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**Article**

## Road to a bioeconomy in the European Union: Mapping drivers of precision fermentation adoption

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## Online-Appendix

# „Road to a Bioeconomy in the European Union: Mapping Drivers of Precision Fermentation Adoption“

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# Appendix

## Appendix A: Detailed Overview of Interviewed Experts

No.	Function	Organization Type	Rationale for Inclusion	Date
1	Consultant	Consultancy	<ul style="list-style-type: none"> <li>• Works at the technology practice of one of the largest management consultancies globally, consulting for several Fortune 500 companies</li> <li>• Co-authored seminal and respected reports on the transformation of diverse industries and value chains through synthetic biology, including PF</li> <li>• Previously worked at an established deep tech think tank</li> <li>• Holds a PhD in Biochemistry</li> <li>➔ Works with the niche and the socio-technical regime; unique perspective on landscape pressure on regime; and interactions between niche and (industry) regime</li> </ul>	26.04.2023
2	Investment Manager	Venture Capitalist	<ul style="list-style-type: none"> <li>• Experienced venture capital investor and company builder with strong focus on biomanufacturing</li> <li>• Board member at European start-up that utilizes PF to produce staple foods</li> <li>➔ Works from the niche with several PF companies, has a short- and long-term view on potential niche development</li> </ul>	26.04.2023
3	Doctoral Student in Law, Consultant	University: Faculty of Life Sciences: Food, Nutrition and Health; Faculty of Law and Economics	<ul style="list-style-type: none"> <li>• PhD student in law conducting research on authorization procedures of novel technologies and regulation of food innovations in the European Union</li> <li>• Consultant for government bodies, European institutions, and NGOs</li> <li>➔ Works with the established regime on interactions with the niche, especially from a regulatory perspective</li> </ul>	27.04.2023

No.	Function	Organization Type	Rationale for Inclusion	Date
4	Scientist and Entrepreneur	Biotechnology Start-Up	<ul style="list-style-type: none"> <li>Former researcher on strain engineering and biogas fermentation at renowned research institute</li> <li>Co-Founder and Chief Science Officer of a EU-based start-up company developing and producing already known, adapted, or novel macromolecules utilizing PF</li> <li>Holds a PhD in Biochemistry</li> <li>➔ As a core niche actor, the expert offers a micro-level perspective on developing and commercializing innovations from PF</li> </ul>	27.04.2023
5	Policy Affairs Manager	Non-Governmental Organization	<ul style="list-style-type: none"> <li>Heads the German office of an internationally active NGO promoting alternative proteins (including products from PF) to transform the global food system</li> <li>➔ Regularly collaborates with start-ups (niche), corporations, research institutions, and government bodies (socio-technical regime) to promote interactions</li> </ul>	27.04.2023

No.	Function	Organization Type	Rationale for Inclusion	Date
6	Scientific and Investment Director	Direcor and Investment Director (Impact) Venture Capitalist	<ul style="list-style-type: none"> <li>Scientific advisor and director at an internationally active venture capitalist firm with a strong focus on environmentally sustainable transformation of real economy value chains.</li> <li>Involved in several investments in start-ups utilizing PF or further enabling and facilitating technology in the value chain.</li> <li>Co-authored reports with leading corporates and consultancies on the topic, which are referenced by various experts, stakeholders, and institutions</li> <li>Holds a PhD in molecular biosciences</li> <li>Worked several years in management consulting.</li> </ul> <p>→ Takes a short-term and long-term perspective on the challenges and drivers of the niche's potential development, grounded by a deep technical and economic understanding.</p> <p>Facilitates interactions between the niche and the established regime</p>	28.04.2023
7	Professor of Communication Studies and Author	University: Department of Communication Studies	<ul style="list-style-type: none"> <li>Associate Professor of communication studies, conducting research on relationships between social movements; media and technology; and the food system, with a focus on alternative proteins and food justice</li> <li>Published several articles on the perception, discourse, and acceptance of products from cellular agriculture, such as animal-free dairy made using PF</li> </ul> <p>→ Provides unique insights into the status, challenges, and opportunities faced by niche actors in communicating their vision to the regime</p>	01.05.2023

No.	Function	Organization Type	Rationale for Inclusion	Date
8	Researcher and Consultant	Private and Independent Research Institute on Renewable Carbon	<ul style="list-style-type: none"> <li>Leads a department and working group at an internationally recognized research institute focusing on renewable carbon and bio-based products</li> <li>Experienced researcher and consultant involved in various national and international research projects on topics such as biotechnology, chemical recycling, CO<sub>2</sub>-based fuels and monomers, and sustainable feedstock</li> <li>Co-founded and organized a conference on CO<sub>2</sub> as feedstock for fuels, chemicals, and polymers</li> <li>Holds a degree in Biology</li> <li>→ Works with government institutions and industrial companies (socio-technical regime), start-ups and R&amp;D labs (niche); acts as observer and facilitator of multi-level interactions</li> </ul>	03.05.2023

## Appendix B: Coding Structure Used for Analyzing Interviews

Deductive derived codes without formatting, inductive emerged codes in *italic*.

Conceptual Level	Code	Subcode
Drivers of Adoption (Geels & Schot, 2007)	Learning Effects	Technological Commercial
	Sociological & Socio-Technical	Involvement of Powerful Actors
Barriers Faced by Emerging Niche (Kemp et al., 1998)	Infrastructure Production Factors	<i>Investments for Scale-Up</i> <i>Socio-Technical Structure</i>
	Government and Policy Factors	Price Lock-In Regulation Lock-In <i>Regulatory Approval</i>
	Cultural and Psychological Factors	<i>Value Creation</i> <i>Lack of Awareness and Narratives</i> <i>Socio-Political</i>
Landscape Changes (Geels, 2002)	Long-Term	<i>GMO</i> <i>Consumer Acceptance</i> <i>Sustainability</i>
	Short-Term	<i>Food-Security</i> <i>Supply Chain Fragility</i> <i>Technologization</i>

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<b>Conceptual Level</b>	<b>Code</b>	<b>Subcode</b>
Regime Destabilization (Geels, 2002)	Stricter Regulation	
	Changing User and Market Preferences	
	<i>Sustainability Commitments</i>	
	<i>Geopolitical Tensions</i>	
	<i>Supply Chain Disruptions</i>	
Windows of Opportunity (Geels, 2002)	<i>Sustainability as a Performance Criteria</i>	
	<i>Quotas</i>	
	<i>Competitive Moves Among Firms</i>	

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Source: Own illustration.