Flavors of the Future: Reinventing the Food Service Sector in Friesland, Groningen & Drenthe by 2075

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Executive Summary:

The Northern Provinces of the Netherlands, Friesland, Groningen, and Drenthe stand at a critical juncture as their hospitality and food service sectors navigate rapid technological change, demographic shifts, climate pressures, and evolving consumer expectations. The report *Flavors of the Future* provides a long-range perspective to 2075, using scenario planning to help Noorderpoort and regional stakeholders prepare for transformational shifts rather than incremental change. Grounded in extensive secondary research, stakeholder workshops, and expert interviews, the study outlines five plausible futures and the strategic decisions required to thrive within them.

The Dutch food service industry is growing steadily, with annual turnover exceeding €14 billion in 2023 and projections indicating strong continued expansion supported by digitization, sustainability trends, and new dining formats. However, rising costs, labor shortages, and market volatility pose significant pressure. In the Northern Provinces, the sector accounts for around 8% of national food service businesses, with each province facing distinct conditions. Although short-term prospects appear sound, long-term uncertainty underscores the need for strategic foresight.

A 50-year horizon allows the region to consider deep structural forces such as climate change, technological maturity, and demographic transitions that unfold too slowly to be captured in traditional planning. It encourages leaders to prepare for divergent futures, including automation-driven food systems, cultural revival, regenerative ecosystems, and luxury-driven culinary models. This long-term perspective frees imagination, challenges assumptions, and supports integrated systems planning across hospitality, agriculture, education, and regional development.

The project, commissioned by Noorderpoort, set out to create scenarios illustrating the future of regional hospitality and food service, identify drivers of change, assess sustainability implications, and define competency requirements for future jobs. The research followed six core stages: reviewing the project brief, adapting *2075: The Future of Food Tourism* scenario matrix, stakeholder workshops, expert interviews, refinement of scenarios, and final validation workshops.

The four core scenarios include: (1) *Dr Spock's Fast Food Franchise*, imagining a fully automated, biotechnology-powered fast-food model; (2) *The Roots of Provincial Cuisine*, where Friesland, Drenthe, and Groningen emphasize local food identity and authenticity; (3) *Pure Luxury*, where the Northern Provinces become Europe's exclusive culinary destination, driven by Michelin-star clusters; and (4) *The Desire for a Regenerative Future*, in which the Frisian Islands emerge as regenerative food ecosystems blending culinary creativity with ecological stewardship. A fifth middle-path scenario, *The Everyday Northern Table*, blends elements of all four, presenting a pragmatic, community-oriented, and technologically balanced future.

Across all futures, five business decisions are essential: defining regional strategic identity, building resilient supply chains, investing in long-term talent development, determining levels of technology adoption, and designing distinctive experience models. Equally important are curriculum decisions related to competency frameworks, living-lab learning environments, cross-disciplinary teaching models, industry partnerships, and assessment models. Sustainability decisions focus on net-zero and nature-positive standards, the food transition,

circular design principles, ethical supply chains, credible certification, and place-based adaptation.

Ultimately, the future of hospitality and food service in the Northern Provinces will not follow a single linear path. Instead, multiple models of robotic efficiency, cultural immersion, luxury gastronomy, regenerative ecosystems, and hybrid mid-market concepts will coexist. Success will depend on strategic clarity, bold investment in skills and partnerships, and a shared long-term vision aligning technology, culture, sustainability, and regional identity.

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1. Introduction: The Current State

The Dutch food service sector is currently experiencing steady growth, driven by strong consumer demand, digital innovation, and recovery in tourism, however economic uncertainty is creating a cloud over the sector. In 2023, sales in the restaurant, café, and catering segment reached approximately €13.4 billion, an increase of 9% from 2022 and total turnover was around €14.0 billion. Meanwhile, the broader restaurant and catering market generated nearly €20 billion, with cafés and restaurants accounting for roughly €12.7 billion and catering for €3.5 billion. The market is forecast to grow at a CAGR of about 5%, bolstered by evolving consumer habits, government incentives, and the rising popularity of diverse dining formats, especially quickservice outlets and cloud kitchens. In 2025, the total foodservice market is estimated to be around €19.58billion, with an expected surge to €40 billion by 2030. Digitization is a defining trend, features like AI-powered kitchen automation, QR ordering, and widespread online delivery platforms are becoming industry norms. Sustainability, health consciousness, and multicultural menus are reshaping offerings, with about 68% of establishments adopting ecofriendly measures (Euromoniter, 2025b).-service outlets and cloud kitchens. In 2025, the total foodservice -friendly measures

According to Statistics Netherlands (CBS), the number of restaurants in the Netherlands has;

> increased by 58 percent since 2007, and the number of event catering businesses has increased by more than sixfold. On the other hand, the number of bars and cafés has decreased by 33 percent. Statistics Netherlands (CBS) reports this on the basis of the most recent figures on the enterprise population in the Netherlands (CBS, 2024).
>
> The total number of food and beverage establishments increased by 83 percent between 1 October 2007 and 1 October 2024, from nearly 38 thousand to 69 thousand. However, the largest growth was seen among sole traders in event catering. Excluding event catering, there was a 25 percent growth in food and beverage establishments.

Challenges persist with rising labor and commodity costs prompting widespread menu price increases, and the sector faces staff shortages especially among younger workers as well as a wave of expected bankruptcies (about 450 projected in 2025). In summary, while the Dutch food service sector is robust and innovative, success increasingly relies on managing costs, attracting talent, and leveraging technology (Euromoniter, 2025a, Euromoniter, 2025b, Euromoniter, 2024, CBS, 2024).

The food service sector in Groningen, Drenthe, and Friesland is vibrant but faces notable challenges. The three provinces represent approximately 8% of food service sector in the Netherlands (CBS, 2024). In Groningen, hospitality turnover has grown modestly largely due to price increases rather than higher visitor numbers while tourism contributes around €364 million annually and supports 6% of local employment. Businesses are increasingly adopting digital tools and eco-efficiency practices to offset rising labor costs and staff shortages. Drenthe's hospitality workforce stands at about 12,280 jobs, with only slight growth in recent years. Tourism remains a key driver, generating over €600 million annually, but economic pressures such as energy costs and limited labor availability constrain expansion (Euromoniter, 2025a).

Friesland benefits from its strong agricultural base and culinary heritage, anchored by dairy production and local breweries. The province leverages resources like Wadden Sea seafood and farmer markets, creating a distinctive regional food culture that supports restaurants and cafés. Leeuwarden, as a cultural hub, fosters vibrant foodie communities, while sustainability and local sourcing are increasingly shaping menus. Across all three provinces, the sector is adapting through digital innovation, eco-friendly practices, and workforce development. However, profitability remains under pressure from rising costs and staffing shortages, making operational efficiency and technology adoption critical for future resilience. The future outlook looks good in the short term, but in the longer term it is difficult to predict. Hence the need to take a more longer term perspective which isn't bounded by conditions of today.

2. The Need for Change: A 2075 Perspective

Looking ahead to 2075 provides several strategic advantages for understanding the future of food service in Friesland, Groningen, and Drenthe which goes beyond the present and short-term horizon. First, a long-term horizon allows decisionmakers to explore deep, structural changes such as climate transformation, demographic shifts, agricultural evolution, and technological maturity that unfold too slowly to be visible in five- or ten-year forecasts (Postma et al., 2025). These forces will shape ingredients, labour markets, consumer expectations, and operating models in ways that short-term planning cannot capture (Yeoman and McMahon-Beattie, 2024a).-term horizon allows decision-makers to explore deep, structural changes-year forecasts-term planning cannot capture

Second, thinking in 2075 encourages the region to consider multiple, divergent pathways rather than assuming a single trajectory (Kim et al., 2025). This helps leaders prepare for radically different futures, such as hyperautomation, cultural revival, luxury clustering, regenerative ecosystems, or platform-based cooperation without committing prematurely to one model. Such scenario diversity strengthens resilience and reduces strategic blind spots.-automation, cultural revival, luxury clustering, regenerative ecosystems, or platform-based cooperation

Third, a long horizon frees imagination and allows stakeholders to challenge current assumptions. It legitimises bold thinking around robotics, bioengineered foods, new forms of hospitality labour, and redesigned food landscapes across the Wadden Islands and the mainland. This helps organisations innovate rather than merely react.

Fourth, 2075 thinking fosters integrated systems planning. It encourages collaboration across agriculture, tourism, education, technology, and regional development. This means sectors be will increasingly converge as food service becomes more experiential, ecological, and data-driven.

Finally, a forward view to 2075 helps the provinces clarify their unique long-term identity. By imagining contrasting futures, leaders can articulate whether the region should become a technological testbed, a cultural stronghold, a luxury destination, a regenerative exemplar, or a networked midmarket hub. In this way, exploring 2075 is not about prediction but about building strategic clarity, creativity, and capacity to shape the future, rather than being shaped by it (Cordova-Pozo and Rouwette, 2023).-term identity. By imagining contrasting futures, leaders can articulate whether the region should become a technological testbed, a cultural stronghold, a luxury destination, a regenerative exemplar, or a networked mid-market hub. In

this way, exploring 2075 is not about prediction but about building strategic clarity, creativity, and capacity to shape the future, rather than be shaped by it

Thus, for this project report, we drew upon Kim et al. (2025) scenario planning framework to investigate the future of the food service sector in three provinces of the Netherlands (Groningen, Denthe and Friesland) which frames the future in 2075 based on the reasons set out above. It must be noted, however, that this project is NOT a forecast about the future but a project that investigates possibilities thus bringing a unique long perspective about the future not bounded by short termism.

3. The Project Brief

The project brief was to:

- To develop a set of scenarios that illustrates the future of the hospitality and food service sectors in the Northern provinces of the Netherlands (Groningen, Denthe and Friesland)
- For each scenario, illustrate a series of drivers of change shaping the scenario
- For each scenario, implications and decisions are highlighted.
- For each scenario, profiling future jobs with skills and knowledge requirements
- For each scenario, performing at a high level a sustainability assessment.
- A three-page summary 'user-friendly' guide to scenario planning methodology and project steps
- Identification of further options

4. Scenario Planning: Research Methodology

4.1 What is scenario planning?

Scenario planning is a strategic foresight method that helps organisations explore multiple plausible futures rather than relying on a single forecast. By identifying key driving forces—such as technological change, demographic shifts, environmental pressures, and economic trends—and focusing on those that are both highly uncertain and highly influential, scenario planners construct a set of contrasting but internally coherent futures.

These scenarios serve as analytical lenses through which leaders can better understand uncertainty, challenge assumptions, and uncover risks or opportunities that might otherwise remain hidden (Postma et al., 2025). Once developed, scenarios become tools to test the resilience of strategies, policies, or business models. Organisations may ask:

- "How would this strategy perform if this scenario were true?"

- "What capabilities would we need to succeed in such a world?"

By doing so, scenario planning strengthens long-term thinking, encourages creative problem-solving, and supports innovation. It enables decision-makers to navigate complexity

with greater confidence, ensuring preparedness for a range of possible futures rather than being blindsided by change. This approach underpins the methodology used in this project, as outlined in the project brief.

4.2 Central Research Question

The research question for the project was “What will the food sector look like in the Northern Provinces of the Netherlands in 2075?”

The significant of the questions anchors the entire scenario-planning project, establishing a long-term horizon that frees thinking from present constraints and encourages exploration of deep structural changes such as climate transformation, technological acceleration, and demographic shifts. It guides the methodology by clarifying the scope, ensuring that the scenarios examine the whole food-service ecosystem culture, sustainability, labour, education, identity, and supply chains rather than isolated trends. By shaping the scenario matrix around two critical uncertainties (*hedonistic vs. bohemian* consumption and *exclusive vs. community* access – see figure 1), the question enables the creation of distinct futures ranging from technological automation to cultural revival, luxury gastronomy, and regenerative island ecosystems. Its open-ended nature aligns regional stakeholders around a shared future challenge, encourages strategic thinking beyond prediction, and provides a platform for evaluating business, curriculum, and sustainability implications. Ultimately, the question matters because it equips the Northern Provinces to make informed, resilient decisions today while preparing for divergent futures over the next fifty years.

4.3 The Core Stages of the Scenario Planning Methodology Deployed Was?

4.3.1 Stage 1: Understanding the Project Brief and Scope

The project began with an examination of the brief commissioned by https://noorderpoort.nl/. At this stage, the team reviewed client requirements and agreed upon a structure for the report focusing on:

- Scenario development

- Job profiles

- Sustainability

- Curriculum implications

4.3.2 Stage 2: Scenario Framework Development

The initial scenario planning matrix was adapted from *2075: The Future of Food Tourism* (Kim et al., 2025), which proposes four scenarios:

- *Dr Spock’s Restaurant* – Imagine a world where more food is grown in the laboratory than in the field

- *Roots* – Creating a heterogeneous identity in a homogeneous world

- *Royal Mayfair* – The drive for high value and exclusivity

- *La Natura Food Trail* – How to create a food paradise

These scenarios were then modified for the food service sector in the Northern Provinces using Pierre Wack's Shell Method (Chermack, 2022, Chermack and Coons, 2015). This approach relies heavily on secondary research, also known as the "kitchen table" method, drawing evidence from academic literature, industry reports, and government publications. An initial set of scenarios was drafted based on this evidence.

4.3.3 Stage 3: First Stakeholder Workshop

A preliminary set of scenarios was tested with stakeholders and Noorderpoort representatives during a workshop held on 18 September 2025. Participants assessed the plausibility and relevance of each scenario and discussed potential implications. Their feedback informed the next iteration of scenario development.

4.3.4 Stage 4: Expert Interviews and Insights

To deepen understanding of food service dynamics in the Northern Provinces, four experts were identified by Noorderpoort to discuss:

- The current state of hospitality and food service in each province

- What people eat today and how dietary habits are evolving

- Key trends shaping the sector

- The broader context of the Dutch hospitality landscape

Experts consulted included:

Tim Ringers, Chef Proprietor of Restaurant Borage

Erik Jager, Catering Co-Ordinator at Wildlands Adventure Zoo

Niek Strous, General Manager at The Market Hotel Groningen

Gezinus Winters, Economic Affairs Advisor, Groningen Municipality

Insights from these interviews were incorporated into revisions of the scenarios.

4.3.5 Stage 5: Second Stakeholder Workshop

Updated scenarios were presented to stakeholders and Noorderpoort representatives on 16 December 2025. This workshop focused on identifying key implications and strategic decisions, particularly regarding:

- Sustainability

- Curriculum and education

- Knowledge and skills requirements

- Future jobs in the sector

4.3.6 Stage 6: Final Report Integration

Feedback from the second workshop, along with written contributions from participants, was synthesi ed into the final version of the report.

See appendice guide for a user guide to scenario planning for this project.

5. Scenario Construction: The Scenario Matrix

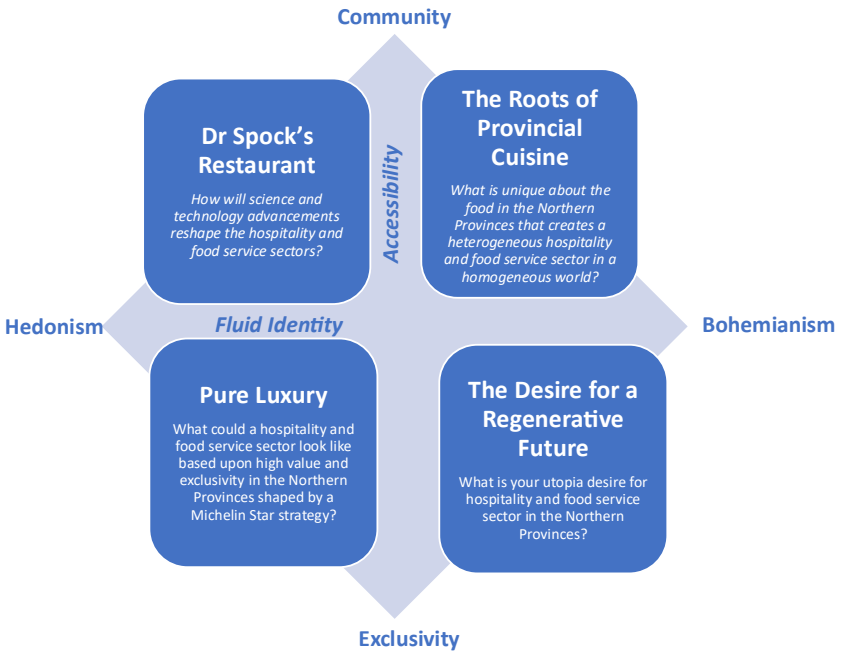

Figure 1: Scenario Matrix adapted from Kim et al (2075: The Future of Food Tourism)

A scenario matrix is a core tool used in strategic foresight and scenario planning. It helps organizations structure uncertainty and explore multiple plausible futures in a clear, logical way (Postma et al., 2025). In Kim et al. (2025) *2075: The Future of Food Tourism,* Yeoman used an ontological (world view) process in order to demonstrate real difference between scenarios overcoming the 'similarity of plausibility' found in many scenario interventions (Yeoman and McMahon-Beattie, 2024a, Yeoman and McMahon-Beattie, 2023). This approach is important given the 50 year or 2075 perspective at the centre of this project. The ontological perspective followed Bergman et al. (2010) approach of truth and explanation, presenting future states or scenarios based on prediction, prognosis, utopia and science fiction. Using this process and adapting Kim et al. (2025), the scenario matrix in figure one was developed. At the heart of each scenario, there is a question which represents the world view of the scenario. The question is used to explore and construct the scenarios.

The horizon axis represents the dimensions of consumer behavior and the role of food consumption. Fluid identity is drawn from the concept that the main stream consumer likes most foods, is willing to sample and experiment new experiences new types of food (Yeoman, 2016). The bipolars along this axis represent two forms of consumption. Hedonism or edonistic food consumption, is the intake of food driven by pleasure, taste, and reward rather than the body's physical need for energy. Whereas bohemianism or bohemian food consumption refers to the traditional, hearty, and often rustic culinary (Haukanes and Pine, 2003). The vertical axis represents how consumers have access food which is defined by two bipolars of community and exclusivity. Exclusivity in food often reinforces social status by using rare, artisanal, or premium products as markers of prestige (Yeoman and McMahon-Beattie, 2014) whereas community access means all residents, regardless of location or income, have consistent, reliable, and physical access to nutritious, affordable, and culturally appropriate food. There are

no barriers to consumption whereas exclusivity strictly limits access to food (Yeoman et al., 2015).

6. Scenario 1: Dr Spock's Fast Food Franchise

Figure 2: Dr Spock's Fast Food Franchise (Image Created by Chat GTP 01022026)

6.1 Essential Question:

Q. How will science and technology advancements reshape the hospitality and food service sectors?

The question *"How will science and technology advancements reshape the hospitality and food service sectors?"* is valuable because it encourages exploration of future trends and strategic foresight in an industry undergoing rapid transformation focused on hospitality and food service. It prompts businesses, researchers, and policymakers to anticipate how innovations such as artificial intelligence, robotics, biotechnology, and sustainable technologies will influence operations, customer experiences, and workforce dynamics. By addressing this question, organizations can identify opportunities for innovation, gain competitive advantage, and make informed decisions about investment and skill development. We answer the question by profiling a futurist fast food franchise operation called *Dr Spock's Fast Food Franchise* as the fast food sector resembles a factory production system were technology and science are embedded in operations and at the forefront of technological implementation (Kumolu-Johnson, 2024, Schmenner, 2004).

6.2 Scenario Story

In Groningen, a city renowned for its vibrant university and youthful population, *Dr Spock's Fast Food Franchise* represents a radical transformation in the hospitality and food service sector. The restaurant operates entirely through advanced robotics, eliminating human servers and delivering ultra-fast, personalized service via AI and neural interfaces. Students and young professionals, accustomed to digital convenience, simply think their order, and within seconds, automated kitchens prepare meals tailored to individual taste profiles. The menu showcases scientific innovation: Lab-Grown Beef Burgers, Cellular Salmon Sushi, Hybrid Protein Nuggets, and Algae-Infused Smoothies have become mainstream, addressing climate change, food scarcity, and ethical concerns. For adventurous diners, options like 3D-Printed Plant-Based Steaks and Cultured Chicken Wraps offer variety without environmental compromise. Every dish is planet-friendly, and holographic displays provide real-time data on environmental impact such as water saved and emissions avoided turning dining into an educational experience. For Groningen's knowledge-driven community, this fusion of food and sustainability science resonates deeply.

Affordability is central to this model. Advances in bioreactor technology and mass production have made these meals price-competitive, supporting global food security and aligning with climate goals. The city's young population embraces this sustainable, tech-driven approach, seeing it as part of their identity and future. Behind the scenes, new roles have emerged. Aging workers equipped with exoskeleton suits maintain robotic systems, while specialists in AI ethics, robotics engineering, and sustainability education thrive in this ecosystem. Jobs have not disappeared, they have evolved, reflecting the pace of technological and scientific advancement.

Groningen's university ecosystem accelerates this innovation**.** With strong research programs in biotechnology, AI, and sustainable systems, the university acts as a living lab for experimentation and collaboration. Students contribute to prototype development, while spin-offs and start-ups born from academic research feed directly into ventures like Dr Spock's, creating a dynamic cycle of knowledge transfer and commercialization.

This transformation hints at the technological singularity, a point where AI and automation surpass human capabilities, reshaping industries and societal norms. In Dr Spock's franchise, decision-making, production, and personalization are fully machine-driven, raising questions about human relevance, ethics, and governance in a world where technology no longer just assists but dominates. Dr Spock's is more than a restaurant; it is a blueprint for the future where automation, sustainability, and education converge to create a dining experience that is efficient, ethical, and environmentally responsible.

6.3 Scenario Characteristics and Implications:

6.3.1 Automation Disruption

Fully robot-run restaurants challenge the traditional labor-intensive model of fast food (Chen et al., 2022). Current chains like McDonald's or Burger King would need to invest heavily in robotics and AI to remain competitive. This shift could lead to significant job displacement for low-skilled workers, while creating new roles in robotics maintenance, AI system management, and data analytics.

6.3.2 Shift to Sustainable Ingredients

The adoption of cultured meat and cellular aquaculture in futuristic models pressures existing supply chains to move away from conventional livestock farming (Chuah et al., 2025, Droog, 2023). Present-day fast-food brands will need to integrate lab-grown alternatives and plant-based proteins to meet consumer expectations for ethical and climate-friendly dining (Penn, 2018)

6.3.3 Price Model Transformation

If technology-driven meals become affordable through mass production, traditional pricing strategies will be disrupted (Tomczyk, 2023). Fast food chains will no longer compete solely on cost but will need to differentiate through personalized experiences, speed, and sustainability credentials (Suryani et al., 2024, French, 2003).

6.3.4 Consumer Transparency Demand

Educational dining, where customers receive real-time data on environmental impact, will set new standards for transparency. Current fast food brands will face pressure to disclose carbon footprints, water usage, and sourcing practices, possibly through digital dashboards or interactive menus (Vu et al., 2017, Toft et al., 2011).

6.3.5 Technological Singularity Risk

As AI systems take over decision-making and personalization, human oversight in operations could diminish(McLean et al., 2023). This raises ethical and governance challenges for today's fast food industry, requiring frameworks to manage AI-driven processes responsibly and prevent over-reliance on technology.

6.4 Weak Signals

6.4.1 Neural Interface Ordering

Description: Brain-computer interfaces (BCIs) are in experimental stages, mainly in healthcare and gaming (Nicolas-Alonso and Gomez-Gil, 2012). Their use for ordering food by thought signals a future where human-computer interaction becomes seamless, eliminating physical interfaces like touchscreens.
Example: *Neuralink (Fiani et al., 2021)* is developing BCIs that allow users to control devices with their thoughts, showing potential for consumer applications in hospitality.

6.4.2 Fully Automated Kitchens

Description: Robotic kitchens exist in pilot projects, but a completely human-free environment is rare. This signals a future where robotics handle all food preparation, reducing labour costs and increasing consistency, while raising questions about maintenance and cybersecurity (Ivanov et al., 2019).
Example: *Moley Kitchens* and *Miso Robotics* have introduced robotic cooking systems that automated grilling and frying tasks.

6.4.3 Cultured Meat as the Norm

Description: Lab-grown meat is approved in limited markets but remains expensive and niche. Its normalization in fast food menus would disrupt agriculture and supply chains, reducing emissions and animal farming while challenging cultural perceptions of "real meat."(Rayner, 2023)

Example: *Upside Foods* and *Eat Just* have received regulatory approval to sell lab-grown chicken in the U.S. and Singapore (Han et al., 2025).

6.4.4 Educational Dining Experiences

Description: Sustainability labels exist, but interactive holographic dashboards showing real-time environmental impact are futuristic (Matišák et al., 2019, Blanche, 2021). This signals a shift where dining becomes educational, influencing consumer behavior and brand loyalty .
Example: *Panera Bread* introduced carbon footprint labeling on menus, signaling growing demand for environmental transparency.

6.4.5 Exoskeleton Suits for Aging Workers

Description: Exoskeletons are used in industrial settings to reduce strain, but their application in hospitality is minimal. This reflects demographic trends of aging populations staying in the workforce and technological solutions to extend physical capability (De Looze et al., 2016, Ivanov et al., 2019, Ivanov and Webster, 2024).

Example: *Sarcos Robotics* and *Ottobock* produce industrial exoskeletons for manufacturing and logistics, hinting at future hospitality use.

6.4.6 University-Driven Food Technology Innovation

Description: Academic ecosystems foster start-ups (Wright et al., 2017), but their direct influence on mainstream fast food is limited. This signals universities becoming accelerators for food technology commercialization, creating hubs for rapid knowledge transfer.
Example: *Wageningen University & Research* leads global research in food technology, spawning start-ups focused on cultured meat and sustainable proteins.

6.4.7 Technological Singularity in Food Service

Description: AI surpassing human decision-making in restaurants (Lee et al., 2021) is speculative but signals a trajectory toward autonomy. If realized, it raises ethical dilemmas around accountability and resilience in service industries.
Example: *Domino's Pizza* uses AI-driven predictive ordering and autonomous delivery pilots with Nuro robots, showing steps toward full autonomy

Job Title: Cultured Meat Production Specialist

Location: Automated Fast Food Franchise

Role Overview:

The Cultured Meat Production Specialist is responsible for overseeing the production of lab-grown meat and cellular aquaculture products within bioreactor systems. This role ensures that cultured proteins meet quality, safety, and sustainability standards while supporting large-scale, cost-effective production for automated food service environments.

Key Responsibilities:

- Operate and monitor bioreactors for the cultivation of animal cells and tissue growth.
- Maintain sterile conditions and troubleshoot contamination issues.
- Optimize growth media formulations to improve yield and reduce costs.
- Collaborate with food scientists and AI-driven systems to integrate cultured meat into automated kitchens.
- Ensure compliance with food safety regulations and sustainability certifications.
- Analyze production data and report on efficiency, environmental impact, and scalability.
- Support R&D initiatives for new cultured meat products and flavor enhancements.

Required Skills & Qualifications:

- Degree in Biotechnology, Food Science, Cellular Agriculture, or related field.
- Hands-on experience with cell culture techniques and bioreactor operations.
- Knowledge of tissue engineering, microbiology, and food safety standards.
- Ability to work with automated systems and interpret AI-driven analytics.
- Strong problem-solving skills and attention to detail.

Outlook:

This role reflects the growing demand for sustainable protein sources and the integration of biotechnology into mainstream food service. Specialists will play a critical part in reducing environmental impact and supporting global food security.

7. Sustainability Implications

This scenario has both positive and problematic implications for sustainability. Positive implications are the role of plant-based proteins, supported by the above referenced shift to sustainable ingredients and experimentations with lab grown meat; the affordability of the food concept, here interpreted as inclusivity; edutainment for sustainability, like the interactive holographic dashboards; and young guests' embracing sustainability as a component of their identity. Problematic aspects that need attention are leaning on and even exploiting personal taste through hyper-personalization; energy intensity of AI and cultured meet; AI governance; transparency and credibility of certification system; and job displacement. Moreover, the scenario does not address sustainability issues beyond the food offer itself (Cavagnaro, 2025a).

As the transition toward strong sustainability unfolds, several problematic aspects require careful management. Hyper-personalization in food offerings risks exploiting human taste preferences shaped by scarcity, leading to unhealthy products high in sugar, salt, and fat. To counter this, AI must be directed toward creating affordable, nutritious, and appealing recipes, particularly in fast-food contexts. At the same time, the energy demands of AI-driven food processing and cultured meat production must be addressed not only through eco-efficiency but by ensuring reliance on renewable energy sources during and after the transition. Parallel to these technical challenges, global debates on AI governance and ethics will be crucial to prevent harm from more-than-human intelligence, though outcomes will inevitably hinge on broader geopolitical dynamics.

Beyond food itself, sustainability requires a holistic approach encompassing certification systems, infrastructure, and employment. Transparency and credibility in sustainability certifications are vital, with a need to consolidate existing schemes into a few science-based frameworks supported by universities and independent bodies. The concept of sustainable food must extend to buildings, furniture, and serving vessels, ensuring coherence across the entire ecosystem. Finally, education and training must prepare workers not only for emerging roles but also support those displaced from traditional agriculture and food service chains, ensuring that the transition is socially inclusive as well as environmentally responsible.

The Job description for a *Cultured Meat Production Specialist* highlights compliance with sustainability and measuring environmental impact for efficiency. For the transition to be toward strong sustainability going beyond compliance and eco-efficiency into positive impacts will be essential.

8. Skills, Knowledge and Education Implications

As science and technology rapidly advance, the hospitality and food service sector will shift from a labour-intensive industry to a highly automated, knowledge-driven ecosystem. The example of *Dr Spock's Fast Food Franchise* shows how robotics, artificial intelligence, biotechnology, and sustainability technologies can transform everyday dining. Guests order through neural interfaces, meals are prepared by fully automated kitchens, and ingredients such as cultured meat and algae-based proteins become normal. These changes bring major implications for skills, knowledge development, and education.

8.1 Skills Implications

Industry practitioners will need far more technical skills than before. Instead of preparing food manually, they will oversee robotic systems, troubleshoot automated equipment, and use data to keep operations efficient. Skills in AI and data literacy will be essential, for example, understanding how personalisation engines work, spotting errors or bias, and protecting customer data. Biotechnology skills, such as food science and sensory engineering and cellular agriculture and bioprocessing will grow in importance as practitioners handle lab-grown ingredients and maintain sterile environments. Moreover, they need the ability to compare environmental impacts between cultured meat vs. conventional meat and understand debates on genetic modifications, cell sourcing, biodiversity and biosecurity using engagement skills to address hesitations or cultural food habits. At the same time, new interpersonal skills will be needed to guide guests through digital menus, holographic displays, and sustainability dashboards. Practitioners must also adapt quickly as technology updates become constant.

8.2 Knowledge Development Implications

Knowledge requirements will expand beyond traditional hospitality. Industry practitioners will need a grounding in robotics, microbiology, AI decision-making, environmental impact measurement, and cybersecurity. Understanding how novel foods are produced (such molecular biology, biochemistry, genetics and synthetic biology, and microbiology) how data is used in automated systems, and how sustainability metrics are calculated will become part of everyday work. Ethical and regulatory knowledge will also matter more, especially when AI systems make autonomous decisions.

8.3 Implications for Education

Education must change to keep up with this new reality. Instead of separating theory and practice, learning environments should function as living labs—places where students work with real robots, bioreactors, AI tools, and sustainability technologies. These labs are startups in cultural meat and fermentation where students work together across disciplines, build knowledge through hands-on experimentation, learn directly from real technological and operational contexts, take initiative in guiding their own learning, and use design oriented approaches to imagine and prototype new solutions for the future of hospitality (Assen et al., 2026).

Universities, colleges, and industry partners will collaborate closely, creating a shared space where boundaries between school and workplace fade (de Boer, 2026). Students learn alongside industry practitioners, testing prototypes, solving real problems, and developing the mindsets needed for rapid technological change. Programmes will blend hospitality with engineering, biosciences, data ethics, and environmental studies. These studies will support new cultural identities and food transparency. Learning will focus on creativity, system thinking, responsible technology use, and continuous adaptation. By developing these skills and knowledge, future practitioners will be equipped to thrive in a sector where automation, sustainability, and human values must work together.

9. Scenario 2: The Roots of Provincial Cuisine

Figure 3: The Roots of Provincial Cuisine (Imagine Created by Chat GTP 02012026)

9.1 Essential Question:

Q. What is unique about the food in the Northern Provinces that creates a heterogeneous hospitality and food service sector in a homogeneous world?

The value of the question draws us into the debate about a globalized and technologically advanced world where food systems may become increasingly standardized through automation, synthetic production, and global supply chains. This question emphasizes differentiation, cultural resilience, and authenticity as strategic advantages. It encourages investigation into how local culinary traditions, ingredients, and practices can adapt to climate change, demographic shifts, and technological disruption while maintaining distinctiveness. We answer the question by exploring the uniqueness and localism of the three provinces of the north, namely Groningen, Drenthe and Friesland in leveraging local provincial food and culture that is authentic and unique (Kim et al., 2025)

9.2 Scenario Story

By 2075, global food systems are dominated by standardized menus and automated supply chains, yet the Northern Provinces of the Netherlands, namely Friesland, Drenthe, and Groningen are strongholds of localism, identity, and authenticity. Here, culinary traditions have evolved into cultural anchors, shaping a hospitality sector that thrives on diversity in an otherwise homogeneous world.

In Friesland, food hubs serve as cultural sanctuaries where heritage grains like einkorn and spelt are milled in cooperative bakeries, and sea buckthorn berries adapted to saline soils which feature in vibrant sauces and desserts. Climate-resilient dairy farms, powered by renewable energy, produce cheeses that tell stories of adaptation and continuity. Dining experiences are immersive: guests share meals while listening to tales of Frisian seafaring ancestors, reinforcing a sense of belonging in a future where identity is often digitized.

Drenthe has embraced its forests as culinary playgrounds. “Forest gastronomy” thrives through foraging walks that culminate in meals cooked in turf ovens, echoing ancient peatland traditions. Micro-kitchens hidden in nature offer menus inspired by archaeological narratives, where dishes revive flavors from prehistoric diets using modern techniques. Hospitality here is experiential in which guests participate in ancestral cooking rituals, blending sustainability with storytelling in ways that global chains cannot replicate.

In Groningen, technology and terroir converge in subtle ways. Vertical farms rise above historic canals, cultivating local vegetables in controlled environments, while smart kitchen systems assist chefs in balancing innovation with authenticity. Interactive “Taste Archives” allow diners to explore centuries of regional recipes through augmented reality, then savor them reimagined with climate-adapted ingredients. Technology here is not the star but a quiet enabler, ensuring that tradition thrives in a future shaped by environmental and social change.

Across these provinces, climate change has reshaped food identity. Salt-tolerant crops, regenerative farming, and biodiversity preservation are not trends but necessities. Yet, rather than erasing heritage, these shifts have strengthened it. The Northern Table of 2075 is a testament to resilience: a place where authenticity thrives amid global uniformity, and where hospitality is not just about serving food but about preserving culture, telling stories, and forging connections in a world that often feels disconnected.

10. Scenario Characteristics and Implications

10.1 Cultural Identity vs. Global Homogenization

The scenario raises the question of how Friesland, Drenthe, and Groningen can maintain distinctive culinary identities in a future dominated by globalized food systems and standardized menus. Preserving authenticity will be critical for attracting visitors and sustaining local pride in a world where cultural uniqueness is increasingly rare (Ellis et al., 2018, Yeoman et al., 2007, Hall, 2007).

10.2 Climate Change and Food Heritage

Changing environmental conditions such as rising sea levels, soil salinity, and biodiversity loss (van der Wiel et al., 2024) will reshape traditional ingredients and farming practices (Van Oort et al., 2023). This creates both challenges and opportunities for adapting heritage recipes without losing their cultural essence (Cerpina and Stenslie, 2022)

10.3 Localism as a Strategic Advantage

Regional uniqueness could become a powerful differentiator for hospitality and tourism, offering experiences that global chains cannot replicate(Yeoman et al., 2007, Hall, 2007).

Cooperative farming, foraging, and storytelling may evolve into premium offerings that combine sustainability with cultural depth (Kim et al., 2025, Yeoman et al., 2075).

10.4 Technology as an Enabler, Not a Replacement

Technological tools like vertical farming and smart kitchens should support local traditions rather than overshadow them. Ethical considerations arise when digitizing food heritage, requiring careful balance between innovation and authenticity (Kim et al., 2025).

10.5 Economic and Social Sustainability

Maintaining cultural food identity must align with economic viability, ensuring that local businesses thrive while preserving heritage (Enriquez and Archila-Godinez, 2022). Policies and community initiatives will be essential to protect food ecosystems and prevent cultural erosion.

10.6 Consumer Expectations in 2075

Future consumers may prioritize immersive, heritage-based dining experiences over convenience, creating demand for authenticity. Global trends such as plant-based diets and lab-grown proteins will intersect with local traditions, influencing menus and culinary innovation (Kim et al., 2025, Yeoman and McMahon-Beattie, 2024b).

11. Weak Signals

11.1 Heritage Grains Revival

Description: Heritage grains like einkorn and spelt represent a return to biodiversity and nutritional authenticity, signaling resistance to industrial monocultures. Their revival suggests a growing consumer preference for traditional flavors and sustainable farming practices (Topczewska et al., 2022, Fusté-Forné and Berno, 2016, Richards, 2015).
Example: Burnt Hill Farm in the U.S. is reintroducing heirloom wheat varieties like Turkey Red, grown organically and milled on-site for artisanal bread and pasta)

11.2 Sea Buckthorn as a Climate-Resilient Ingredient

Description: Sea buckthorn's (Fen et al.) ability to thrive in saline soils makes it a symbol of climate adaptation (Kim et al., 2025, Arts and Weilenga, 2025) in agriculture. Its tart, citrus-like flavor positions it as a premium ingredient for chefs seeking unique, sustainable options.
Example: Scandinavian cuisine increasingly uses sea buckthorn in jams, sauces, and schnapps, highlighting its culinary and health benefits.

11.2.1 Forest Gastronomy in Drenthe

Description: Foraging-based dining reflects a shift toward immersive, nature-integrated hospitality experiences (Bunnell and Gillingham, 2018). It emphasizes sustainability and storytelling, offering guests a connection to ancestral food practices.
Example: Noma in Copenhagen has popularized foraging as a core culinary philosophy, incorporating wild herbs, moss, and forest ingredients into its seasonal menus

11.2.2 Micro-Kitchens in Natural Settings

Description: Micro-kitchens in forests or wilderness areas signal decentralization of food service and hyper-local dining. They cater to consumers seeking intimate, eco-conscious culinary experiences away from urban centers (Kim et al., 2025).
Example: Off-grid outdoor kitchen setups, such as those featured in eco-retreats and permaculture communities, use portable stoves and solar ovens to create sustainable dining experiences

11.3 Interactive Taste Archives

Description: Digital archives preserving regional recipes indicate a growing role for technology in cultural memory. They allow consumers to explore culinary heritage through augmented reality and virtual experiences.
Example: The Ark of Taste by Slow Food Foundation catalogs endangered foods globally, creating a living database to preserve culinary traditions.

11.4 Cooperative Farming and Storytelling Hubs

Description: Food hubs combining cooperative farming with cultural narratives highlight a merging of agriculture and hospitality (Sgroi and Marino, 2022). They strengthen local identity while promoting sustainable food systems.
Example: Dutch food cooperatives, such as FoodCoopOsdorp in Amsterdam, bypass supermarkets to source directly from farms, fostering community engagement and storytelling

Job Title: Taste Memory Archivist

Location: Meppel

Role Overview:

The Taste Memory Archivist is responsible for preserving, curating, and activating the culinary heritage of the Northern Provinces through a multimodal "Taste Archive." This role blends ethnography, sensory science, and digital archiving to safeguard traditional recipes, techniques, and flavor profiles while adapting them for future hospitality experiences. The archivist ensures that local food identity remains vibrant and accessible in a world of cultural homogenization

Key Responsibilities:

- Collect and document heritage recipes, cooking techniques, and ingredient profiles through fieldwork with farmers, foragers, and chefs.
- Develop interactive archives using AR/VR and sensory data for immersive culinary experiences.
- Conduct sensory analysis and maintain provenance records for authenticity and cultural integrity.
- Collaborate with hospitality partners to translate archives into menus, tasting events, and educational programs.
- Manage ethical protocols, consent agreements, and benefit-sharing with local communities.
- Monitor preservation risks and recommend interventions for endangered food traditions.

Required Skills & Qualifications:

- Master's or PhD in Food Studies, Sensory Science, Archival Science, Anthropology, or related fields.
- Expertise in heritage documentation, sensory evaluation, and digital archiving standards.
- Strong knowledge of Dutch food culture; Frisian or Low Saxon language skills are a plus. Ability to use AR/VR tools, sensory analysis instruments, and metadata systems.
- Excellent communication and community engagement skills with cultural sensitivity.

Outlook:

By 2075, the Taste Memory Archivist will play a critical role in sustaining regional food identity amid global homogenization. This position offers opportunities to lead innovation in cultural preservation, immersive dining experiences, and ethical food heritage management. Demand for this role will grow as hospitality sectors seek authenticity and experiential value in a climate-adaptive, technology enabled future.

12. Sustainability Implications

In this scenario, sustainability offers promising opportunities but also presents ambiguous implications that require careful management during and after the transition.

Emphasizing food's cultural dimensions can strengthen identity and authenticity, yet it risks fostering isolationism and exclusion, which contradicts the principle of shared responsibility for a common future (Cavagnaro, 2025b). Similarly, prioritizing locality supports sustainable practices and cultural heritage, but if local food is exploited for tourism, it could lead to scarcity and inflated prices for residents. To mitigate these risks, strategies such as quotas and environmentally responsible cooking methods should be implemented. Turf cooking, for example, should be avoided due to its ecological impact (Kim et al., 2025) Cooking with a hay oven could be promoted instead. This is a fascinating traditional method that uses heat from hay to slowly and evenly cook food. This concept is like slow cooking but relies on a natural, sustainable heat source (Symons, 2004).

Other critical considerations include the integration of plant-based proteins, which are essential for a healthy and sustainable food system, alongside efforts to minimize waste, adopt renewable energy, and ensure sustainability across all hospitality elements, from buildings to utensils.

The scenario highlights climate adaptation. While climate adaptation is vital, an exclusive focus on it could overshadow mitigation efforts, worsening long-term climate challenges. Additionally, sustainable transport for visitors and innovative roles like "taste memory archivists" will be necessary to balance cultural preservation with planetary boundaries. These professionals will need creativity and sensitivity to prevent alienation, manage tourism responsibly, and design strategies that harmonize authenticity with environmental and social sustainability (Postma, 2025).

13. Skills, Knowledge and Education Implications

In a world where global food systems have become standardized through automation and synthetic production, the Northern Provinces of Groningen, Friesland, and Drenthe stand out by protecting their unique food cultures. Their cuisines remain rooted in heritage grains, forest ingredients, and climate-adapted crops. This commitment to local identity shapes a hospitality and food service sector that is rich, diverse, and deeply connected to place. These developments bring important implications for the skills people need, the knowledge they must develop, and how education should evolve.

13.1 Skills Implications

Hospitality practitioners will need a combination of traditional and future-oriented skills. They must understand regional ingredients and heritage and traditional cooking techniques while also being able to use modern tools like smart kitchens, vertical farms, and digital storytelling platforms. Skills in cultural interpretation and culinary ethnography in practice guidiing foraging, sensory storytelling, and climate-adapted menu design will become increasingly valuable. Practitioners must be able to create immersive, meaningful food experiences rather than just serve meals. At the same time, practical abilities such as regenerative farming, biodiversity

management, and sustainable food processing become essential as climate change reshapes the regional food landscape.

In this way, the Northern Provinces' unique food identity becomes both a cultural treasure and a future-proof economic advantage.

13.2 Knowledge Development Implications

Future practitioners will need deep knowledge of local food heritage, such as Frisian grains, Drenthe forest foods, and Groningen vegetable traditions, but also an understanding of how these can adapt to rising sea levels, salinity, and biodiversity loss. Knowledge about culinary anthropology and historical recipes. They will need to know how to combine old recipes with new climate-resilient ingredients, how to use technology to preserve culinary memory, and how to integrate environmental science into daily food practices. Understanding cultural history, storytelling, and community values will be just as important as understanding food science, digital tools, and sustainability metrics.

13.3 Implications for Education

Education must support this blend of tradition and innovation. Instead of learning only at school, students should train in living labs where they work directly with farms, food hubs, forests, and cultural archives. Participate in co-creation with local communities. Within these environments, students learn together across disciplines, build understanding through hands-on practice, engage deeply with real places and local food cultures, take ownership of their learning paths, and apply creative design methods to shape new forms of hospitality (Assen et al., 2026). Schools, universities, and local businesses should share expertise, allowing students and industry practitioners to learn together. Educational activities may happen inside bakeries, forest kitchens, vertical farms, or digital taste archives. Programmes should combine hospitality, local food heritage, environmental science, storytelling, technology, and community engagement. This cross-boundary approach (de Boer, 2026) ensures learners understand not only how to cook or serve food, but how to protect culture, adapt to climate change, and design meaningful experiences that global chains cannot replicate.

14. Scenario 3: Pure Luxury

Figure 4: Pure Luxury (Image Created by Co Pilot on 01022026)

14.1 Essential Question:

Q. What could a hospitality and food service sector look like based upon high value and exclusivity in the Northern Provinces shaped by a Michelin Star strategy?

The significance of asking what a hospitality and food service sector based on high value and exclusivity could look like in the Northern Provinces lies in envisioning a model that prioritizes quality, sustainability, and cultural authenticity over mass tourism. Central to this vision is the role of Michelin-starred restaurants, which act as powerful drivers of prestige and economic value (Rita et al., 2023, Martins, 2022, Batat, 2021b). Such establishments not only attract affluent visitors willing to spend more per capita, but they also elevate the region's culinary reputation, showcasing local produce, seafood, and artisanal traditions at the highest international standard. Their presence signals exclusivity and excellence. On the downside, the scenario carries risks of social exclusivity, where locals may feel priced out of dining and leisure spaces, creating divides between residents and tourists. It also risks cultural dilution, economic vulnerability, and environmental strain if luxury offerings prioritize outside prestige over community access and sustainability (Vinh Hoa and May, 2021).

14.2 Scenario Story

2075, the Northern Provinces of the Netherlands had risen to become Europe's most exclusive culinary destination. Once modest and rural, the region had been reimagined as the Golden Triangle of Gastronomy, where food was celebrated not simply as nourishment but as art, science, and status. Michelin-starred restaurants formed dazzling clusters across Groningen,

Friesland, and Drenthe, drawing elite travelers from every continent. These establishments offered more than meals: they curated immersive experiences where molecular gastronomy merged with centuries-old traditions, and dishes were co-created by chefs, food scientists, designers, and technologists.

The clean air, fertile land, and cultural heritage of the North provided the perfect foundation for this transformation. Farms became experimental laboratories, cultivating rare grains and bioengineered vegetables that fed directly into the kitchens of the Michelin cluster. Dining spaces blended Frisian architecture with futuristic design, while technologists ensured every plate was a multisensory performance. The region became a sanctuary for elite experiences, a place where culinary innovation was not just practiced but institutionalized through tightly knit ecosystems of creativity.

Yet beneath the brilliance, challenges persisted. Chronic labor shortages plagued the sector, as the demand for highly skilled chefs, sommeliers, and service staff far outstripped supply. Automation filled some gaps, but the irreplaceable human artistry left restaurants competing fiercely for talent. Social exclusivity deepened: locals found themselves priced out of establishments that once served their communities, watching from the margins as their homeland became a playground for the global elite.

The Northern Provinces stood as a paradox where an unparalleled sanctuary of culinary innovation and prestige, yet one where the divide between global recognition and local accessibility had never been sharper. The Golden Triangle of Gastronomy embodied both triumph and tension, a future where food defined status as much as sustenance.

14.3 Scenario Characteristics

14.3.1 Michelin-Starred Restaurant Clusters

The Northern Provinces become home to dense clusters of Michelin-starred restaurants, attracting affluent visitors and elevating the region's global prestige (Martins, 2022). However, this concentration risks pricing out local residents and reinforcing exclusivity in dining and leisure spaces (Vinh Hoa and May, 2021).

14.3.2 Culinary Innovation Ecosystems

Chefs, food scientists, designers, and technologists collaborate to create futuristic food experiences that blend tradition with cutting-edge science (Ottenbacher and Harrington, 2007). While this drives creativity and global leadership, it may overshadow local practices and alienate communities who value authenticity (Martins, 2022).

14.3.3 Transformation of Rural Landscapes

Farms evolve into experimental laboratories producing rare, bioengineered crops tailored for elite dining experiences (Mishra, 2023, Caporaso, 2021, This, 2009). This enhances sustainability and food science but risks commodifying land and disconnecting agriculture from everyday local needs.

14.3.4 Chronic Labor Shortages

High demand for skilled chefs, sommeliers, and service staff creates fierce competition for talent, destabilizing smaller businesses. Automation fills some gaps, but the irreplaceable human artistry leaves the sector vulnerable to workforce shortages (Schembri, 2025, Gottardello and Karabag, 2024, Miklós, 2019, Yeoman and McMahon-Beattie, 2024a).

14.3.5 Social Exclusivity and Inequality

Hospitality becomes a sanctuary for global elites, deepening divides between wealthy visitors and local communities. This raises ethical questions about who benefits from regional transformation and whether inclusivity can be preserved (Gottardello and Karabag, 2024, Batat, 2021a, Yeoman and McMahon-Beattie, 2018, FENG, 2024)

14.4 Weak Signals

14.4.1 Luxury Tourism in Rural Locations

Description: Increasing demand for exclusive, high-value travel authentic experiences (Yeoman and McMahon-Beattie, 2018). We are observing affluent travelers increasingly seek exclusivity and cultural authenticity rather than crowded urban luxury. This is driven by a desire for slow travel, private culinary tours, and destination dining in rural landscapes. This trend is observed in many rural regions from Luberon in France to Tuscany in Italy (Kim et al., 2025)

Example Now: *Oan Tafel* in Wergea, Friesland offers modern fine dining using local Frisian ingredients, part of a growing trend to elevate rural gastronomy in the Netherlands. Oan Tafel advocates Dutch Cuisine (Haex, 2020) shaped about Albert Kooy. Most recently, Michelin connected fine hotels with fine restaurants with a new program called Michelin Keys

14.4.2 Experimental Farms Producing Rare Grains and Bioengineered Vegetables

Description: The **Experimental Farm Network (EFN)** in the U.S. collaborates with small growers to breed unique grains and perennial crops for sustainability. Heritage grains like einkorn or bioengineered vegetables with enhanced flavors create signature menus that define luxury.

Example Now: Michelin Green Star restaurant, Emmer & Rye feature heirloom grains like emmer and einkorn in house-made pasta and bread. They grind grains fresh daily for unique textures and flavors. Whereas, Vespertine works with farms using biodynamic and experimental growing techniques

14.4.3 A Heritage Revival

Description: Frisian and Dutch culinary heritage revival focuses on reinterpreting traditional dishes and ingredients for modern fine dining, blending authenticity with innovation. It emphasizes local identity, sustainability, and storytelling, turning heritage into a luxury experience (Kim et al., 2025, Plagmeijer and Muller, 2019).

Example Now: Restaurant Wannee uses classic Dutch principles of "Dutch Cuisine" with seasonal, local produce and traditional recipes reimagined for contemporary menus whereas De Heeren van Harinxma incorporates Frisian specialties like spiced cheeses and regional vegetables into Michelin-starred dishes, elevating heritage flavors to haute cuisine.

14.4.4 Multisensory Gastronomy

Description: As experience economy evolves, gastronomy becomes a central sphere (Flinn, 2021, Yeoman and McMahon-Beatte, 2019) shaped by senses. Multisensory gastronomy is a dining approach that engages all five senses; taste, smell, sight, sound, and touch in order to create immersive culinary experiences. It combines food with elements like visual art,

soundscapes, and scent design, turning a meal into a performance that stimulates emotions and memory (Spence, 2022).

Example Now: Le Petit Chef uses projection mapping on tables to animate storytelling during courses, blending visuals and flavors whereas Alinea, a three Michelin star restaurant is known for its interactive dining experiences. Alinea uses aroma-infused pillows, edible helium balloons, and synchronized music to complement courses, creating a fully immersive sensory journey.

14.4.5 Skill Shortage

Description: There is a growing shortage of Michelin-star-level chefs due to the intense training requirements, high stress, and global competition for talent. This scarcity is amplified by the expansion of luxury dining worldwide, creating a talent gap that automation and technology cannot to date replace (Schembri, 2025, Gottardello and Karabag, 2024)

Example Now: In France, Michelin-starred restaurants like *Le Suquet* have closed because chefs could not sustain the workload and find qualified replacements. In the Netherlands, top restaurants such as *De Librije* and *Inter Scaldes* report difficulties recruiting skilled staff, leading to reliance on international talent and innovative training programs (de Bruin, 2023, Arts and Weilenga, 2025).

Job Title:

Head Chef

Location:

Mid Laren, Drenthe

Role Overview:

As Head Chef of a Michelin-starred establishment in Europe's most exclusive culinary destination, you will lead a team of culinary innovators to craft immersive, multisensory dining experiences that merge molecular gastronomy with Frisian heritage. This role demands mastery of haute cuisine, sustainability principles, and collaboration with food scientists, technologists, and designers to deliver dishes that define status and artistry in 2075.

Key Responsibilities:

- Design and execute avant-garde menus featuring rare grains, bioengineered vegetables, and heritage ingredients sourced from experimental farms.
- Integrate multisensory elements (AR/VR, soundscapes, scent design) into dining experiences.
- Lead a multidisciplinary team including sous chefs, food technologists, and sensory designers.
- Maintain Michelin standards of excellence while embedding sustainability and cultural authenticity.
- Collaborate with local producers and innovation hubs to pioneer new culinary techniques.
- Ensure compliance with ethical sourcing, regenerative agriculture, and zero-waste principles.

Required Skills & Qualifications:

- Proven experience in Michelin-starred kitchens or equivalent luxury dining environments.
- Expertise in molecular gastronomy, ingredient engineering, and sensory design.
- Strong leadership and talent development skills in a high-pressure, creative setting.
- Knowledge of Frisian and Dutch culinary heritage and ability to reinterpret traditions.
- Familiarity with automation tools, AI-driven personalization, and sustainability metrics.
- Advanced culinary education plus certifications in food science or gastronomy innovation preferred.

Outlook:

This role offers the opportunity to shape the future of luxury dining in a region celebrated as the Golden Triangle of Gastronomy. Demand for Michelin-level chefs will remain high due to global talent shortages, making this position both prestigious and pivotal in defining culinary excellence for decades to come

15. Sustainability Implications

The sustainability implications of a Michelin-star-driven hospitality sector in the Northern Provinces are both promising and problematic.

On the positive side, Michelin restaurants can act as catalysts for sustainable innovation by collaborating with experimental farms to cultivate rare grains and bioengineered vegetables, reducing reliance on global supply chains. They also contribute to cultural sustainability by reinterpreting traditional dishes for modern fine dining, blending authenticity with cutting-edge techniques. Architectural choices that integrate Frisian heritage with futuristic design further reinforce cultural identity while offering opportunities to incorporate eco-friendly materials and biophilic principles (Kim et al., 2025, Batat, 2021b, Vinh Hoa and May, 2021)

However, the scenario poses significant challenges for strong sustainability. Social exclusivity risks alienating local communities as luxury dining becomes accessible only to affluent tourists, creating economic and cultural divides. Environmental concerns arise from elite travel habits, such as private jets, and the potential ecological impact of hyper-technological agriculture if soil fertility and biodiversity are not prioritized. To mitigate these issues, strategies such as imposing high fees on fossil-fuel-based flights to fund climate initiatives, ensuring food affordability for residents, and designing agriculture systems that restore ecosystems are essential. Without these measures, the pursuit of prestige could undermine inclusivity and environmental resilience

16. Skills, Knowledge and Education Implications

In this scenario, the Northern Provinces of the Netherlands become Europe's most exclusive culinary region, a "Golden Triangle of Gastronomy." Luxury dining, Michelin-star excellence, and multisensory food experiences define the hospitality and food service sector. This shift creates important implications for the skills practitioners need, the knowledge they must develop, and how education should evolve.

By blending creativity, heritage, and cutting-edge science, education can prepare the next generation to thrive in a region where food is not just a meal, but a symbol of status, culture, and world-leading excellence

16.1 Skills Implications

The sector will rely on highly specialised and creative skills. Industry practitioners will need advanced culinary abilities, from molecular gastronomy techniques to working with rare grains and bioengineered vegetables in experimental farming. Skills in storytelling, sensory design, and guest experience creation become essential, as meals are no longer just food but curated performances. Staff must also master high-level service skills (Michelin Star level) such as wine pairing, table choreography, and personalised hospitality for high-spending guests. As farms become experimental food labs, new skills emerge in regenerative agriculture, ingredient innovation, and close chef–farmer collaboration. Despite some automation, human artistry remains irreplaceable, increasing demand for skilled chefs, sommeliers, food designers, and experience specialists (Schembri, 2025, Martins, 2022).

16.2 Knowledge Development Implications

To support this pure luxury sector, knowledge will need to span multiple domains. Practitioners must understand new culinary techniques, regional culinary heritage, local crops, and artisan traditions, while also staying fluent in food science, flavour chemistry, sustainability, and biodiversity. They must be familiar with how climate change affects ingredients and how to adapt traditional dishes in ways that preserve cultural meaning. Multidisciplinary approach including knowledge of luxury tourism, guest psychology, and exclusivity branding becomes important for attracting elite visitors. Technological literacy also matters, in fields like smart kitchen systems, sensory technology, and digital storytelling tools used to enhance experiences.

16.3 Implications for Education

Education must evolve into a hybrid model where schools and industry work together to grow top-level talent. Traditional classroom learning will no longer be enough. Instead, experimental farms, research kitchens, design studios, Michelin-linked restaurants, and multisensory experience labs become learning environments. Within these spaces students work in multidisciplinary teams, build knowledge through hands-on experimentation, learn directly from the environments and cultural settings around them, take initiative in shaping their own learning trajectories, and apply design innovative culinary and hospitality concepts (Assen et al., 26).

Students learn directly alongside chefs, food scientists, cultural historians, and technologists. Programmes should combine gastronomy, food science, sustainability, heritage studies, design, and business. Because skill shortages are severe, education must provide specialised pathways in fine dining, sensory gastronomy, high-end service, fermentation science, ingredient innovation, and farm-to-table collaboration.

17. Scenario 4: The Desire for a Regenerative Future

Figure 5: The Desire for a Regenerative Future (Image Created by Co Pilot on 01022026)

17.1 Essential Question:

Q. What is your utopia desire for hospitality and food service sector in the Northern Provinces?

In an ideal future, the hospitality and food service sector of Friesland, Groningen, and Drenthe would embody a model of regeneration and balance, where culinary excellence coexists with social and environmental responsibility. This vision prioritizes local food systems, ensuring that rare grains, heritage crops, and sustainably sourced seafood form the backbone of Michelin-level dining experiences. It creates quality jobs that attract and retain talent through fair wages, continuous learning, and cultural pride, while fostering collaboration between chefs, farmers, and technologists. The sector would champion eco-friendly practices, from zero-waste kitchens to carbon-neutral supply chains, supported by progressive environmental legislation that safeguards biodiversity and rural landscapes. Ultimately, this utopia transforms the Northern Provinces into a global benchmark for, luxury rooted in authenticity and sustainability where prestige does not come at the cost of community or planet.

17.2 Scenario Story

By 2075, the Friesland Islands had become a living laboratory of regenerative hospitality, where the rhythm of the tides dictated the pace of life and every bite of food told a story of ecological stewardship and cultural resilience. The archipelago of Vlieland, Terschelling, Ameland, and

Schiermonnikoog has evolved into a micro-food ecosystem, uniquely tailored to its landscape and biodiversity.

On Vlieland, chefs worked hand-in-hand with marine biologists to cultivate seaweed forests and shellfish beds, transforming ocean harvests into restaurant worthy dishes. Terschelling became the island of grains, reviving ancient cereals like einkorn and spelt through salt-tolerant farming techniques. Ameland specialized in wild herb gastronomy, blending foraged botanicals with bioengineered vegetables designed for nutrient density and flavor. Schiermonnikoog embraced closed-loop aquaponics, creating a self-sustaining cycle where fish farming and vegetable cultivation thrived in harmony.

Hospitality careers were deeply interwoven with nature and culture. Islanders trained as eco-hosts, combining the roles of chef, guide, storyteller, and conservationist. Guests didn't just dine, they embarked on immersive journeys, learning how their meals supported dune restoration, bird habitats, and carbon-neutral farming. Youth programs ensured that islanders stayed and thrived, turning hospitality into a source of pride and purpose rather than seasonal work.

The Friesland Islands stood as a beacon of regenerative luxury, proving that exclusivity and sustainability could coexist. Here, prestige was measured not by opulence alone, but by the depth of connection between people, place, and planet in order to create a future where hospitality healed rather than consumed.

17.3 Scenario Characteristics

17.3.1 Climate Vulnerability

The ecosystem of the Friesian Islands depend on fragile marine and coastal ecosystems. Rising sea levels and storm surges could disrupt aquaponics systems on Schiermonnikoog (Temmerman, 2022) and shellfish farms on Vlieland (Dickson et al., 2023), requiring costly adaptive infrastructure like floating farms and salt-tolerant crops (Wiertsema, 2021).

17.3.2 Talent Retention

However, small populations on Vlieland and Schiermonnikoog risk losing youth to mainland cities unless strong cultural and economic incentives exist, creating chronic labor shortages and reliance on automation (El Hajal and and Yeoman, 2024, Yeoman and McMahon-Beattie, 2024a)

17.3.3 Balancing Exclusivity and Community Access

High-value tourism on Ameland and Terschelling could price out locals. Without inclusive policies, cultural authenticity may erode, turning heritage into staged performance rather than lived reality (Clarke and Ng, 1993).

17.3.4 Technological Dependence

Each Friesian island could be considered as its own micro-food ecosystem (Arts and Weilenga, 2025) implying advanced systems like aquaponics and bioengineering. Over-reliance on external technology providers for these systems could make islands vulnerable to supply chain disruptions, requiring local technology capacity building for resilience (Iravani et al., 2017, Kourtit et al., 2011).

17.3.5 Regulatory and Ethical Challenges

Bioengineered crops on Terschelling or labatory-grown seafood on Vlieland may raise questions about food safety and cultural integrity, demanding transparent labeling and strong legislation (Munshi and Sharma, 2018).

18. Weak Signals

18.1 Regenerative Hospitality

Description: Regenerative hospitality moves beyond sustainability by actively restoring ecosystems and communities through tourism and dining practices (Dredge, 2022). It positions hospitality as a force for ecological healing rather than mere resource consumption (Inversini et al., 2023).

Example Now: *De Nieuwe Winkel* in Nijmegen (Michelin Green Star) sources ingredients from Ketelbroek Food Forest, an agroforestry project that regenerates soil and biodiversity while supplying fine dining.

18.2 Youth Engagement Through Regeneration

Youth engagement in regenerative tourism (Scheyvens and Kaire Gataulu, 2025) is gaining traction through training programs that blend entrepreneurship, sustainability, and cultural stewardship. These initiatives aim to retain local talent by turning hospitality into a purpose-driven career path rooted in ecological and social impact. The result is a new generation of islanders who see tourism as a regenerative force rather than seasonal labor.

Example Now: The European Youth Roots project equips young entrepreneurs with tools to develop sustainable tourism businesses across coastal and cultural regions.

18.3 Culinary-Marine Collaboration

Description: A new form of culinary innovation is emerging where chefs collaborate directly with marine biologists to design regenerative ocean-based food systems (Moreau and Speight, 2019). These partnerships go beyond sourcing ingredient, they restore ecosystems like seaweed forests and shellfish beds while crafting high-end dishes. The result is cuisine that's both ecologically restorative and gastronomically elite (Pérez-Lloréns, 2019).

Example Now: In Zeeland, Dutch chefs Eco-Host as a Hybrid Career

18.4 Eco-Host as a Hybrid Career

Description: Hospitality roles are evolving into hybrid careers (Ramya et al., 2025)where individuals act as chefs, guides, conservationists, and storytellers. These eco-hosts offer immersive experiences that connect guests to local ecology and culture, turning tourism into a source of pride and purpose. It's a reimagining of service work as ecological stewardship (Kim et al., 2025).

Example Now: Scotland's food tourism strategy promotes immersive experiences led by

trained locals who combine culinary skills with nature guiding are working with marine ecologists to develop seaweed-based menus sourced from local aquaculture projects.

18.5 Closed-Loop Aquaponics in Hospitality

Description: Aquaponics systems are being integrated into hospitality venues, merging food production with guest experience (Gillion, 2024, Dayawansha, 2024). These closed-loop systems conserve water, reduce waste, and offer visitors hands-on learning about regenerative agriculture. They represent a fusion of sustainability and luxury (Silva, 2025, Kim et al., 2025).

Example Now: Eco-resorts in Costa Rica like Tilajari and Playa Cativo use aquaponics to supply kitchens and educate guests.

Job Title: Culinary Ecologist

Location: Terschelling

Role Overview:

The Culinary Ecologist is a pioneering role at the intersection of gastronomy, ecology, and cultural heritage. Based on Terschelling, renowned for its regenerative hospitality practices—you will lead the design of food systems that reflect the island's unique biodiversity and seasonal rhythms. This role blends scientific insight with culinary creativity to craft immersive dining experiences rooted in ecological stewardship

Key Responsibilities

- Collaborate with ecologists and local producers to source and cultivate ingredients aligned with regenerative principles.
- Develop seasonal, place-based menus that reflect ecological cycles, cultural narratives, and sustainability goals.
- Conduct field research on local biodiversity, soil health, and climate-adaptive food practices.
- Train hospitality staff and eco-hosts in the ecological and cultural significance of ingredients and preparation methods.
- Lead guest workshops and tasting journeys that connect cuisine to habitat restoration and carbon-neutral practices.
- Document and share findings through culinary journals, regional food networks, and sustainability forums.

Required Skills & Qualifications:

- Advanced degree or equivalent experience in agroecology, food systems, or culinary arts.
- Proven experience in sustainable menu development and ecological food sourcing.
- Familiarity with regenerative agriculture and biodiversity-based culinary design.
- Strong storytelling and public engagement skills, ideally within hospitality or education.
- Ability to work cross-disciplinarily with farmers, chefs, scientists, and cultural stewards.
- Fluency in Dutch and English; Frisian language skills a plus.

Outlook

As Terschelling continues to evolve as a model for regenerative hospitality, the Culinary Ecologist will play a central role in shaping its identity and influence. This position offers the opportunity to redefine luxury through ecological connection, turning food into a medium for healing landscapes and deepening cultural understanding. Long-term pathways include regional leadership, academic collaboration, and innovation in climate-resilient cuisine.

19. Sustainability Implications

This scenario presents profound sustainability implications, positioning hospitality as a regenerative force rather than an extractive industry. Positive feedback loops emerge through collaboration among chefs, farmers, technologists, and government policies prioritizing sustainability. Environmentally, hospitality actively repairs ecosystems by integrating innovations such as closed-loop aquaponics, seaweed forests, and shellfish beds that act as carbon sinks, improve water quality, and restore marine biodiversity. Farming methods aligned with natural rhythms reduce ecological disturbance, while dune restoration and bird habitat protection become integral to tourism experiences. Socially, the sector addresses long-standing challenges like youth retention by creating new careers such as eco-hosts, roles that combine culinary arts, environmental stewardship, and cultural interpretation thus transforming seasonal jobs into lifelong professions rooted in pride and purpose (Kim et al., 2025, Dredge, 2022).

However, achieving true regeneration requires vigilance to avoid overlooking foundational sustainability measures. Before creating positive value, efforts must halt biodiversity loss, phase out fossil fuels, and ensure circular systems for food and energy. While salt-resistant crops and climate-adaptive farming support food sovereignty, dependency on international tech firms poses risks that can be mitigated through partnerships with local universities. Sustainability must extend beyond ingredients to encompass architecture, décor, and operations, using bio-based materials and biophilic design to enhance well-being (Cavagnaro, 2025a). Transparency and credibility are critical: eco-hosts and regenerative claims should be backed by science-based evidence stored in accessible databases maintained with independent institutions. Ultimately, this scenario demands advanced knowledge of ecosystem dynamics, carbon cycles, and habitat restoration, alongside skills in translating sustainability science into immersive guest experiences thus making hospitality a driver of ecological and cultural resilience (Sheldon, 2021).

20. Skills, Knowledge and Education Implications

In this utopian scenario, the hospitality and food service of the Friesland Islands becomes a model of regeneration, balance, and cultural pride. Here, food is not only a source of pleasure but a way to heal landscapes, preserve traditions, and support communities. Hospitality blends seamlessly with eco-friendly practices, creating a sector that is luxurious, meaningful, and sustainable. This scenario brings important implications for the skills practitioners need, the knowledge they must develop, and how education should evolve.

In this utopia, hospitality does not just serve food; it sustains life, community, and the future of the Northern Provinces.

20.1 Skills Implications

Industry practitioners will need a uniquely broad and integrated skillset. Instead of specialising in only one area, “eco-hosts” combine the roles of chef, guide, storyteller, conservationist, and cultural ambassador. Skills in foraging, regenerative farming, seaweed and shellfish cultivation, and aquaponics become essential. Practitioners must be able to explain ecological cycles and regenerative principles to guests, lead immersive experiences, and cook with ingredients grown in fragile island ecosystems. Emotional intelligence, cultural sensitivity and significance, and

place-based knowledge become just as important as culinary expertise. Because climate change increases vulnerability, skills in adaptation, problem-solving, and system resilience are also vital.

20.2 Knowledge Development Implications

Knowledge must develop across multiple layers: ecology, food science, biodiversity, cultural history, and technology. Practitioners will need to understand ecosystems, soil health, salt-tolerant crops, and biodiversity restoration. They must also know how heritage ingredients can be adapted without losing cultural meaning. At the same time, they need familiarity with technological tools such as closed-loop aquaponics, climate-adaptive farming techniques, and food bioengineering. Ethical knowledge becomes essential, especially around transparency, labeling, and cultural integrity when using advanced food systems. This blending of traditional wisdom with scientific understanding is crucial for maintaining authenticity in a high-tech future.

20.2.1 Implications for Education

Education must adopt a living lab model rooted in the islands themselves. Learning takes place in dune landscapes, tidal zones, aquaponic systems, food forests, and community kitchens. Schools, universities, and local businesses collaborate closely so that learning, research, and real-world practice happen together. They focus on tasting journeys. In these settings, students work together across disciplines and with the industry, build understanding through hands-on experimentation, learn directly from the ecological and cultural environments around them, take responsibility for shaping their own learning pathways, and use creative design methods to develop regenerative solutions for the islands (Assen et al., 2026)

Programmes should integrate ecology, hospitality, food science, heritage studies, storytelling, and regenerative design. Youth engagement is critical: education must create clear pathways for islanders to stay, thrive, and build meaningful careers through hospitality that protects their home. By connecting people, place, and purpose, education becomes a tool for long-term resilience, ensuring that the sector continues to restore ecosystems, strengthen culture, and inspire guests from around the world (de Boer, 2026).

21. What are the key decisions across all scenarios from a business, curriculum and sustainability perspective?

21.1 Key Decisions: A Business Perspective

The five most important decisions across all scenarios include:

21.1.1 Decide the Region's Core Strategic Positioning

The most fundamental decision is whether the Northern Provinces will compete on technological efficiency, cultural authenticity, exclusive luxury, or regenerative experience design—or deliberately combine elements into a hybrid model. This choice shapes investment priorities, talent development, branding, visitor targeting, and the overall economic identity of the region.

21.1.2 Build Resilient and Differentiated Supply Networks

Across all scenarios, control over distinctive supply chains matters. Whether it is biotech driven ingredients, heritage grains, experimental luxury crops, or island-based regenerative systems, businesses must decide which supply chain assets to invest in and protect. This includes partnerships with farms, labs, universities, and cultural organisations.-driven ingredients, heritage grains, experimental luxury crops, or island-based regenerative systems, businesses must decide which supply chain assets to invest in and protect. This includes partnerships with farms, labs, universities, and cultural organisations.

21.1.3 Invest in Talent Pipelines Aligned to the Chosen Future

Each scenario demands different skill profiles; robotics engineers, cultural storytellers, Michelin-level chefs, or hybrid eco-hosts. A strategic decision is required on which talent ecosystems to build, how to attract or retain them, and how to structure long-term capability development in hospitality and food service.

21.1.4 Choose Technology Adoption Levels and Governance Models

From full automation to light augmentation, businesses must decide how far they go with AI, robotics, data systems, and food production technologies. This includes governance, security, brand trust, ethical use of AI, tech partnerships, and a long-term risk management.

21.1.5 Design Distinctive Experience and Business Models

Whether built on speed, storytelling, exclusivity, or immersive place-based journeys, businesses must make deliberate choices about the kinds of experiences they want to sell. This decision shapes pricing, infrastructure, brand identity, marketing, and revenue models (high-volume, premium, ultraluxury, subscription, or multiday experiential packages).-based journeys, businesses must make deliberate choices about the kinds of experiences they want to sell. This decision shapes pricing, infrastructure, brand identity, marketing, and revenue models (high-volume, premium, ultra-luxury, subscription, or multi-day experiential packages).

21.2 Key Decisions: A Curriculum Perspective

The five key curriculum decisions across all scenarios are;

21.2.1 Decide the Core Competency Mix: Technical, Cultural, Experiential, or Ecological

Each scenario privileges different capabilities—robotics and AI (Scenario 1), cultural and sensory interpretation (Scenario 2), elite culinary artistry (Scenario 3), or ecological literacy (Scenario 4). A central decision is how to balance these into a coherent competency framework. The curriculum must determine the proportion of technology, craft, heritage, and systems thinking required for future-ready graduates.

21.2.2 Define the Learning Environment Model

All scenarios imply a move beyond traditional classrooms toward varying forms of living labs: automated labs (Scenario 1), community and heritage sites (Scenario 2), Michelin linked innovation kitchens (Scenario 3), or ecological field labs (Scenario 4). A critical decision is the investment in physical and experiential learning spaces aligned with multiple possible futures.-linked innovation kitchens (Scenario 3), or ecological field labs (Scenario 4).

21.2.3 Establish Transdisciplinary Integration Pathways

Whether it is combining engineering with hospitality, anthropology with gastronomy, or ecology with culinary arts, the curriculum must determine which disciplines integrate, how, and to what depth. This decision shapes programme design, faculty expertise, and partnerships.

21.2.4 Build Long-Term Industry and Knowledge Partnerships

Each scenario requires strong external collaboration with technology firms, cultural organisations, luxury restaurants, or ecological institutes. A key decision is which partnerships to prioritise and how to embed them structurally into curriculum delivery, thus establishing firm life long learning systems.

21.2.5 Select an Assessment Philosophy that Matches Future Skills

Graduates may need to demonstrate mastery of automated systems, storytelling, multisensory menu design, or regenerative project work. A strategic decision is how to design assessment models that measure and monitor not just competence but creativity, adaptability, and system-level thinking across all futures.

21.3 Key Decisions: A Sustainability Perspective

These are the fop five decisions based upon the four scenarios;

21.3.1 Set a Net-Zero & Nature-Positive Operating Standard

Define binding and science-based targets for emissions, energy mix (renewables share), and biodiversity outcomes (e.g., habitat restored per € of revenue). Require every concept whether robotic fast-food, heritage kitchens, Michelin clusters, island lodges to operate on a verifiable pathway with annual public reporting and third-party assurance.-party assurance.

21.3.2 Choose Circular Design Principles for Food, Water, and Materials

Adopt circular KPIs across menus and assets: food waste ≤10%, mandatory upcycling/valorisation streams, water recirculation where feasible, and low impact materials (fittings, uniforms, packaging) with repair/reuse policies. Bake circularity into procurement contracts and kitchen design from day one.-impact materials (fittings, uniforms, packaging) with repair/reuse policies. Bake circularity into procurement contracts and kitchen design from day one.

21.3.3 Lock In Traceable, Ethical, and Resilient Supply Chains

Mandate end-to-end traceability (digital passports) for ingredients, whether cultured proteins, heritage grains, or premium produce. Set redline criteria on deforestation free, fair labour, animal welfare, and local livelihood benefits. Choose local suppliers to mitigate climate and geopolitical shocks; maintain contingency menus for disruptions.-to-end traceability (digital passports) for ingredients-line criteria on deforestation-free, fair

21.3.4 Implement Credible Certification & Data Governance

Select a minimal, science-based certification stack (e.g., carbon accounting standard + biodiversity metric + circularity label) and unify guest facing claims under one transparency dashboard. Establish data governance for AI/ Internet of Things (IoT) kitchens to measure energy, waste, and sourcing impacts without compromising privacy or greenwashing.-based certification stack (e.g., carbon accounting standard + biodiversity metric + circularity label) and unify guest-facing claims under one transparency dashboard. Establish data governance for AI/

21.3.4 Invest in Place-Based Adaptation & Community Benefit

Ringfence a share of capital and operating expenditure (e.g., 1–2% of turnover) for local adaptation: flood defenses, soil/salt-tolerant crops, marine habitat projects, forest stewardship, and community training. Tie operating licenses or incentives to local hiring, supplier development, and shared infrastructure (e.g., district energy, composting hubs).-fence a share of -tolerant crops, marine habitat projects, forest stewardship, and community training. Tie operating licenses or incentives to local hiring, supplier development, and shared infrastructure (e.g., district energy, composting hubs).

22. The Need for a Fifth Scenario – Middle Pathway

The workshops with key decision makers, suggested a middle pathway where the scenarios would be combined representing everyday dining. This is the scenario called *The Everyday Northern Table*.

By 2075, a large segment of the hospitality and food service sector in the Northern Provinces has settled into a stable, pragmatic middle ground known as *The Everyday Northern Table*. These restaurants are neither fully automated nor artisanal outliers; instead, they blend practical technology with human-c-entred service to deliver reliable, affordable, and recognisably local dining experiences.

Menus focus on familiar dishes updated with climate-adapted ingredients and simple smart-kitchen efficiencies. Kitchens use semiautomated tools including AI-assisted preparation

systems, portioning sensors, and waste-tracking software but retain human cooks for quality, consistency, and emotional connection. Service remains personal but streamlined: digital ordering exists alongside traditional table service, allowing restaurants to adapt to diverse customer preferences.-adapted ingredients and simple smart-kitchen efficiencies. Kitchens use semi-automated tools-assisted -tracking software

Supply chains combine local producers for core ingredients with regional hubs for affordability and stability. Restaurants operate on hybrid business models with part dine in, part convenient takeaway, and part subscription meal plans thus catering to families, commuters, and budget conscious guests who still value place-based food.-in, part convenient takeaway, and part subscription meal plans-conscious guests who still value place-based food.

The workforce is composed of multiskilled staff who manage both people and technology. Roles such as “kitchen operator chefs” and “guest experience coordinators” emerge, blending operational oversight, customer service, and light tech management.-skilled staff who manage both people and technology. Roles such as “kitchen operator-chefs” and “guest experience coordinators” emerge, blending operational oversight, customer service, and light tech management.

The Everyday Northern Table becomes the backbone of the regional dining economy: dependable, scalable, and community focused. It preserves the warmth and familiarity of traditional hospitality while embracing practical innovation. In a world of extremes of hyper automation, heritage immersion, luxury theatrics, and regenerative ecosystems this middle path scenario anchors daily life with comfort, stability, and balanced progress.-focused. It preserves the warmth and familiarity of traditional hospitality while embracing practical innovation. In a world of extremes-automation, heritage immersion, luxury theatrics, and regenerative ecosystems-path scenario anchors daily life with comfort, stability, and balanced progress.

23. Conclusion

Across all five scenarios, several clear conclusions emerge about the future of hospitality and food service in the Northern Provinces. First, the sector is moving toward diversification rather than convergence. Whether through automation, cultural anchoring, luxury experience design, regenerative placemaking, or platform-enabled midmarket dining, the future will not be defined by a single dominant model. Instead, different business types will coexist, each targeting distinct markets, talent pools, and investment strategies.-making, or platform-enabled mid-market dining, the future will not be defined by a single dominant model. Instead, different business types will coexist, each targeting distinct markets, talent pools, and investment strategies.

Second, value creation shifts from purely serving food to creating systems, experiences, or identities. In the tech-driven scenario, value lies in data, robotics, and efficiency; in heritage and luxury scenarios, it lies in storytelling and craftsmanship; in regenerative and platform scenarios, it lies in ecosystems and networks. This requires businesses and policymakers to think beyond traditional restaurant economics and invest in capabilities that align with their chosen direction.

Third, talent becomes a strategic battleground. Automation reduces some labour pressures but introduces demand for new skills, while cultural, luxury, and regenerative models require deep

expertise, creativity, or ecological knowledge. Education systems must therefore produce hybrid professionals capable of navigating technology, craft, culture, and systems thinking.

Fourth, supply chains become critical sources of competitive advantage, whether through biotech, local heritage ingredients, experimental farms, regenerative ecosystems, or cooperative purchasing platforms. Control over inputs increasingly shapes resilience and differentiation.

Finally, regional identity must be intentionally designed. The Northern Provinces can position themselves as a technological testbed, a heritage stronghold, a luxury destination, a regenerative model, or a digitally coordinated mid-market region—but each requires aligned policy, investment, and branding. The overarching conclusion: the future rewards clarity of strategic choice and coordinated action across industry, government, and education.

Appendice: A Practical Guide to Using Scenario Planning: Lessons from the 2075 Food Service Futures Project

What is Scenario Planning?

What is scenario planning? Scenario planning is a strategic foresight method that helps organisations explore multiple plausible futures rather than relying on a single forecast. By identifying key driving forces, such as technological change, demographic shifts, environmental pressures, or economic trends and then focusing on the most uncertain and influential among them, scenario planners construct a set of contrasting but internally coherent futures. These scenarios act as lenses through which leaders can better understand uncertainty, challenge assumptions, and reveal risks and opportunities that might otherwise remain unseen (Postma et al., 2025). Once scenarios are developed, they become tools for testing the resilience of strategies, policies, or business models. Organisations can ask, "How would this strategy perform if this scenario were true?" or "What capabilities would we need in a world like this?" In doing so, scenario planning not only strengthens long-term thinking but also fosters creative problem-solving and innovation. It encourages decision-makers to navigate complexity with greater confidence, ensuring they are prepared for a range of possible futures rather than being blindsided by change. This is what we have done for this project as stated in the project brief.

The central research question is 'What will the food sector look like in the Northern Provinces of the Netherlands in 2075?

In this appendice, we explain how scenario planning was applied for the Nooderport projects

Step 1: Start by defining why scenario planning is necessary for the problem at hand

- Scenario planning begins by clarifying why an organisation cannot rely on traditional forecasting, and in the 2075 Northern Provinces project this need was obvious, as the region faces deep-time forces, such as climate change, demographic decline, technological automation, and shifting cultural identities—that unfold over decades and interact unpredictably.
- The 50-year horizon to 2075 was intentionally chosen because shorter timeframes would be dominated by existing constraints like budgetary cycles, short-term labour shortages, and current political issues, all of which would limit thinking; a distant horizon freed participants to imagine long-range structural change.
- Scenario planning therefore provided a structured way for regional leaders, educators, and policymakers to explore transformative possibilities rather than extrapolations of today, and to prepare for divergent futures where food systems, hospitality models, and consumer expectations could look radically different.

Step 2. Frame a precise central research question to anchor the entire process

- A high-quality scenario exercise always begins with a single clear question, and in this project the organising question was: “What will the food service sector look like in the Northern Provinces of the Netherlands in 2075?”, which directed all research and ensured conceptual coherence.
- By formulating the question in this way, the project avoided drifting into unrelated territory and kept attention focused on long-term transformations shaping hospitality, culinary identity, sustainability, talent pipelines, and technological integration.
- This question also ensured that the eventual scenarios were directly relevant to the strategic decisions Noorderpoort and regional actors needed to make about education, sustainability planning, curriculum development, and economic positioning.

Step 3. Establish the boundaries of the system to ensure analytical focus

- Scenario planning becomes effective only when the scope is well defined, and in this project the system under study included the entire food service value chain—restaurants, cafés, catering, culinary training, workforce development, regional supply chains, and food-related tourism.
- Because long-term futures depend on cross-sector linkages, the scope also incorporated climate scenarios, sustainability transitions, food production systems, demographic changes, and cultural heritage.
- At the same time, the team intentionally excluded short-term political volatility, national-level economic forecasting, and detailed predictive modelling, as these factors would distract from exploring broad and deep structural forces relevant to 2075.

Step 4. Build the methodological scaffolding using an ontological framework and the Shell method

- The 2075 project used Kim et al. (2025) ontological scenario typology, which distinguishes between prediction, prognosis, utopia, and science-fiction futures (Bergman et al., 2010), ensuring the scenarios explored fundamentally different worldviews rather than minor variations of the same logic.
- This approach was combined with Pierre Wack’s Shell method (Chermack and Coons, 2015), which emphasises the importance of identifying drivers of change, mapping critical uncertainties, and challenging the mental models that organisations use to make assumptions about the future.
- By merging ontology with the evidence-driven Shell process (Chermack and Coons, 2015, Wack, 1985, Wack, 1984), the team created a methodological foundation capable of producing scenarios that were imaginative yet analytically grounded, diverse yet coherent.

Step 5. Identify the two critical uncertainties and construct the scenario matrix

- The team next determined which uncertainties would have the greatest structural influence on the future of food service, ultimately selecting the nature of food consumption (hedonistic vs. bohemian) and the degree of access (exclusive vs. community-based) as the two axes of the scenario matrix.
- The horizontal axis captured whether food in 2075 would be driven by experimental, pleasure-seeking, globally influenced consumption (hedonistic) or by traditional, rustic, heritage-based practices rooted in regional culture (bohemian).
- The vertical axis represented whether food experiences would be accessible to all residents and visitors (community access) or limited to high-value, premium, niche markets (exclusive access).
- When intersected, these two axes created four distinct quadrants—each representing a radically different future identity for the Northern Provinces—and these quadrants formed the foundation for the first four scenarios.
- Importantly, the matrix reflected the region's real tensions: the push between high-tech efficiency and cultural authenticity, the friction between inclusive access and elite experience, and the contrast between global culinary cosmopolitanism and provincial identity.

Step 6. Conduct rigorous evidence-gathering to ensure plausibility

- Scenarios require a strong empirical base, and the team drew from a wide spectrum of data, including demographic shifts, CBS economic indicators, Euromonitor consumer analyses, KNMI climate projections, cultural studies, food technology literature, sustainability research, and global hospitality trends.
- This evidence helped identify the drivers of change most relevant to 2075, such as automation in kitchens, cultured meat systems, regenerative agriculture, multisensory gastronomy, shifting youth demographics, talent shortages, biodiversity decline, rising sea levels, and the cultural revival of local ingredients.
- By integrating both weak signals (like neural-interface ordering or seaweed forests) and dominant trends (like AI-driven efficiency or climate adaptation), the team ensured each scenario reflected plausible long-term developments rather than speculation.

Step 7. Draft the four initial scenario narratives directly from the matrix

- The upper-left quadrant, *hedonistic and community-access* produced *Dr Spock's Fast Food Franchise*, a future dominated by automation, robotics, cultured proteins, neural interface ordering, and fully automated kitchens that make high-tech dining affordable to all (see *Figure 6: Scenario Matrix adapted from Kim et al* (Kim et al., 2025))
- The lower-left quadrant, *bohemian and community-access* became *The Roots of Provincial Cuisine*, a future where Friesland, Groningen, and Drenthe embrace cultural identity, storytelling, heritage grains, forest gastronomy, foraging, and climate-resilient local ingredients.

- The upper-right quadrant, *hedonistic and exclusive* became *Pure Luxury*, a future in which the region becomes Europe's most exclusive culinary destination, defined by Michelin-star clusters, multisensory dining, experimental farms, and the dominance of elite tourism.
- The lower-right quadrant, *bohemian and exclusive* became *The Desire for a Regenerative Future,* a utopian future where the Frisian Islands become regenerative micro-food ecosystems, integrating seaweed forests, aquaponics, biodiversity conservation, eco-hosting, and ecological tourism.
- Each scenario was deliberately differentiated not by minor variables but by its underlying worldview technological progress, cultural revival, luxury exclusivity, or ecological regeneration.

Step 8. Test and refine the scenarios through stakeholder workshops and expert interviews

- Scenario planning becomes powerful when enriched by real-world insight, and two major workshops allowed stakeholders including hospitality professionals, educators, students, policymakers, and regional advisors to critique and refine the draft scenarios. This workshop involvement was important to ensure stakeholders 'bought into' the scenarios' and ensure acceptance of the scenarios rather than rejection, hence the importance of iteration throughout the project with Nooderport and stakeholders. (Gabriel, 2014, Wright and Cairns, 2011)
- These sessions challenged assumptions about labour markets, consumer behaviour, sustainability risks, supply-chain resilience, regional branding, and technological adoption, ensuring each scenario reflected local context rather than external theory alone.
- Expert interviews with chefs, restaurateurs, hotel managers, and economic advisors added depth by highlighting operational realities, from current sustainability constraints to emerging culinary trends, tourism patterns, and technological feasibility.
- This participatory validation ensured that the scenarios became shared mental models for the region, not simply academic constructs.

Step 9. Add a fifth scenario to represent a balanced, everyday future

- Stakeholders expressed that the four extremes while methodologically useful—did not represent the future most residents and businesses might actually experience, prompting the creation of *The Everyday Northern Table*, a hybrid scenario combining practicality, affordability, light automation, local food traditions, and accessible sustainability.
- This scenario became a realistic reference point for regional planning because it showed how moderate technological adoption, blended service models, and community-oriented dining could form the backbone of the everyday hospitality economy.
- It acted as the stabilising centre of the scenario set, ensuring that planning did not gravitate solely toward radical or utopian futures.

Step 10. Use the scenarios to analyse implications for business, education, and sustainability

- The team used the five scenarios to map long-term business implications such as workforce needs, supply-chain diversification, technological investment strategies, price models, brand differentiation, and culinary innovation pathways.
- Educators used the scenarios to identify future skillsets required for 2075, from automation and AI literacy to heritage stewardship, luxury-service mastery, ecological gastronomy, and multidisciplinary design thinking—ensuring that curricula anticipate rather than react to change.
- Sustainability experts used the scenarios to explore ecological risks and opportunities, including the environmental impact of automation, the regenerative potential of island ecosystems, the carbon footprint of luxury tourism, and the possibilities of circular food systems.
- This structured implications analysis allowed each scenario to become a practical decision-making tool rather than simply a narrative exercise.

Step 11. Translate scenario insights into strategic decisions that can be made today

- The final step involved identifying which decisions remain important across all scenarios, such as defining the region's strategic identity, building resilient supply networks, developing long-term talent pipelines, and embedding sustainability into every layer of policy and practice.
- Scenario planning revealed where the region must invest regardless of how the future unfolds skills, sustainability, education, supply chains and where flexibility is essential, such as technology adoption levels or experiential business models.
- Because each scenario highlighted different risks and opportunities, the exercise allowed leaders to build strategies robust enough to thrive in multiple futures, ensuring reslience against uncertainty and readiness for transformation.

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