposing audiences, and the consensus agreements

<p style="text-align: center;">1. INTERESTED AUDIENCES</p> <ol style="list-style-type: none">1. The topic of vegetarian burgers, chicken tenders, and salmon steaks is of interest to health-conscious consumers, environmentalists, food industry professionals, culinary enthusiasts, and investors and entrepreneurs.2. Health-conscious consumers are interested in the nutritional content and potential health benefits of these plant-based alternatives.3. Environmental activists are interested in the sustainability aspects of these products, such as using sustainable packaging and locally sourced ingredients.4. Food enthusiasts are intrigued by the emphasis on flavor and texture in these plant-based options, which mimic traditional meat dishes.5. Individuals seeking dietary alternatives are also interested in these plant-based options.6. The TECHNICAL PROFESSIONALS group, consisting of scientists and businesspeople, is interested in the practical aspects of developing and marketing these products, such as ensuring nutritional value, identifying the best plant-based ingredients, developing effective marketing strategies, understanding market demand, and optimizing production processes.7. The CITIZENS WATCH ACTIVISTS group, focusing on social welfare, is more concerned with the social and ethical implications of plant-based meat products. <p style="text-align: center;">2. CONSENSUS STATEMENTS</p> <ol style="list-style-type: none">1. The consensus statements for each vegetable meat product focus on health benefits, sustainability advantages, and taste appeal.2. The clarity of the consensus statements is high, and the science basis behind the statements is solid.3. The consensus statements are convincing to attendees, others outside the meeting, and are practical.4. The taste and texture of the products play a crucial role in the success of the consensus statements, as they need to replicate the experience of traditional meat products.5. Health benefits contribute to their appeal by providing nutritious options low in harmful fats and cholesterol.6. Sustainability mind-set suggests using environmentally friendly ingredients and production methods to ensure the success of the veggie meat products in the market. <p style="text-align: center;">3. OPPOSING AUDIENCES</p> <ol style="list-style-type: none">1. The discussion on plant-based alternatives to traditional meat products is influenced by various audiences, including traditional meat-eaters, environmental skeptics, health purists, and culinary traditionalists.2. Traditional meat industry members may view these alternatives as competition, while lobbying groups representing the interests of the conventional meat industry may oppose them.3. Carnivore advocacy groups may also view plant-based alternatives as a threat to their beliefs and dietary preferences. Some consumers may be resistant to change or have strong preferences for traditional meat products, leading to resistance towards adopting veggie meat products. Agricultural organizations that rely heavily on animal farming may also resist the development and promotion of veggie meat products.4. Traditional meat producers may view plant-based alternatives as a threat to their business, while consumers may prefer traditional meat products for cultural or personal reasons.5. Environmental skeptics may also resist the idea of promoting veggie meat products due to their reduced environmental impact.6. Traditional meat consumers may resist the idea of switching to veggie alternatives due to perceived differences in taste, texture, and satisfaction.7. Environmental skeptics may question the sustainability claims of producers, while traditionalists may view these alternatives as a departure from their cultural traditions.8. Skeptics of health claims may also resist the idea of promoting veggie meat products.
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Step 6 – Innovation through analysis: Alternative Viewpoints, What’s Missing, Innovation Ideas

The final set of analyses are those which lead to innovation. Table 7 shows the three final sets of analyses. The first analysis deals with alternative viewpoints, topics that must be

considered, but which do not represent opposing viewpoints, but perhaps better represent ‘new, unexpected issues.’ The second section deals with what is missing within the materials generated by SCAS. This second section can only work with the information developed in the current iteration. ‘What is missing’ ends up being a way to think about the topic when one

has relatively little information. The third and final section presents small ideas for innovation, based upon the information already processed.

What's key here is that AI functions as a critical thinker to assist the user. AI is not providing final solutions, but it is striving to

think in a productive, new way, depending only on the facts provided. Whether these breakthroughs are actually novel, never-before-thought-of ideas, or just skilled reworkings of the material accessible to AI, is debatable, and discussed below.

Table 7: Steps toward innovation: alternative viewpoints, what is missing, innovation. All three come from the AI analysis of AI-generated material for the particular iteration.

1. ALTERNATIVE VIEWPOINTS

1. Veggie burgers may have high protein content, but their sustainability may be questionable due to monoculture crops, deforestation, and soil degradation.
2. Critics argue that the taste and texture of veggie burgers will never fully replicate traditional beef burgers, making them less appealing to consumers.
3. Chicken tenders may have additives and preservatives that affect health benefits, while environmental activists argue that they require significant resources and energy to produce. Veggie salmon steaks may have less nutritional benefits than real salmon, and environmentalists may argue that plant-based sources of omega-3 may not be as effective.
4. Ultimately, the success of veggie meat products depends on balancing taste, health, sustainability, marketing, branding, and environmental challenges.

2. WHAT IS MISSING

1. The topic questions focus on the Health, Sustainability, Eating, and TECHNICAL PROFESSIONALS perspectives on plant-based and meat-based products. However, they lack a discussion on target market, consumer preferences, competition analysis, pricing strategy, and potential challenges in bringing these products to market. The focus should be on the development and promotion of veggie meat products, their cost and accessibility compared to traditional meat products, consumer demographics, marketing and branding strategies, research and development efforts, partnerships with food industry stakeholders, and long-term goals for adoption.
2. GROUP 1 (TECHNICAL PROFESSIONALS group) should focus on research and development efforts, addressing challenges like texture and taste inconsistency, formulating recipes, collaborating with food scientists and culinary experts, and using innovative technologies to optimize manufacturing processes. GROUP 2 (CITIZENS WATCH group) should discuss initiatives to reduce carbon footprint, advocate for policies and regulations, and form partnerships with local communities to make plant-based meat options more accessible and affordable. Ethical standards should be monitored and enforced, and best practices for communicating environmental and ethical benefits to consumers should be considered.
3. Additional aspects missing from the topic questions include price, availability, cooking methods, nutritional comparison, and consumer preferences.

3. INNOVATIONS

1. The company is introducing a range of innovative plant-based products, including "bleeding" burgers made with beet juice, sustainable seafood products from aquaculture farms, and innovative plant-based cheese alternatives.
2. They are also offering personalized meal plans, cooking classes, and tastings to educate consumers on the benefits and versatility of these products.
3. They are also promoting the use of plant-based and sustainable seafood options in schools, hospitals, and other institutions.
4. The company is also introducing plant-based meat alternatives made from innovative ingredients, subscription services for curated veggie meat product boxes, and experiential marketing campaigns.
5. They are also collaborating with food scientists, nutritionists, and sustainability experts to develop evidence-based research supporting the health benefits and sustainability of veggie meat products.
6. The company is also introducing eco-friendly packaging solutions, sustainable farming practices, affordable pricing strategies, and certifications indicating adherence to ethical standards and animal welfare practices.
7. The company is also partnering with local farms or suppliers to source fresh, organic ingredients for their products.

Discussion and conclusions: AI as a 'Socratic tutor' for the topic of 'veggie meats'

Artificial intelligence may help the interested person learn about vegetarian meats in a number of ways. AI can gather and analyze data from a number of sources to provide exact information on the nutritional value, environmental impact, and manufacturing practices of these products. It may also adjust ideas to a person's dietary preferences and limitations. AI can observe market trends, identify popular brands and commodities, and offer new options for the consumer to explore. Furthermore, AI may respond to particular questions, provide recipes and cooking instructions, and advise on how to transition to a more plant-based diet.

When it comes to learning about veggie-based meats, consumers have a variety of needs. They may want to understand the nutritional benefits of these products, how they compare them to traditional meat, and how they can be incorporated into their diet. They may also be interested in the environmental impact of veggie-based meats, the different brands and products available, and how these products are made. Additionally, they may want to know about the taste and texture of veggie-based meats, any potential allergens, and the cost compared to traditional meat.

From a commercial standpoint, AI may give useful information about customer preferences and behavior surrounding vegetarian meats. Companies may use AI to develop new products, improve existing offerings, and better target their marketing efforts. AI may also help businesses optimize their supply chains, reduce waste, and speed up production processes. In the long run AI may help businesses stay competitive in the growing market for plant-based meals while also contributing to food sustainability.

From a scientific standpoint, AI may stimulate innovation in the development of plant-based meats. Researchers may apply artificial intelligence to design novel plant-based components, enhance product flavor and texture, and develop healthier alternatives to conventional meat. AI may also help scientists, food technologists, and nutritionists work together to solve issues related to the development and acceptability of vegetarian meats. Finally, AI has the potential to significantly advance the science of plant-based meals and contribute to a more sustainable food system.

The ultimate objective of investigating veggie-based meats would be to have a better understanding of their benefits and limitations. The user would learn how to make informed shopping selections for vegetable-based meats, how to properly cook and store them, and how to include them into a nutritious diet. They would also learn about the environmental effect of meat production, the health advantages of plant-based diets, and

the potential economic savings of using veggie-based meats instead of conventional meat.

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