SEASONED™

# D4.2 Report on Industrial Sustainability Strategy

**July 2025**

## WP4 - Sustainability actions to step up and continuously grow UPWr's excellence

Funded by
the European Union

**PROJECT SUMMARY**

# FOOD SENSORY SCIENCE RESEARCH.

The project aims is to improve the knowledge, skills, and competencies of the research and admin staff of UPWr in the field of the sensory evaluation of food and consumer behaviour with special attention to newly designed innovative processed food products with healthrelated properties. The project also aims to establish an international network among leading universities and centres in food sensory analysis to prepare competitive research applications/proposals within the EU and global challenges (UN SDGs).

The project aims to establish an international network of leading universities, centres in food sensory analysis and innovation consultants (SDU, UMH, BCC, REDINN) to step up in science and research, improving managerial and administrative capacities, networking skills and strategies to engage society and citizens as well as public authorities and private businesses, and regional and European institutions. SEASONED will enable FBFS and its partners, leading research institutions from Spain, Denmark, and Italy, to co-develop a capacity building programme to share and integrate expertise and skills to access new research avenues and develop new approaches to prepare competitive research applications within the EU and global challenges (Green Deal, UN SDGs). Implementing Gender Balance Monitoring, Open Science, Citizen's Engagement, FAIR data research principles, and monitoring of Key Performance Indicators project will create short–to long-term societal, scientific, and economic impacts. Ultimately, UPWr's ambition is to develop and reach the top of the sensory evaluation centres' competencies and become the leading centre of excellence in Central and Eastern Europe (CEE). As a result, at the end of the project and far beyond the project duration, UPWr wants to establish a Consumer Behaviour Centre (CBC). SEASONED CBC will be a unique platform dedicated to scientists (ESRs including the MSc and PhD students, ERs, other scientists from national and international units), business partners and consumers from this part of Europe.



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[1] PU – Public, fully open (Deliverables flagged as public will be automatically published in CORDIS project's page), SEN – Sensitive (limited under the conditions of the Grant AgreementConsortium and the EC)

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| List of Abbreviations and Acronyms | |
|---|---|
| BCC | Basque Culinary Centre |
| CBC | Consumer Behaviour Centre |
| DDB | Danish Dairy Board |
| E3S | European Sensory Science Society |
| EAFRD | European Agricultural Fund for Rural Development |
| EIB | European Investment Bank |
| EUDR | EU Deforestation Regulation |
| ERDF | European Regional Development Fund |
| ESF+ | European Social Fund+ |
| ESG | Environmental, Social, and Governance |
| ETS | Emission Trading Scheme |
| MAPP | MArket-based Process and Product Innovation in the Food Sector |
| PTTZ | Polish Food Technologists' Society (Polskie Towarzystwo Technologów Zywności) |
| REDIII | Renewable Energy Directive III |
| REDINN | European Network for Innovation (Rete Europea Dell'INNovazione) |
| RRF | Recovery and Resilience Facility |
| SDU | South Denmark University |
| SSF | Sensory Science Facility |
| UMH | University Miguel Hernàndez |
| UPWr | Wroclaw University of Environment and Life Sciences |

# Executive Summary

UPWr is recognised for its excellence in the domain of sensory science. Both nationally and internationally. The consensus among experts is that it has cutting-edge instrumentation and laboratory facilities, excellent technical and scientific support staff, and a demonstrated ability to serve the innovation and growth-related needs of local food and beverage companies.

As the domain of sensory science evolves, so too will its role as a driver of innovation and growth for the food and beverage sector. The sensory science group at UPWr, an informal network led by Prof. Kita, has the potential to greatly expand the role it currently plays with the local food and beverage industry. Now is a good time to reflect upon how to unlock this potential, transforming the existing group into a service-oriented Sensory Science Facility, to be integrated into a Consumer Behaviour Centre, which UPWr plans to develop in the future, that will achieve financial autonomy on the basis of the scientific and technical services it provides, while acting as a driver of growth and development for the local food and beverage sector.

The transformation of the current structure where the provision of sensory science services is based on informal arrangements relying on staff, laboratories and scientific instrumentation belonging to a wide range of departments, into an efficient service-oriented enterprise, responsive to the changing needs of industry, will require the establishment of a new entity. One that is able to operate in ways that are significantly different from those of academic departments or technology transfer offices.

This report outlines the principles on which such an entity might operate. It outlines a roadmap for how a successful transition might be achieved.

# Introduction

This document presents a strategy for the creation of a Sensory Science Facility or SSF, at UPWr. This is intended to serve the food and beverage industry in the region, and where appropriate, in Poland and its neighbouring states.

Developed with support of the EU funded SEASONED project, this strategy builds upon the existing scientific and technical capabilities of the sensory science group at UPWr, on the recent initiatives to enhance its ability to provide high quality services to local industry, and on its relationship with the **E3S**[2] which brings together the national sensory science institutions of fifteen European countries. The SSF should one day become integrated within the planned Consumer Behaviour Centre or CBC, whose creation is part of the long-term strategy of UPWr. However, as concrete plans for the CBC are still not clear, the present document refers essentially to the sensory science component of the future CBC, for which the SEASONED project has laid a solid basis.

UPWr already has a high level of scientific and technical capability, acquired over many years. Its capabilities in sensory science and in other areas of relevance for the food and beverage industry are scattered across different university departments. These are organized as a network under the leadership of Prof. Agnieszka Kita. This network involves staff from various departments but has not yet been formalised within the university's structure. It receives basic budgetary support from the university system via the departments which take part in its activities and has been very successful obtaining research grants from EU and national programs, despite the competitive nature of those programs. On the basis of such funding, it has been able to develop cooperation with industry. So far, the relationship with industry is based on co-p articipation in EU or nationally funded projects for research and innovation, as well as on service requests from industry for testing or analysis. Usually for small scale assignments.

The ambition of the sensory science group at UPWr is to further develop its activities, deepening its relationship with local industry, and increasing its sources of revenue. It aims to become a key player in the growth and development of the food and beverage sector in and beyond the region. To the point where it achieves financial autonomy. More specifically, to the point where it no longer relies on ad-hoc project finance based on success in winning highly competitive calls of EU and national programs, but on regular predictable income from the routine provision of services to industry.

The details of how the SSF will evolve in the coming years, and what it will become over a period of ten years, are impossible to provide at this point. These will emerge on the basis of a process of engagement with local industry. They will depend on the preparedness of local industry to provide inputs to the university on its future needs from sensory science, on its appetite for

[2] The European Sensory Science Society, https://e3sensory.eu

innovation, and on the manner in which it adopts sensory science as a driver of new product development and quality management in the coming years.

Nevertheless, it is possible to describe the process by which the SSF at UPWr can develop and achieve its ambitions for the future. The main task of this document is therefore to describe as clearly as possible the stages through which UPWr can navigate to realize its ambition of becoming a financially autonomous provider of scientific and technical services to the food and beverage sector, playing a key role in the growth and development of the region.
This document is the result of work led by UPWr and REDINN with the active involvement of the other partners such as the UMH, BCC and SDU. [3] These have provided invaluable inputs and feedback, based on their own experience and on successful models which have emerged in their countries and regions throughout the project life.

## The Status of Sensory Science at UPWr

UPWr is a relatively small university, with a student population of about 7,000. The university focuses on Lifesciences, embracing fields that range from biotechnology to animal sciences, and food and nutrition technology.

UPWr has a very good scientific reputation. It is recognized not only in Poland, but internationally. Every year it is ranked highly for its teaching, for its production of patents and for its ability to access research funding. In the international Shanghai Ranking it is listed as being among the best universities in the world in the fields of Food Science & Technology. According to the 2024 Perspektywy[4] ranking of the more than five hundred universities in Poland, UPWr ranked:

- No 26 overall, up from No. 30 in 2023
- No 1 in the area of natural sciences and agriculture,
- No. 15 overall in terms of scientific efficiency
- No. 1 for scientific efficiency in the area of natural sciences and agriculture

As a domain of scientific inquiry, sensory science is considered to be a part of Food and Nutrition Technology. Although this is a recognised area of research excellence at UPWr, it has not been a privileged area for investment compared to other fields within the university. Nevertheless, it has steadily grown under the leadership of Prof. Agnieszka Kita. Since 2011 it has managed to secure funding for investment in equipment. Regional and European funds have been used to build a solid layer of scientific and technical infrastructure. This is currently used for internal research and for the provision of services to local industry. The SEASONED project has helped to

[3] REDINN, https://www.redinn.it
University Miguel-Hernández, https://www.umh.es/?lang=EN
Basque Culinary Centre, https://www.bculinary.com/en/home
South Denmark University, https://www.sdu.dk/en

[4] Perspektiwy University Ranking is an independent foundation that every year ranks Poland's universities (public and privates) to assist candidate university students in their career choice. The ranking evaluates universities based on criteria like prestige, graduates on the labor market, academic potential, and internationalization. The Perspektywy ranking also includes rankings by subject and by type of university (private, public academies of applied sciences, and state higher vocational schools). https://2024.ranking.perspektywy.org

raise awareness of the role of sensory science at the university, enabling further investment in instrumentation and reinforcing the capabilities of the researchers involved.

The challenge now is to embed sensory science in the growth and development of the local economy. This requires expanding existing services, and developing new services, building upon the existing facilities and culture of excellence in research and teaching. In recent years, despite progress in the provision of services to industry, the sensory science group has not yet developed a systematic offer of services for industry. This is understandable given that the primary focus of those involved is research and teaching. Interviews with Prof. Kita and other researchers involved in the provision of services confirm that more needs to be done to organize and expand service provision. This is reflected in a way of working which has emerged over the years, and which goes practically as follows:

- The relationship between the university and industry is initiated and maintained by individual researchers.
- A researcher who is personally known to a local business gets a request to perform certain tasks such as analyses or testing.
- The design of such tasks is left up to the company making the request.
- Once a request is made, the researcher responds with an estimated budget for the work to be done
- The request must be confirmed by university management.

In effect, a trilateral relationship emerges where the task is agreed between the company and the researcher, the terms are validated and confirmed by the management of the university, eventually leading to the signature of a contract between university management and the company, for work to be done by the researcher and colleagues.

Repeating this experience has resulted in the emergence of an informal catalogue of services to industry. Researchers are familiar with the general framework within which cooperation occurs. They understand what equipment needs to be used for which task, and how many hours or working days might be needed to complete that task. As one of the final outcomes of the SEASONED project, a formal catalogue of services offered to industry has been launched at the final project conference in Wroclaw on the 24-26$^{th}$ of June 2025.

This approach has worked quite well until now. It could continue to do so, as long as the number of services is low and as long as there is no pressure to increase the use of equipment or expand the role of the sensory science group to play a more pro-active role in the sector.

## Summary SWOT Analysis

The table below provides a summary of the main strengths and weaknesses, opportunities and threats for UPWr related to the development of the SSF beyond the SEASONED project, in a way that is coherent with the objective of it achieving financial autonomy.


## Recent Progress

Over the course of the SEASONED project, the UPWr team has acquired a broader knowledge of the international landscape of sensory science, culminating in the E3S Symposium held in Rennes in May 2025. At this meeting Prof. Kita was honoured as the Polish delegate to E3S, gaining visibility for UPWr, and recognition for its work in sensory science. This led to useful local and international contacts for future collaboration on which UPWr can now build.

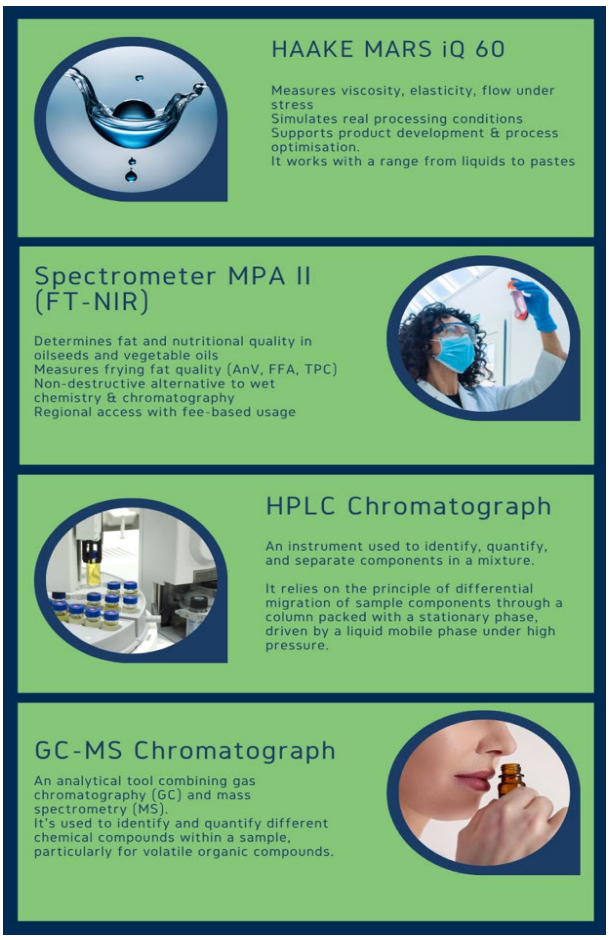
Thanks to collaboration with the other leading research institutions in the consortium, the team has significantly improved its capability in terms of research and potential for service provision. New themes for research and innovation have emerged within UPWr, which are promising in terms of their potential as a basis for collaboration with business on new ideas and product concepts.

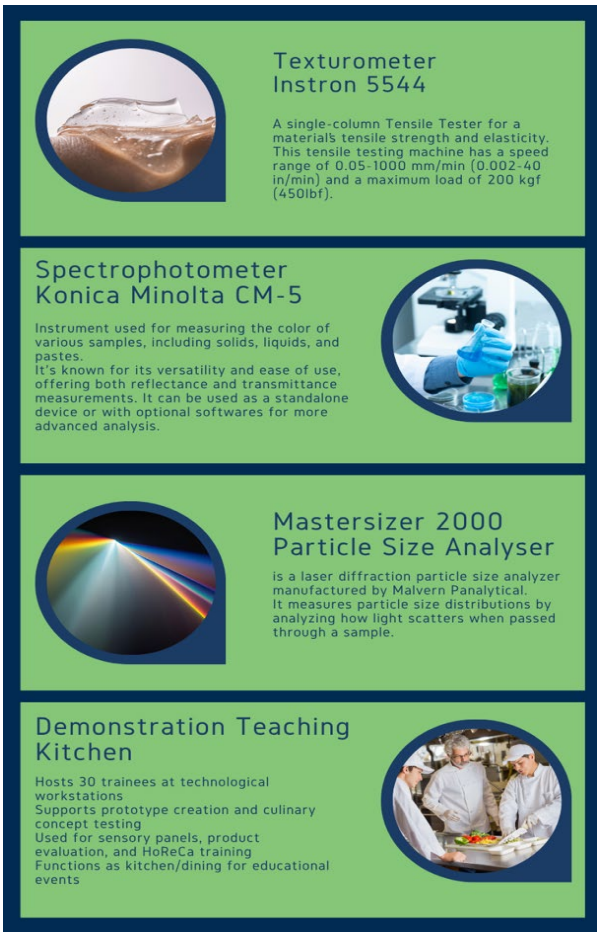
Although the SEASONED project has raised the readiness level of the UPWr sensory science team in the management of funded projects, much remains to be done to enhance its ability to systematically cultivate relations with industry. To facilitate growth along those lines, it will eventually become necessary to create a formal structure based on the activities,

instrumentation and infrastructure that the sensory science group has so far managed to obtain. This is the starting point for the present report.
Right now, the ongoing activities of the sensory science group are distributed across a number of buildings and laboratories at UPWr. Dedicated sensory science labs now exist at three main sites:

- One located in the Faculty for Biotechnology and Food Science
- A second in the Centre for Applied Biology and Innovative Food Production Technologies
- A third laboratory at the Centre for the Development of Regional Products

Over the years, the laboratories at UPWr have acquired a number of precision instruments for the analysis of raw ingredients and compounds, their textures, their colour and properties, including food nutritional values and composition. The list of instruments includes some essential for the work of a sensory science laboratory and other more precise for advanced analysis and academic




demonstration, such as:

Thanks to the significant efforts of the SEASONED project, these facilities have had an opportunity to mature, both in terms of equipment and increased potential for sensory science related service provision.

The sensory science group has already achieved a lot based on informal ad-hoc arrangements, and good-will collaboration of colleagues in different departments of the university. These achievements are fragile in that they rely on the abilities of a small number of exceptional people. It is of pivotal importance to capitalize on these existing arrangements and consolidate an organizational structure to enable the expansion and diversification of service provision and achieve higher levels of operational efficiency.

But such improvements will be hard to obtain, and even harder to maintain without significant organizational and institutional changes. The further development of sensory science at UPWr for the benefit of local industry requires a transition from the existing framework to a new organization and a more formal set of arrangements intended to overcome the operational constraints of a university department. A new entity is necessary, that pro-actively establishes and maintains close relations with local industry, and that achieves a high level of operational efficiency in the provision of services in response to its needs. In short, a spin-off of the university, drawing upon the resources of the university, but run for the benefit of local industry, eventually playing a larger role in the orchestration of activities intended to support innovation and growth in the local food and beverage business eco-system.

# Key Factors for Sustainability

The sustainability of the SSF will rely on developing reliable sources of revenue based on the routine provision of services corresponding to the needs of local industry. Many of those services will most likely respond to needs in the area of quality management for existing products and processes, as well as support for new product and process design.

Most importantly, the sustainable operation of the SSF will require organisational development, good governance and adequate financing. Creating the SSF will require a significant step beyond the usual operating procedure.

The sustainability of the SSF will also rely on its ability to anticipate the future needs of industry and the role of sensory science in responding to those needs. Timely insights into the future needs will enable the SSF to experiment with and define new services that respond to those needs. If the SSF decides to embrace this role, it can do so by developing a Foresight capability, expressed in the routine production of periodic reports that look into the future of the food and beverage sector, consumer needs and consumer behaviours, and anything else which may have an impact on the need for sensory science, to explore emerging trends and their consequences for existing businesses in the food and beverage sector, as well as opportunities opening up for the creation of new businesses.

## Expanding the Catalogue of Services

In terms of new services, a sensory science laboratory typically provides more than just laboratory services of a technical nature. Sensory science has grown to include in its ‘toolbox,’ techniques borrowed from neuroscience, psychology and the science of perception, consumer behaviour, consumer trends, marketing, product design and presentation, health and well-being,

advanced manufacturing, applications of automation and AI. It will be useful for the SSF to explore the need for such tools among local and regional food companies and consider the provision of new services catering to those needs.

A full-service laboratory might cover portion-size, packaging, and presentation, not just the preparation of samples for testing. It might call upon expertise in marketing and psychology. It might also call upon expertise in nutrition, and specific areas of health care, such as inclusivity, immunology (diabetes), weight management, and cardiovascular health.
The point is that the new entity might need to provide in a systematic way, services that call upon capabilities that do not exist in UPWr, but which may exist in the broader eco-system of academic institutions.

A priori, the SSF should consider provision of services such as:

- **Routine technical services**, based on equipment and skills available at the SSF.
- **A platform for integrating the services** of other actors in the region, for example in domains such as marketing, and behavioural sciences.
- **Mutualised access** to compliant technical equipment and technical support staff, including the rental of dedicated on-campus laboratory space.
- **Ecosystem creation**, providing support for new business creation, incubation and growth acceleration, and access to research funding.
- **Foresight provision**, guiding partners and clients through the changing trends in the Sensory Science thanks to marketing and data analysis.
- **Logistical support** for conferences, workshops and summer schools in the context of E3S.

Arguably, the first and most important of these is the routine provision of technical services based on equipment and skills already available at UPWr.

Interaction with industry in the project has led to identify possible additional areas of collaboration and enlargement of the SSF offer beyond the current model based on limited testing and analysis assignments. These include:

- Better integration of sensory science and consumer science expertise and ability to combine lab tests and consumer science surveys
- Adaptation of the current offer of the sensory science group to the growing diversification of consumers and consumer needs, by understanding and managing approaches adapted to those different groups and their needs[5].
- Include in the available expertise at the SSF areas related to what is defined in sensory science as “oral comfort” including texture and perception and the relationship between texture, comfort and satiety, which is fundamental for segments of consumers for which the food intake must be specifically monitored and kept under control.[6]

[5] (2025) David López-Lluch (UMH), *“Inclusive design as a tool for products improvement”;* “Seasoned in 4 Season”, International Scientific Conference on Food Sensory Science, UPWr, Wroclaw, 25-26 June 2025.
[6] (2025) Davide Giacalone (SDU), *“Diversity in the determinants of consumer acceptance of plant-based foods”*; Ibidem

- Include in the expertise available also areas of perception integrating the traditional approach based on the five commonly known senses, with sense related to the vestibular system, interoception and proprioception.
- Include in the offer areas related to related domains such as quality engineering processes, marketing programmes and theories, shelf-life, advertising, cost control, etc. [7] [8]
- Include technical expertise, which can be eventually offered to companies and to research organisations, on areas related to the accreditation of testing and calibration facilities according to standards ISO 17025 and 17065 related to conformity assessment.
- Management of sensory panels and related training procedures, especially for panels coordinators, covering issues like the development and management of sensory lexicons.[9]

## Pricing Services

Until recently, the sensory science group has mainly worked with industry on the basis of projects funded by national or European programs. These generally operate on the basis of cost reimbursement. A system which is far removed from that of a commercial service.

As the SSF moves towards financial autonomy and greater independence from the university, it will need to discover the appropriate way in which to charge for services. The pricing of such services may include access to equipment, use of reagents and other inputs, routine maintenance and certification for compliance, support from qualified technical staff and other costs. It is possible that the full range of costs to be included may not even be easy to understand at this stage and that the SSF will have to go through a process of cost discovery, before it can understand how to approach the appropriate pricing of its services.

Other issues to be addressed include how to invoice for activities undertaken with partners, some of which may come from UPWr, and some of which may come from outside. In this respect, further attention should be given to structure models of cooperation with industry that go beyond single testing demands, to cover broader sets of activities within medium-term research contracts agreements. This is a model that Mondelez, a multinational and a key player in the region, could embrace, based on its R&D cooperation strategy.

Effectively addressing such issues will require pro-active experimentation and the close attention of essential non-academic staff. It is possible that the partners in the SEASONED consortium can provide assistance or guidance in the early stages of establishment of the SSF.

[7] (2025) Laura Vázquez-Araújo (BCC), “A multi-dimensional approach to new food development: Examining the interaction of sensory properties, consumption context, and cultural significance”; Ibidem
[8] (2025) Paula Varela-Tomasco (Nofima), “Sensory Secrets: Texture’s influence on food intake, consumer behaviour, and implications for product reformulation”; Ibidem
[9] (2025) Ángel A. Carbonell-Barrachina (UMH), “Role of sensory evaluation panels in the accreditation of food quality schemes”; Ibidem

## Expanding the Client Roster

This has much in common with other tasks such as 'developing partnerships,' As it is common to consider the client as a partner, due to the mutual dependence of the client on the service provider for future prosperity and success in production and new product development.

But clearly, the initial focus can be on existing and past clients, local business, and alumni, who have gone on to work in the food industry, and who can provide a good starting point for SSF engagement with industry.

The university has about two thousand graduates every year. Not all of whom work in the field of food science. Of those that do, not all will go into industry. But it is likely that a significant number of graduates will go to industry. These can be an invaluable resource for the SSF, providing a point of entry into a company and as initiators of strategic relationships that will eventually lead to repeatable service contracts.
The issue of how to use the alumnus network is therefore an important one, as it could prove valuable in helping the laboratory expand and diversify its service offering and sources of revenue.

The work of expanding the client roster, requires a pro-active approach. It is not enough to set up a website or open a shop and wait for clients to stop by. In an initial period at least, continuous dedicated effort is required to build and maintain the client list. The SSF may eventually reach a point where the effort required to acquire clients is less, as it becomes well known for the service it provides, to the point where clients naturally gravitate to it for support. To reach that point however, dedicated staff are required, that will spend 90% of their time 'on the road,' that is outside the office, visiting local food companies, finding out what they are doing, finding out about their plans for the future, and discussing how the SSF can help them to achieve their goals.

## Developing Partnerships

The systematic nurturing of partnerships will enable the SSF to play a significantly expanded role in the development of the local food and beverage sector. Until now there is no obvious 'organiser' of a local business ecosystem bringing together primary and secondary producers, research and education performers and service providers. The SSF will decide where the boundary of its activities lie. It may be too soon to say where this is for now. Arguably, it will shift through association with the E3S, through learning from its members and participation in its activities. A more explicit vision will emerge in the coming years.

In any case, partnerships will play an important role in expanding and extending the offer of services that respond to the needs of local industry. These services could include training and research, as well as more routine technical services based on the use of specialized equipment. Training need not be limited to routine teaching by UPWr faculty and staff. It could aim at a broader range of issues, as mentioned under the section entitled "Expanding the Catalogue of Services," including new product and process innovation, and addressing new consumer trends, which may require inputs from disciplines such as psychology, marketing, and healthcare.

Some of the following cases of industry-led sensory science developments may be of inspiration to draw some of the development lines of the SSF.

The MAPP Centre for Research on Value Creation in the Food Sector for Consumers, Industry and Society, is based at Aarhus university. The name stands for "Market-Based Process and Product Innovation in the Food Sector". It is grounded in the discipline of marketing and conducts research that generates insights into peoples' perception and behaviour in the agricultural and food system. It illustrates the existence of needs which may be evoked by industrial actors, which fall within the expanding scope of sensory science but lie outside of the scope of those currently addressed by the sensory science group at UPWr. In future, it may be useful to extend the offer of services provided by the SSF, to included services like those of MAPP, but based on partnerships with local organisations.

The case of Ferrero Rocher illustrates the scale of sensory-science-based activities undertaken by large food and beverage companies. It is an example of the effort that some companies employ to consistently produce a 'perfect' product. Ferrero Rocher employs over 1000 tasters. It carries out more than 18,000 seasonal tastings at every stage of the production process. It uses techniques such as neuromarketing, where consumer response to the product, its packaging and presentation is analysed based on the recording of brain waves. Ferrero Rocher is very big highly profitable company. It can well afford its own facilities. But most companies cannot do that. Those that can however, may already be in search of opportunities to save money by renting facilities or sharing facilities with other businesses. Much of the business of a modern university is 'real estate'. Universities make money from renting out student accommodation, facilities for hosting conferences, lab-space or other forms of accommodation for companies that want to maintain a close relationship with on-campus research teams or service providers. This too is something that the SSF might like to explore with local food and beverage companies and consider as part of its economic model going forward.

The systematic development of partnerships is a key capability that the SSF will need to develop. It will require dedicated staff. There are many relevant networks on which to build. These include, existing and past partners, the networks of alumni, other research performers and sensory science service providers in the region, research performers and services providers in complementary domains such as marketing, psychology and behavioural science, as well as local businesses. Lists of these are provided in annex. Priority should be given to partnerships that will allow the SSF to provide basic services that will generate reliable repeated income and eventually support the salaries of essential non-academic staff.

## Developing the Local Business ecosystem

The sensory science group at UPWr sees the provision of sensory science services as a catalyst for the transformation of the local food industry. It sees a role for the SSF based at UPWr as a driver of innovation and growth for the sector. This however will require a much greater and pro-active engagement with local industry.

Until recently, engagement with local industry has been ad-hoc in nature, based on the personal contacts of research staff and students. It has been driven mainly by opportunities to apply for research funding from EU and national research and innovation programs. Such programs at best

only partially align with the needs of local industry. As a result, there are many unmet needs, specific to the local business eco-system.

Furthermore, the contacts developed in an opportunistic manner by staff and students, are likely to vanish over time, once the initiators graduate or move on to positions elsewhere. The new sensory science facility will need to engage with industry in a more systematic, robust and purposeful way, so that contacts once established are preserved, and maintained, allowing those relationships to deepen over time. This will enable the SSF to move beyond its initial efforts at routine service prevision, extending the range of services provided, and dealing with higher level issues such as local programming, and investment in the local business eco-system.

This can start with a focus on the immediate needs of a limited number of key players, acting as lead-users or early-adopters of SSF services. It can then spread to larger groups of local uses, based on shared needs, where appropriate extending to the needs of their suppliers.

In summary, it is better to start small, with a limited number of key ideas for services offered based on feedback from industry and experience in past projects (low hanging fruit). Hence UPWr can explore the possibility of expanding on these as offering to key industry partners and seeing what kind of partnerships are needed to offer such services. Starting with this, the university can progressively put in place the structures, practices and processes needed to make that happen. The creation of the SSF provides UPWr with an opportunity to play a much larger role in the development of the local business eco-system, tapping into EU funds for local development, to establish UPWr as a key player not only at local level, but at national and international level, burnishing its reputation and improving its position in the national and internation university rankings.

## Creating an Appropriate Governance Structure

To achieve the growth and development that has been presented in the previous chapter, the SSF will need to demonstrate its ‘readiness to engage’ with local industry players in new ways. There are several ways in which it can do this.

### Conservative Scenario

The sensory science group continues to operate as before based on existing arrangements with the departments involved. Prof. Kita remains in charge. The sensory science group can continue in this way based on funding from research activities run by individual researchers, funded by EU and national programs, in the framework of a research policy defined at the level of the sensory science group and the departments involved.

With this approach, it will prove difficult to systematically develop services needed by industry to the point where they provide the group with reliable sources of revenue. The management of such activities will be challenging and it will be hard to achieve more ambitious goals in relation to the local business eco-system.

### Ground-breaking Scenario

A more radical scenario will require the creation of an independent entity, which we refer to as the SSF, able to manage the business of service provision, for the benefit of local industry, with a view to achieving a much deeper relationship with local industry, and a high level of operational efficiency, with a view to achieving financial autonomy.

A key issue to be addressed within this scenario the need for both scientific and technical leadership, and an entrepreneurial mindset to manage operational aspects of the transition from an ad-hoc set of activities of the sensory science group and the informal arrangements it has with various university departments, to an independent initiative manged by a new entity based on formal agreements with all of those involved.

If the university is to align its activities with the needs of industry, it will need to closely involve industry in the governance of its activities. There are many ways to do this. But it should not be left up to chance.

With the SSF at its core, and eventually as part of the anticipated CBC, UPWr might establish a Polish Sensory Science Ecosystem (PSSE) that brings together researchers, professors, graduates, SMEs, corporations, and F&B producers to pool resources and boost collaborations, improving the capacities and the competitiveness of the sector at regional and national level.

The SEASONED partnership currently consists of 4 Universities and 1 Innovation Network. Notwithstanding the academic component of the partnership, all the partners work in close collaboration with food industry stakeholders.

The partnership's specific international expertise in agri-gastronomic sciences & food engineering, combined with the institutional capability of Prof. Kita as a vice-chair of the PTTZ, has strong potential to attract stakeholders from the region and the whole Poland for new collaborations, market-driven research and the exploration of new ideas that can in time, position the SSF as a centre of excellence not only for Poland, but for the whole of Central and Eastern Europe.

The PSSE may start from the integrated services to be provide by the SSF, as announced at the International Conference of 25-26 June 2025. It can proceed with the recruitment of non-academic staff in charge of reaching out to local stakeholders and establishing partnerships. This process may be guided by an Oversight Committee, focusing on drafting the agreements with every new partner and on discussing with them activities to bridge potential competency gaps and investing in innovation projects.

A database of talented individuals and complementary centers of excellence can be implemented, and regular conferences and Ecosystem meetings can serve as platforms to stimulate peer-to-peer knowledge transfer and the exchange of experiences in an informal manner through practical experience. These activities can have the following outcomes:

- Providing inputs to regional & national research centres to advance sensory science research in the region.
- Providing tools & resources to local SMEs, professionals, & graduates, enabling them to acquire new skills and bridge academia and industry.
- Maintaining and improving the services and the network of Sensory Science institutions created by SEASONED, ensuring the long-term sustainability of project results.

The Ecosystem may evolve to take on a variety of forms and architectures. The one presented above is one of the many possibilities. But other possibilities exist, and the UPWr can pursue the one that is best adapted to its ambitions, in accordance with real-world dynamics, or following examples provided elsewhere. The SEASONED partners from Denmark and Spain may have good advice to give on this. It is useful to look at how the issue of governance is handled elsewhere.

One example to consider is that of the Danish Dairy Board[10] (DDB), a business association representing the dairy industry in Denmark. It hosts the Danish Dairy Research Foundation of

[10] Danish Dairy Board, https://danishdairyboard.dk/

DDRF, a non-profit research organisation managed by the DDB and the Danish Agriculture and Food Council. It is useful to note the role played by industry in this structure. The Board of Directors of the DDRF is chaired by the SVP for research at ARLA foods, Denmark's biggest dairy company, and fifth biggest in the world. Its activities are organised and overseen by two coordination groups.

- A 'technology and food safety' coordination group chaired by the CEO of Thise Mejeri a producer of organic milk and dairy products from Northern Denmark.
- A 'Health and Nutrition' coordination group chaired by a senior executive and R+D advisor at Arla Foods.

The decision of how to organize an advisory board, or steering committee, and the rules by which it should operate, does not have to be taken immediately. It may be better to wait until the SSF has spent some time getting to know the actors from industry, until it has a better idea of the range of services it would like to provide, and the other kinds of partners it may need to involve in the provision of those services. Nevertheless, the intention to establish such a structure should be made explicit from the start and become a subject for discussion when engaging with major local actors from the food and beverage sector.

## Futureproofing the SSF

The field of sensory analysis is expanding rapidly and will continue to evolve. As it evolves, the range of services it can provide to local industry will evolve too. This means that the services provided by the SSF to local industry will change, not only in response to new possibilities offered by sensory science, but in response to the changing needs of local industry, as it grows and expands in response to new market and consumer trends. It is therefore useful to look at how the SSF can prepare for the future, by anticipating change and piloting the new services that local industry may one day require. One way to think the future is to look at what the front runners of today are doing.

By virtue of Prof Kita's role as head of section of Food Sensory Analysis for the PTTZ, she is now the Polish delegate to E3S. In this way the sensory science group at UPWr is linked to a European network of experts and the activities of E3S working groups pro-actively exploring the future of sensory science in Europe.

The ideal way for the SSF to take part in such activities is to pro-actively contribute on the basis of its own independent reflection on the future of sensory science and industry needs. Such work might best be done in collaboration with other local actors in domains of importance for the future of the sector. For example, with local actors in marketing, consumer behaviour, nutrition and healthcare, AI and automation. Ideally, such work should be conducted with guidance from local industry and in partnership with other academic institutions and sensory service providers.

The following table illustrates an essential, non-exhaustive list of public/private Polish actors working in the same domain:

| Organisation | City | Expertise |
|---|---|---|
| **GBA POLSKA Sp. z o.o.** | Mysłowice | Experts in laboratory analytics and additional services for the testing of food, environment and cosmetics sectors. In the field of sensory analysis, they perform routinary tests on *a. food and ingredients quality production; b. drinking water; c. non-food, cosmetics, and packaging: d. animal feed*<br>Since 2021 they're part of the GBA Group, a European network of testing laboratories. |
| **Silesia Lab Sp. z o.o.** | Katowice | Is a research laboratory that performs research on the working environment and certificates working equipment meet noise, safety and environmental standards. Customers are usually industrial machinery and tools producers in need for testing the sensory and environmental impact of their devices. |
| **Eurofins Environment Services Polska Sp. z o.o.** | Katowice | A network of laboratories that carries out research and testing on in food, pharmaceutics, cosmetic, and agriscience. In the food and feed sector, Eurofins provides the following quality and ingredient analysis services:<br>a. nutritional value; b. protein and fat composition; c. content of acids sorbic, benzoic acid and their salts; d. presence of allergens; e. analyses of GMOs in food, residues of veterinary drugs, the content of metals, pesticides, micro and macronutrients and vitamins |
| **JS HAMILTON** | Gdyna | A service company which offers a wide spectrum of microbiological and chemical analyses for manufacturers of food, cosmetics, pharmaceuticals, chemicals, food contact materials. It provides also independent inspection services to check the quality and quantity of goods for international trade.<br><br>In the sector of food, they carry out marketing research, sensory analysis for quality of food and raw materials, food adulteration detection, molecular and microbiological analysis. |

Many of the most important and immediately relevant insights will derive from trends impacting local consumers and local producers. Ideally such work could be done by the SSF or some local actors in collaboration with local stakeholders. They should not rely exclusively on insights from organisation that operate on a large scale. These may be less sensitive to issues of local importance for local markets and industrial actors.

It is useful to illustrate what this may mean with a limited number of examples intended to highlight the need to anticipate changes in the work that will drive demand for new sensory science services. This will help the SSF to grow and adapt to changes as they occur, serve industry in new and better ways. The goal in what follows is not to be exhaustive, but to illustrate the kind of change that the SSF may need to navigate, if it is to align with the evolving needs of industry.

## Food trends related to diversification of consumer needs

As confirmed by several interventions at the final project conference (Edgar Chambers, Paula Varela, Erminio Monteleone) and by interaction with industry, the sector is encountering a growing diversification of consumers' needs. This is also a consequence of the progressive empowerment of consumers, deriving from a wider availability of information and choice than in the past. Consumers tend to know more about food and about healthy eating, which generates higher demand for healthier options, while meeting consumer expectations about the sensorial experience. There is also growing demand for products that address aspects of social inclusion. For instance of the inclusion of disabled or older people in food design. This requires attention to issues of palatability, chewing, swallowability and packaging design, as well as to more traditional aspects of texture.

An increasing number of people suffer from non-communicable diseases or conditions such as diabetes, obesity, high blood pressure, allergies and intolerances. Others suffer from lack of time and increased reliance on snacks consumed on-the-go or at-the-desk, instead of a drawn-out sit-down meal.

### *Global shift towards healthy eating and plant-based food*

Connected to environmental challenges, the food sector is expected to invest in alternatives to meat and dairy, therefore into plant-based products. This might present a very interesting development opportunity for the SSF. Especially in view of Poland's higher level of pro-capita meat consumption than that of many other European countries[11]. The replacement of meat and the production of meat analogous products presents huge challenges in terms of perception and satisfaction, along with issues related to (often health related) information about the product.

### *Food trends related to ageing*

Many food trends have their origin in the ageing of society. As society ages, its food habits, its need for nutrition and occasion for consumption changes too. The food and beverage industry responds to these trends with new product concepts, new formulations and new services.

Age Platform Europe produces an annual report on ageing[12]. Reports such as these provide a starting point for analysis of future trends. The reasons for the ageing of society as a whole include better healthcare and declining fertility. There are significant differences in how this will

[11] (2024) Strategy&, "The state of the meat market in Poland in 2023", PWC Network, https://www.strategyand.pwc.com/pl/en/publications/2023/the-state-of-the-meat-market-2023.html
[12] (2024) AGE Platform Europe, Annual Report 2024, https://www.age-platform.eu/age-annual-report-2024/

play out in different regions of Europe, as well as in how this impacts men and women in different age groups. These changes impact how people live, work and play, their nutritional needs, as well as the 'what, when, where and how' of their consumption habits. These factors drive innovation in the food and beverage industry, and by extension creating demand for new sensory science services.

Finland is home to innovations where baking flour contains ingredients derived from insects. These ingredients, which are high in protein, vitamins and minerals, can be added to normal flour to make bread which is suitable for consumption by older people. These may only have coffee or tea with a single slice of toast for breakfast, leading to insufficient intake of essential vitamins and minerals. The consumption of bread containing ingredients derived from insects, allows them to better meet their nutritional needs, by making sure that the most important meal of the day contains more than just carbohydrates. The pioneering product in this category was launched in 2017. The bread is called Fazer Sirkkaleipä and claims to be the world's first insect bread[13].

Japan is a good place to look for innovations around ageing. Since Japan started to develop an interest in rugby, local clubs have sprung up where even 70- and 80-year-olds play on a regular basis. This creates new nutritional needs, as older people not only in Japan, but all over the world, want to, and do live active lives.

Another issue that older people often face, is difficulty in swallowing. It turns out that 'thicker' drinks are easier for those people to consume. Food scientists are therefore busy developing agents that thicken drinks, making them easier to swallow, without adversely affecting taste and other sensory qualities. In Japan these ideas are being applied even to traditional teas. Protein added to almost any kind of drinks is not only of interest for older people, but also for athletes and other kinds of healthy living enthusiasts. Starbucks for example has been actively experimenting with such formulations

*Food trends related to climate change*

Climate change is a significant driver of demand for new sensory science services. It affects all forms of food production in all parts of the world. It is having an impact on supply chains, and the availability of primary inputs and other ingredients for the food industry. It is changing the cost of production and attendant supply chain risks.

Wine, whose consumption is a very important part of the way we live in Europe, is a case in point. Many of the vines planted in Bordeaux, now come from the Douro region of Portugal. They are better suited to the warmer climate. Changes to weather patterns, the periods that are wet or dry, hot or cold, have an impact on the way the fruit matures, on the speed at which the different fractions of the juice mature. This creates new sensory challenges for the growers who must decide when to pick and how to mix the different grape varieties to produce the taste that they want. Other challenges arise due to the higher levels of sugar in the grape when harvested and the high alcohol content of the wine produced. An increasing number of consumers are turning away from those strong wines. They want something lighter. And so there is increasing interest

[13] (2017) Merisalo R., Kang H., Kuitunen E., Heimonen F., "The World's First Insect Bread", Aim2Flourish, Hanken School of Economics. https://aim2flourish.com/innovations/the-worlds-first-insect-bread

in low-, very low- and even zero-alcohol wines. Especially for younger drinkers. Growers are working hard to develop new varieties and techniques to produce wines for those changing consumer preferences, from changing ingredients.

*Digitalisation of sensory science, data management and AI*

Pepsi has been making headlines as a pioneer in the application of AI in all areas of the food and beverage industry, including sensory analysis. It uses AI to adjust recipes to make them healthier, without compromising taste or quality. It claims to have reduced its product design cycle from 6 months to 6 weeks. In the case of Cheetos, it uses AI to study the crunch and texture of the product, as well as 'how it melts in the mouth.' It has used AI to optimize the 'curve of the arc' of the product and how much 'cheese dusting' is optimal from a consumer point of view. This example illustrates a possible need to work with local actors on the application of AI to the food and beverage sector. This is an issue to be explored with local industry, and if relevant developed on the basis of new kinds of partnership in the local business ecosystem.

Since 2024 the E3S has devoted attention and resources to the so-called "Emerging Digital Techniques in Sensory Science". Digital techniques in Sensory Science may cover different aspects and refer to a broad set of scientific techniques, ranging from biometric measurements to virtual and augmented reality, sensing technologies and artificial intelligence. Just as in many other industrial sectors, AI is being deployed to anticipate and accelerate new formulations and combinations of materials intended to improve products and processes. Many opportunities exist where sensory science can integrate the use of AI tools to improve it's the precision and efficiency of processes for producers, as well as the appeal of products to consumers.

Machine Learning and statistics have been used to predict sensory and consumer responses from non-sensory data, such as chemical, physical, and physicochemical measurements, thus obviating the requirement of human tasters to provide sensory responses to products. The algorithms can perform regression to predict continuous values, such as acceptance and intensity attributes (sweetness, juiciness, and acidity), or classification to predict discrete values, such as specific flavours, satisfaction and consumer reaction[14]. Sensory science has grown into a complex multi-disciplinary field of knowledge. Understanding the multi-disciplinary nature of sensory science is a prerequisite to generate any credible, solid vision for the future. Without such awareness, any development initiative is doomed to produce incremental steps. We believe this would not be a winning attitude in the long-term.

As prof. Edgar Chambers of Kansas State University put it during the SEASONED final conference, "Humans eat, machines don't". Digitalisation is progressing in sensory science. As former President of the E3S Erminio Monteleone stated at the final project conference, every lab should have software for recruiting panels, designing studies and data analysis. Many options, including free-of-charge options, are already available today. The use of IT tools have to be considered. But there is a limit to what software can do to replace humans in tasks that relate to complex human

[14] (2023) Cleiton A Nunes, Michele N Ribeiro, Thais CL de Carvalho, Danton D Ferreira, Luciana L de Oliveira, Ana CM Pinheiro; "Artificial intelligence in sensory and consumer studies of food products", Current Opinion in Food Science Volume 50, April 2023, 101002

perception. The potential role of AI in sensory science is being debated, although it is not yet entirely clear which aspects or tasks of sensory science can be left to it. The SSF should maintain a high level of readiness to understand and embed where appropriate, the use of innovative IT tools in its processes, testing and decisions.

*Other Needs of Industry*

Consumers are not only interested in convenience, health and well-being. They are also concerned about the health of the planet. For this reason, all companies include food and beverage companies are required to manage a transition to net zero, reduce their impact on the environment, biodiversity and their consumption of scarce resources. They are also required to comply with an increasing range of reporting requirements. Such issues are now included in the last revision of EU law pertaining to geographic indicators, alongside the sensory properties of the food item.

Furthermore, the SSF will become an important element in the supply chains of the companies to which it provides services. It may therefore be required to provide its clients with information concerning its own impact on the climate and environment, in line with existing standards. According to recent EU legislation, companies of a certain size must conduct ESG accounting based on the CSRD, the CSDDD and the GCD. They may also need to demonstrate compliance with legislation such as EU Energy Trading Scheme, the RED III[15], and the Deforestation Regulation (EUDR).[16] Even if legislation imposes a burden for reporting on companies above a certain size. This inevitably extends to smaller companies who supply the big ones. They must provide the basic information needed by the large companies to fulfil their reporting obligations.

Such reporting requires companies to obtain information from supplies, related to its carbon footprint, use of energy, and water, its treatment of waste, its treatment of workers and suppliers, the treatment of animals, and impact on biodiversity for example. Most likely, the university is already undertaking measures to lower its carbon footprint and comply with ESG related legislation. While the new entity is considering the establishment of new administrative, management and reporting systems, it should consider measures to address the reporting needs of its clients driven by the CSRD and related legislation.

These trends create new compliance and reporting needs, in particular for food exporters in the region. This is a relatively new area creating business needs to which the SSF might want to respond. These trends create new compliance and reporting needs, in particular for food exporters in the region. This is a relatively new area creating business needs to which the SSF might want to respond. These trends create new compliance and reporting needs, in particular for food exporters in the region. This is a relatively new area creating business needs to which the SSF might want to respond.

[15] Renewable Energy Directive III; EU Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652
[16] COMMISSION NOTICE – GUIDANCE DOCUMENT for Regulation (EU) 2023/1115 on deforestation-free products https://green-forum.ec.europa.eu/nature-and-biodiversity/deforestation-regulation-implementation_en

## Recruiting Essential Non-Academic Staff

While it is clear that dedicated staff are required to take charge of essential tasks for the SSF. It may be less clear what profile or profiles are needed to deliver the kind of transformation required for the SSF to expand its services to the point of achieving financial autonomy.

Universities employ several categories of staff. In addition to staff for research and teaching, they employ professional managers, accountants, administrators and technicians. The SSF will need to employ people with profiles which are quite distinct from those of the teaching-researcher. Ultimately the SSF will need staff that will spend most of their time visiting local companies, engaging with management involved in marketing, new product development, quality control, and other functions where sensory science may play a role, as well as organising an efficient service-oriented activity. This will require good communication skills, a curiosity about the world and how it works, an interest in how innovation happens, how companies operate, and how to executives think. Key to the successful creation and launch of a service-oriented SSF, capable of achieving financial autonomy, is the recruitment of essential non-academic staff. By this is meant, staff that are not employed in academic roles. Such staff, may have an academic background, but in their new role, they will need to be free from the pressures of academic life. Free of pressure to teach, supervise students, conduct research projects, publish or find their next post-doc position.

The recruitment of one or more people who will dedicate themselves full time to the development of the SSF as a service provider operating in the interest of local business clients must be seen as the fundamental condition for success. The selection of personnel for the job of driving the creation of an SSF intended to achieve financial autonomy in a limited amount of time will play a determining role in the overall success of the venture.

## Securing Adequate Finance

It is hard, if not impossible, to establish maintain and grow any kind of a structure that relies entirely on uncertain sources of funding, such as the EU funded framework program. Other sources of finance such as ERDF, structural funds, cohesion funds, the recovery and resilience fund or EIB loans, are easier to obtain that FP grants, because they are not competitive in nature.

If needed, they may provide project financing for initiatives such as new buildings, the establishment of quality management systems and the hiring of non-academic personnel. In all cases, the underlying activities of the entity must cover the day-to-day cost of running the business. This includes the cost of support staff, maintenance, amortisation of equipment, and servicing of loans. It is therefore useful to consider the development of routine services that can be efficiently offered to economic actors, on a scale that adequately covers basic running costs.

For this reason, we have sent a series of questions to the university, to establish an initial target for the level of services that must be sold to cover the operating costs. A simple analysis based on the following can help to establish a first milestone on the way to achieving the UPWr ambition for the entity.

- The cost of maintaining and operating the existing system.
- Its current level of use and revenues generated.

- The threshold which needs to be obtained to cover costs.

It is expected that the current level of services and related earnings by the entity is not sufficient to cover the cost of operation of the entity.

A first step on the road to achieving the ambition for the entity is to expand its existing activities to reach and exceed that threshold. This will require new services, new contracts, and a concerted effort to sign up new clients.

The creation of the SSF will require financing. How much will depend on a detailed vision of the role it will play as an 'organizing' force in the local food related business eco-system. A realistic and feasible vision of what the SSF might become over a period of 10 years, with sufficient detail to motivate the creation of a budgeted project, will only emerge after a period of engagement with local industry, potential partners and local development authorities. Nevertheless, it is important to start thinking already about financing options. Insights into the possible sources of funding, in particular the sources of negotiable grants and loans, will have a significant impact on the 'strategic conversations' needed to create a detailed development plan.
In what follows, we review a limited number of funding options such as ERDF and RRF funding, as well as EIB loans. This list is not exhaustive. But it should motivate the basic work that needs to be done, but which could easily be ignored until too late.

The European Regional Development Fund[17] also known as the ERDF is one of three instruments collectively referred to as the Cohesion Funds. Among other things it supports investment in research and innovation. It supports the establishment and operation of 'competence centers,' specialized facilities for research and development in specific technologies. It also supports cross-border and interregional cooperation projects. For the period 2021 to 2027 it has a total allocation of €226B. This is allocated to member states on the basis of regional operational programs. These are co-defined by those member states and the European Commission. They are administered by local agencies or authorities in each member state or region.

It is worth noting that ERDF funding has been used in the past to provide support to the research budgets of universities and research centers. For example, ERDF-based funding accounted for 30% of research funds at Babes-Bolyai University in Romania over the period 2014-2020. In 2023 ERDF funds were used by Latvia to support important projects which failed to get funding under Horizon Europe. ERDF funds can therefore be used not only to develop institutions and infrastructure, but also to support research and innovation budgets. In this sense, it provides a mechanism for removing much of the uncertainty associated with reliance on the highly competitive calls of EU and national research funding programs.

Generally, only a part of the agreed budget is provided by the European Commission. The remainder must come from other sources as co-financing. Such sources include other EU funding programs, members state budgets, investment banks such as the EIB, and private investors based on PPPs. The total amount provided by the ERDF varies from about 50% for more developed regions and up to 85% for less developed regions.

[17] EU Commission, European Regional Development Fund https://ec.europa.eu/regional_policy/funding/erdf_en

An ERDF allocation of over €47B has been provided to Poland for the period 2021 to 2027. The post-2027 allocation and intervention logic is currently under discussion. It seems likely that a larger portion of ERDF will be allocated to innovation and competitiveness, than in the past. The UPWr should take steps to identify possible sources of funding for the development of the SSF. These include opportunities under the current program and the new program post 2027, which in principle is currently under negotiation.

Managing authorities and information points exist in all EU member states. The Commission maintains a database of the ongoing programs[18] and the managing authorities in each country[19]. In the case of Poland these include the Polish Ministry of Funds and Regional Policy, as well a Central Information Point for the European Funds, based in Warsaw.

The ERDF is not the only EU program which can be used to support the development of an institution such as the SSF at UPWr. The Recovery and Resilience Fund or RRF is also an option. RRF funds can also support both national and local research infrastructures. [20] They can be used for the modernization and renewal of services, enhancing their capacity and promoting regional development. It is worth looking into the Polish Recovery and Resilience Plan to see what options are currently available, or to establish a position in discussions about follow-on programs.
The EIB offers loans to higher education and research institutions on very favourable terms. Over the last decade it has provided more than €30B for investment in schools, universities, and further education. The current lending envelope includes financing for higher level education institutions, as well as for the development of technical and scientific services in Poland[21]. Examples exist of how this has worked in cases such as Belgium and Romania.

Once again, whoever leads the effort to develop the SSF, will need to devote time and energy to identifying the sources of funding for its future development. In the case of EIB funding, there are many doors to knock upon. One could start with the EIB office in Poland[22].

In a previous section, we mentioned 'other needs of business' pointing out that the SSF is ultimately a supply chain partner for local business, and a contributor to their overall carbon footprint under scope 3 emissions. It may be useful to consider a broader set of projects for the development of the SSF. One that goes beyond the development of scientific and technical capabilities, to include energy efficiency and reduction of the carbon footprint of the SSF, the university itself and even food and beverage companies in the region. If this is the case, it is possible to call upon technical support from the EIB provided by its EIB ELENA program for technical assistance[23].

If the goal of the SSF is to achieve financial autonomy on the basis of reliable sources of income from the provision of routine services to industry, it should be eligible for an EIB loan. It is possible

[18] EU Commission, Programmes Database https://ec.europa.eu/regional_policy/in-your-country/programmes_en
[19] EU Commission, Managing Authority List https://ec.europa.eu/regional_policy/in-your-country/managing-authorities_en
[20] EU Commission, RRF https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en
[21] EIB, https://www.eib.org/en/projects/pipelines/all/20230394
[22] EIB, https://www.eib.org/en/contacts/office/poland
[23] EIB, https://www.eib.org/en/products/advisory-services/elena/index

that such loans can be granted as part of a package that includes grants from programs such as the ERDF.

## Proposed Next Steps

Without a detailed understanding of what is happening in the local food industry, and without regular contact with its CEOs, marketing and product development managers, it is hard to see what the sensory science facility can become over a period of say ten years. For this reason, the development of the sensory science facility should be seen as a multi-phase process, in which each phase is supported by its own program of investment to achieve goals defined in collaboration with university leadership and local industry.

The initial phase should focus on the transition from the current system based on ad-hoc arrangements and good-faith collaboration between colleagues in different university departments, to a more robust and formal arrangement which will allow dedicated SSF management to optimize the use of existing laboratory space and instrumentation, and to achieve a high level of operational efficiency, based on improved visibility of the services on offer, ease of access by outside clients, and the efficient provision of basic services to local business.

Subsequent stages can be planned in detail once a clear transition plan has been agreed with the university departments involved and a deeper relationship has been established with local industry leaders and business associations.

Each phase of development of the SSF, will require investment. Given the nature of available forms of finance, the investment required for the SSF may best be obtained in associated with complementary investments required for the further development of the university and the local food and beverage economy. In this way, the SSF is already positioned as an important part of a broader business ecosystem.

Such an approach will not only fund the creation and development of the SSF, it will also upgrade the economic environment in which the SSF will operate and reassure other important actors that they are not in competition with the SSF for scarce resources or needed funding. This could be a determining factor in a successful transition from the current situation based on good-faith arrangements with the departments currently involved in the work of the sensory science group, to formal arrangements required to achieve operational efficiency in the provision of services to local industry.

In a first phase of development the SSF can focus on working towards financial autonomy through the routine provision of services to local industry, based on existing capabilities. In subsequent phases, it can expand upon those services to include new ones, some of which may require further investment.

The recruit will require basic amenities such as an office, telephone, laptop and storage space, as well as a place to meet people from industry and elsewhere who come on campus. They will spend most of their time outside the office, visiting companies, visiting partners in other research centres, and people from local government. They will need a budget for travel. They might prefer

to use their own car or avail of one provided for their job by the university. They will also need a budget for the creation of a simple website, and basic marketing materials such as business cards and basic brochure of proposed services.

There are many ways to organize the work. The recruit may already have a clear idea of what to do and how to do it. Or it may need to discover what works based on a process of problem solving and discovery. What follows is intended to give an idea of what life for that recruit might look like.

## Establish a Working Group for Business Eco-System Development

Given the nature of available EU and other forms of finance, the investments required at each phase of the development of the SSF, may best be obtained in associated with complementary investments required need for the further development of the university and the local economy. As mentioned above, such an approach will upgrade the economic environment in which the SSF will operate and reassure other important actors of the business eco-system that they are not in competition with the SSF for scarce resources or needed funding.

The main task of the committee for Business Eco-System Development will be to act as a bridge between the sensory science group, the university, local industry, local authorities and other relevant actors, to identify available sources of finance, establish a plan for the development of the local food and beverage sector, and guide requests for funding though the various administrative procedures.

Such a plan should take account of the needs of different actors, presenting it as a coherent whole that makes sense to local authorities responsible for economic growth, taking into consideration:

- The need of the SSF to progress in phases. Early phases may cover the recruitment of essential non-academic staff, as well as funding to pilot new services which can generate reliable revenues, such as quality management, testing and certification services.
- The needs of the UPWr Technology Transfer Office which may have ambitions to develop an incubator, accelerator or seed fund activity.
- The needs of UPWr departments already involved in the work of the sensory science group,
- The needs of actors in other institutions, which may want to offer their complementary services under the banner of the SSF. These might include a need to pilot complementary, industry-oriented services in areas such as marketing, psychology, perception and food-design.

## Establish an Oversight Committee for the Development of the SSF

The development of the SSF, operating as a service-oriented enterprise, playing a role in the development of the local food and beverage industry, eventually achieving financial autonomy, should take place in phases, with each phase requiring dedicated investment.

The activities of the sensory science group, the staff that participate in its activities, the laboratories and instrumentation that it uses, are currently distributed across several departments of the university. The creation of the SSF, able to efficiently serve the needs of local industry, will require an evolution from whatever arrangements are already in place, to more formal arrangements, eventually under the independent authority of the SSF.

That means managing a transition to more formal arrangements for:

- Access to laboratory spaces.
- Use of instrumentation.
- Employment of research staff, technicians, and students.
- Contracting of support services.
- Negotiation of agreements with both internal and external clients.
- Billing and receipt of payments for service delivery.

These are all issues to be agreed with departmental and university leadership. The oversight committee will strong leadership to drive the entire process. It will represent the interests of the university in general and that of the sensory science group in particular. It will act as the interface between the implementing team and the University. It will oversee the recruitment of the start-up team, monitor their work, and intervene to address issues of an administrative nature as they arise.

The priority will be to appoint someone to oversee the creation of the implementing or delivery team for the launch of the SSF. One of the jobs of the oversight committee could be to ensure that all issues listed under sustainability factors above, are at least considered and discussed with the oversight committee, if not directly addressed in the work of the team responsible for the day-to-day execution of the launch of the SSF.

## Organising the Non-Academic Structure of SSF

The oversight committee will not be able to take care of the very large number of practical tasks required to create the SSF:

- Formalize arrangements with the various departments of the university.
- Engage with industry and bring onboard key clients.
- Define the services it will provide.
- Experiment with pricing and contracting.
- Take care of the detailed planning and drafting of budget.
- Put in place more formal procedures and processes.
- Organize the recruitment of staff needed to ensure operational efficiency.

The primary task of the oversight committee will be to recruit essential non-academic staff define the work they will do and oversee the execution of that work.

There may be a need to recruit a team to fulfil the range of tasks required in the initial set-up. The required composition of such a team may not be apparent from the start. This will depend on the nature and rate of adoption of the services that the facility can provided in its initial phase.

This work will require a strong focus on:

- The identification of services required by industry. Many of which may not be within the immediate capacities of the sensory science group. In particular, they may include routine quality related services. These may be of little interest to research scientists. But they are of great importance to industry and could provide the kind of regular income needed to achieve financial autonomy.
- The provision of such services in compliance with applicable industry norms of and standards, such as 'good laboratory practice.' This may require attention to issues related to intellectual property, the protection of industrial secrets and the creation of auditable paper trails.
- Close attention to issues such as calibration and maintenance, not only of machinery but also of consumables, protocols for cleaning and the provision of certificates if necessary.
- Close attention to commercial and administrative issues such as contracting, service level agreements, pricing policies, invoicing and total cost management.
- Balancing the needs of business clients with those of teachers and researchers, some of which may come from outside the sensory science group at UPWr.
- Expanding the business client roster beyond partners that already engage with UPWr based on EU and national funded research programs.

Eventually there may be a need to develop new services beyond those originally anticipated by the sensory science group. The starting point can be services base on the use of existing instrumentation, scientific and technical support staff.

The kind of work required of the key person, will be to initiate exploratory talks with local industry to align the services of the SSF with their plans and future needs. This is quite different from the natural kind of outreach that research groups might practice, where the goal is to interest industry in the ongoing research projects. The more long-term thinking of research groups is of course of relevance to industry, but it may not be a priority for industry with many more immediate issues to address. It has to start with listening with an open mind to the more immediate needs of industry, especially in areas such as routine testing and quality management, as these should lead to the definition of services that are routine, repeatable and capable of creating regular income for the SSF. Practical this may proceed as follows:

- Contact and visit local food and beverage industry actors and talk to the CEO, marketing manager, research and quality control people and explain that you are conducting a series of exploratory visits to help you position the university as part of a regional food industry cluster.
- Present the vision of the university and ask them to accompany you on the journey to see how they can better serve the needs of local industry.
- Be open to new ideas for required services, needs that the university on its own may not be able to meet, but which may be met through collaboration with other actors in the region.

Further work required at this stage is to engage with other sensory analysis actors in the region, to explore their vision of the future, their links with industry and the possibility of working together to jointly provide services based on the other needs of the local food and beverage

business eco-system. This work cannot be reduced on the basis of a big conference, where everyone is invited to speak, on scientific and technical issues. What is needed is a series of one-on-one meetings. This is the only way to start the process to:

- Establish the leadership of the university in the overall initiative.
- Obtain significant insights into the opportunities.
- Obtain significant insights into the roles that different actors can play going forward.

## Identify Sources of Financing for the Transformation

A key task of the working group for business eco-system development, will be to identify appropriate sources of financing, that will cover the needs of the SSF at each stage in its development, as well as those of its allies at the university, in other institutions and local industry.

It is highly unlikely that the needed funding will be made available from a single funding program. Furthermore, any relevant funding program will only partly cover needs and must be accompanied by outside sources to complete the package. This is the where local government plays an important role as it is their job to identify such 'other' sources of finance. In addition to funding from the EU framework program for research and innovation, relevant sources include ERDF, EARDF, ESF+, RRF, as well as EIB grants and loans. These are not the only possible sources, but they are important ones and are better adapted for funding infrastructure, various other aspects of institutional development, as well as providing support for industry, SMEs and local business clusters, then national and EU research funding programs to which the sensory science group is already well acquainted.

The need for finance will change as the SSF progresses from one stage of development to the next. Success at one stage, will provide the confidence needed to progress to the next. It is not just about generating new revenues, sufficient to cover running costs. It is also about investments, in the form of donations, grants or loans, and increasing revenues to cover the cost of services those loans.

## Outline of the First Phase of the Transition

The focus in the first three to six months should be on meeting people in local industry to get a feeling for the level of demand for certain services, to solicit short contracts, to make sure that the services are provided to the satisfaction of the client and establish a relationship in which further commitments can be built.

It may be necessary to navigate an initial phase of work which is chaotic and opportunistic. A lot will be learned in this phase on how to organize the provision of services. The recruit will need to 'discover' how to work with the technicians, reserve access to equipment, ensure that it is adequately supplied with consumables, that it is calibrated correctly, cleaned, maintained and made ready for the next use. This is a process of discovery necessary for the transition from an academic environment to a more intense service-oriented environment, where the goal is to make maximum use of the available facilities.

Achieving financial autonomy means covering the day-to-day cost of running the facility. This may or may not include the cost of laboratory space in the form of rent paid the university for example, the cost of support staff, the maintenance and amortisation of equipment, the servicing of loans used to put in place any needed quality management systems, IT and administrative infrastructure.

These details are a matter for negotiation with the departments involved. These arrangements will need to be identified, inventoried and eventually formalised. It is not clear at this stage if this can be done on a scale that is adequate achieve financial autonomy. Nevertheless, it should be clear after several years of operation what can be achieved and what is required to reach that goal.

### Outline of Subsequent Phases of the Transition

By now the team and its leadership will have developed a deep relationship with local industry, as well as a feeling for where it wants to go in terms of new products and service development. It will also have a clearer idea of its role in the development of the sensory science in service of the local food industry, its positioning with respect to other major actors in the area, and the boundaries between what it will contribute and what others will contribute as members of an increasing complex and rich local business eco-system. Through its engagement with local authorities, it will have developed an awareness of financing options available for further development. At this stage it will start to formulate plans for subsequent phases of development of the sensory science facility. These may rely on other sources of finance such as ERDF, EARDF, RRF, and EIB funding.

## Conclusions

This report confirms that the sensory science group at UPWr is at a crossroad moment in its evolution, poised to transition from a largely research-driven and ad-hoc service provider into a fully-fledged, service-oriented entity capable of driving innovation and growth in the local and regional food and beverage ecosystem.

The analysis conducted throughout this report has outlined the significant scientific and technical achievements already made by the sensory science group under Prof. Kita's leadership, as well as the critical structural, organisational, and financial reforms necessary to ensure long-term sustainability and financial autonomy. The transformation envisaged will be neither immediate nor straightforward, but it is necessary and feasible on condition that the recommended steps are taken in a phased manner.

A key conclusion is that UPWr's greatest strength lies in its regional excellence in sensory science, supported by excellent instrumentation and highly qualified technical staff. This is borne out by strong national and international recognition of UPWr, its place in domestic and international rankings, recognition of the work of the sensory science group, and its link to the E3S. Building from its scientific and networking capabilities provide a robust foundation on which to build a more structured service provision model. However, the current service provision heavily relies on the dedication of a small group of researchers and on informal departmental arrangements.

Consolidation into a dedicated SSF, with its own governance structure, service catalogue, and non-academic staff, is therefore indispensable to transform these individual and department-based efforts into an institutionalised, efficient, and scalable service platform.

The opportunities for growth identified in this report are substantial. The diversification of consumer needs, the global shift toward healthier and plant-based diets, the increasing demand for age-appropriate food solutions, and the urgent need to respond to climate change collectively represent powerful market drivers that will fuel demand for advanced sensory science services.

Moreover, the digitalisation of sensory science and the growing application of AI in product design and quality optimisation require an ever-ending commitment for UPWr to modernise and keep up to date with the latest sensory science trends, and the evolving needs of local industry. By positioning itself at the forefront of these emerging trends, the SSF can become not only a service provider but also a thought leader and innovation catalyst for the food industry in Poland.

Realising this vision will require decisive organisational development, adequate financing and the recruitment of essential non-academic staff. The report has clearly indicated that the sustainability of the SSF will depend primarily on its ability to generate stable and predictable income streams through routine, repeatable services such as quality management, testing, and certification. These may not be the most academically stimulating activities, but they are essential to secure the financial autonomy necessary to sustain more innovative and research-oriented services. The development of a robust client base will require a proactive business development strategy, leveraging alumni networks, existing partnerships, and targeted outreach to local and regional companies. Dedicated non-academic staff with strong communication and commercial skills will be critical to this effort, as they will act as the primary interface with industry, translating scientific expertise into tangible business value.

Equally crucial will be the establishment of appropriate governance and partnerships. The SSF must adopt a governance model that systematically involves industry representatives, ensuring that its strategic direction is closely aligned with market needs. Examples such as the Danish Dairy Research Foundation highlight the benefits of industry-led advisory structures in strengthening the relevance and credibility of service provision. Partnerships with complementary research performers, marketing and behavioural science experts, and local business networks will further enhance the SSF's capacity to deliver integrated, high-impact services. By doing so, the SSF will contribute not only to individual company performance but also to the broader development of a dynamic food business ecosystem in the region.

Financially, the transformation of the SSF cannot rely solely on research grants or university budgets. This roadmap has highlighted the availability of multiple funding opportunities, such as the European Regional Development Fund, the Recovery and Resilience Facility, and European Investment Bank loans. These can be combined and leveraged to finance the infrastructure, governance, and staff recruitment required for the transition. However, these opportunities will only be realised through coordinated efforts between the SSF, the university's leadership, and local authorities. The creation of a dedicated working group on business ecosystem development, as recommended, can secure these resources and to ensure that the SSF is embedded within a broader regional innovation strategy.

In operational terms, a phased approach is recommended. The first phase should focus on optimising the use of existing facilities, formalising service provision processes, and piloting services that can generate regular income. This phase will be characterised by close engagement with local companies, iterative experimentation with pricing models, and the development of efficient internal procedures. Only after achieving operational stability the SSF should expand into more complex services and broader ecosystem-building initiatives. By doing so, the SSF can minimise risks, build credibility with industry partners, and create the financial stability required for future growth.

In conclusion, the SSF at UPWr has the potential to become a benchmark for how a university-based facility can become the core of a public-private business ecosystem driving regional economic development while maintaining scientific excellence. By institutionalising its operations, aligning closely with industry needs, and leveraging available funding and partnerships, the SSF can transform from a primarily academic initiative into a financially autonomous, innovation-driven service hub. Achieving this transformation will require vision, leadership, and perseverance, but the rewards, in terms of enhanced regional competitiveness, improved industry-academic collaboration, and the strengthening of UPWr's reputation as a leader in applied sensory science, will be well worth the effort.

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