A.T2.1
EXISTING ADVANCED TECHNIQUES AND TOOLS

D.T2.1.2 Capitalization report

Version Final
31.05. 2017

Project code: CE393
Project acronym: I-CON
Title: Improving Competences and skills through Food sector InNovations

Deliverable D.T2.1.2:

Capitalisation report

Work package T2:
Developing tools to improve competences in food sector

Activity:
Identification of existing advanced techniques and tools

Document issued by: **Campden BRI Hungary Ltd. (CBHU)**

Delivery month: **05/2017**
Version: **8.0 Final**
Document language: **ENG**

Dissemination Level		
PU	Public	
PP	Restricted to other programme participants	
RE	Restricted to a group specified by the consortium	
CO	Confidential, only for members of the consortium	x

Table of content

1. Introduction including the objectives

The objective of Task 2 of the I-CON project is to develop tools and techniques to improve competences and skills of food related SMEs through cross-sector related tools and techniques. The target groups of the task are relevant national and regional ministries, universities, private and public R+D departments, chambers, clusters, innovation centers, SMEs and large companies.
This resulted in an inventory of the existing advanced tools and techniques grouped by nine targeted areas of benefits and three areas of applications such as food safety, quality and labelling; mechatronics and food design.
Within the Task 2, the first sub-task was the *Identification of existing advanced techniques and tools* to support SMEs in the areas of mechatronics, food safety, quality and labelling, and food design. The Deliverable D.T2.1.1 was about the analysis of the collected existing advanced tools and techniques.

The aim of Deliverable D.T2.1.2 is to identify those collected tools and techniques which can satisfy the regional needs for capacity building and knowledge transfer.

2. Methods

A template was developed by CBHU considering the relevant disciplines and the responsibilities of the regional and knowledge partners in Task 2.1.In the template, regional needs were grouped by the targeted categories of benefits defined in D.T.2.1.1. Analysis of collected existing advanced tools and techniques.

Each regional partner should identify the needs of their own region and match them with the available, relevant tools. Knowledge partners should check the list of needs provided by the regional partners and identify further available relevant matching tools and techniques. For each matching method and techniques the relevance for the main disciplines such as food safety, quality and labelling (FS), mechatronics (M) and food design (D) had to be indicated.

One regional need may be associated with several targeted benefits, and one tool and technique may be applicable to meet several regional needs and also may be relevant for more than one main discipline.

The template was sent to the project partners for reviewing and commenting.

The following partners sent their contributions:

- Knowledge partners:
  - BIZ-UP
  - CBHU
  - UHOH
  - UNISEF
- Regional partners:

- CCIS-CAFÉ
- CNA-ER
- KIGPSIO
- PTP
- SCCI
- STRIA

3. Comparison and reconciliation of the regional needs for capacity building and knowledge transfer with available advanced tools and techniques

3.1. Improving cost efficiency

Regional needs		Tools and techniques	Indication whether it is related to food safety, quality and labelling (FS), mechatronics (MS), Food design (D)			Comments
			FS	MS	D	
Region	Needs	Matching tools and techniques				
Slovakia	New solution of packing use	3.1.1.4. Anti-tempering smart labels 3.1.1.28. How to determine shelf-life testing of food product 3.1.1.31. INNOVATION in making self-adhesive labels more attractive 3.1.1.32. IQ-Freshlabel/Smart labelling 3.1.1.42 Sleeving- new method in the labelling of products 3.1.1.50. New labelling printing device 3.3.1.3. Design for recycling web platform dedicated to the guidelines for designing more easily recyclable packaging 3.3.1.5. Edible, biodegradable Food packaging 3.3.1.9.Technologies of multi-material packaging processing	x		x	Innovation in making self-adhesive labels more attractive
Slovakia	Focus on the acquisition	3.1.1.2. Air fryer	x			Strategic plans of the

	of new innovative technology facilities	3.1.1.3. Airflow puffing 3.1.1.18. Freeze drying 3.1.1.26. High Hydrostatic Pressure (HHP) 3.1.1.27. High-pressure water- jet cutting 3.1.1.43. Sonic dryer 3.1.1.44. Spray dryer for microencapsulation				companies to be competitive and able to develop technological conditions with the aim to improve cost efficiency
Italy, Emilia Romagna region	Supporting the capacity building process by trainings for competences and skills of food related SMEs.	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.8.Chain management for SMEs 3.1.1.9. Code of Best Practices for cleaning and disinfection of Minimally Processed Vegetables 3.1.1.11. Education and training paths 3.1.1.21. Good Hygiene Practice guidelines (considering the main objectives of the I-CON project) 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.25.Guidelines for the hygienic design, construction and layout of food processing factories G39 (Campden BRI) 3.1.1.38. PATHWAY-27 Industry Guidelines for developing products with health claims 3.1.1.39. Practical risk analysis, testing and action levels 2013 (Campden BRI	x	x		

		UK), Allergen management guideline 3.1.1.40. Predictive microbiological models 3.1.1.46. Threat Assessment Critical Control Points (TACCP) 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7) 3.2.1.1. Experience exchange circle 3.2.1.9. Symposium with accompanying small trade fair				
Italy, Emilia Romagna region	The specific problem concerns how to concretely help micro and small companies, not enough structured, to turn an idea into a viable project. Specific needs: the challenge of integration between the different components of the supply chain and the lack of communication among the stakeholders involved; the limited contacts between the manufacturing industries and the advanced technology providers; low level of managerial skills:	3.1.1.1.A sustainable network in food safety 3.1.1.8.Chain management for SMEs 3.1.1.11. Education and training paths 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers Visual thinking technique 3.2.1.3. Innovation voucher (only applicable in Austria) 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centers, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0. 3.3.1.1. Business model canvas for food design (synergies between food and ict, design and cultural and	x	x	x	

	involvement of product and process designers, interaction designers, start-uppers; low international projection; the lack of digitalization of regional SMEs.	creative industries)				
Italy, Emilia Romagna region	Facilitate the access of micro and small businesses to the research community (laboratories, research centers, universities), in particular referring to innovation in the field of mechatronics. Knowledge transfer between companies and research representatives will skip "language" barriers and increase networking opportunities, in order to enable new technological or commercial partnerships.	3.1.1.12. EHEDG Documents 8, Guide to the "Hygienic Equipment Design Criteria" 3.1.1.19. fTRACE service 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.2.1.3. Innovation voucher (only applicable in Austria) 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centers, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0.	x	x		Within CNA ER system, CNA Innovazione is the accredited Center for the technological transfer process.
Slovenia	Integrate of SMEs into global value chains and networks (extend to global markets)	3.1.1.1. A sustainable network in food safety 3.1.1.8. Chain management for SMEs 3.1.1.11. Education and training path 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional	x	x	x	

		food manufacturers 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centers, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0. 3.3.1.1. Business model canvas for food design (synergies between food and ict, design and cultural and creative industries)				
Slovenia	Higher energy and resource efficiency in production	3.1.1.17. FoodManufuture 3.2.1.2. FRISBEE tool 3.2.1.6. New innovative technological equipment to ensure food production and packaging of finished products 3.2.1.7. Powerkure ™ - compensation device to stabilize electric current supply and optimize the distribution according to processes needs	x	x		
Slovenia	The establishment of virtual technological production systems, use of intelligent materials and systems, which reduces maintenance needs	3.1.1.4. Anti-tampering smart labels 3.1.1.6. Biometric identification and access control 3.1.1.7. Biosensor system (lactate biosensor) that ensures quality and efficiency in the fruit juice industry 3.1.1.17. FoodManufuture 3.1.1.31. INNOVATION in making self-adhesive labels more attractive 3.1.1.32. IQ-Freshlabel/Smart labelling 3.2.1.2. FRISBEE tool 3.2.1.6. New innovative technological equipment to ensure food production	x	x		

		and packaging of finished products 3.2.1.7. Powerkure ™ - compensation device to stabilize electric current supply and optimize the distribution according to processes needs				
Poland	To follow up new standards for recycling of multi-material packaging and hazardous packaging	3.3.1.6. EN European Standards and Specifications by: CEN European Committee for Standardization website - www.cen.eu 3.3.1.8. Search Standards tool at website of European Committee for Standardization (CEN) 3.3.1.9. Technologies of multi-material packaging processing			x	
Poland	Transparency of material and information flow in inter-organizational Supply Chains	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.19. fTRACE service 3.1.1.47. tsenso - temperature monitoring and last-mile disposition system for passive cooled delivery 3.2.1.10. Supply Chain Management online tool / ADINIS Cloud service	x	x		
Poland	Sorting fruits in terms of many market-relevant parameters	3.2.1.11. The sorting line with water unloading used for sorting and packing of fruits.		x		
Hungary, South Transdanubia	Extended use of energy efficient production (processing, heating, cooling technologies) technologies based on resources available on the premises of the food production	3.1.1.2 Air fryer 3.1.1.17. FoodManufuture 3.1.1.23. Guideline for Cleaning Suited Equipment 3.2.1.2. FRISBEE tool 3.2.1.6. New innovative technological equipment to ensure food production and packaging of finished products	x	x		

	companies (heat pumps, PV, etc.).	3.2.1.7. Powerkure ™ - compensation device to stabilize electric current supply and optimize the distribution according to processes needs				

Regional needs		Tools and techniques	Indication whether it is related to food safety, quality and labelling (FS), mechatronics (MS), Food design (D)			Comments
			FS	MS	D	
Region	needs	Matching tools and techniques				
Slovakia	To offer high quality products to the customers	3.1.1.7. Biosensor system (lactate biosensor) that ensures quality and efficiency in the fruit juice industry 3.1.1.8. Chain management for SMEs 3.1.1.15. ESN Consumer Testing Guidelines 3.1.1.16. Food Compositional data 3.1.1.20. Gluten free, allergen management and product development perspectives 3.1.1.26. High hydrostatic pressure (HHP) 3.1.1.28. How to determine shelf-life testing for food products 3.1.1.35. National nutritional database 3.1.1.36. New nutritional recommendations for optimal health and quality of life in European elderly (NU-AGE diet)	x			it is necessary for companies to improve and keep high quality of their production to beat strong competition There are quite a lot of typical and traditional food products in Slovakia, such as sheep cheese, string cheese. To keep the quality and standard as requested by the clients (very often tourists) it is necessary to keep the system of production

		3.1.1.38. PATHWAY-27 Industry Guidelines				in a traditional way. There is no chance to replace the manual production by high quality modern technological lines.
Italy, Emilia Romagna region	Supporting the capacity building process by trainings for competences and skills of food related SMEs.	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.8.Chain management for SMEs 3.1.1.9. Code of Best Practices for cleaning and disinfection of Minimally Processed Vegetables 3.1.1.11. Education and training paths 3.1.1.21. Good Hygiene Practice guidelines (considering the main objectives of the I-CON project) 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.25.Guidelines for the hygienic design, construction and layout of food processing factories G39 (Campden BRI) 3.1.1.38. PATHWAY-27 Industry Guidelines for developing products with health claims 3.1.1.39. Practical risk analysis, testing and action levels 2013 (Campden BRI UK), Allergen management guideline 3.1.1.40. Predictive microbiological models	x	x		

		3.1.1.46. Threat Assessment Critical Control Points (TACCP) 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7) 3.2.1.1. Experience exchange circle 3.2.1.9. Symposium with accompanying small trade fair				
Italy, Emilia Romagna region	The specific problem concerns how to concretely help micro and small companies, not enough structured, to turn an idea into a viable project. Specific needs: the challenge of integration between the different components of the supply chain and the lack of communication among the stakeholders involved; the limited contacts between the manufacturing industries and the advanced technology providers; low level of managerial skills: - involvement of product and process designers, interaction designers,	3.1.1.1.A sustainable network in food safety 3.1.1.8.Chain management for SMEs 3.1.1.11. Education and training paths 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.2.1.3. Innovation voucher (only applicable in Austria) 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0. 3.3.1.1. Business model canvas for food design (synergies between food and ict, design and cultural and creative industries)	x	x	x	

	start-uppers; low international projection; the lack of digitalization of regional SMEs.					
Italy, Emilia Romagna region	Facilitate the access of micro and small businesses to the research community (laboratories, research centers, universities), in particular referring to innovation in the field of mechatronics. Knowledge transfer between companies and research representatives will skip "language" barriers and increase networking opportunities, in order to enable new technological or commercial partnerships.	3.1.1.12. EHEDG Documents 8, Guide to the "Hygienic Equipment Design Criteria" 3.1.1.19. fTRACE service 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.2.1.3. Innovation voucher (only applicable in Austria) 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0.	x	x		Within CNA ER system, CNA Innovazione is the accredited Center for the technological transfer process.
Slovenia	Sufficient capacity for the product development and marketing, availability of necessary staff, knowledge and capital	3.1.1.8. Chain management for SMEs 3.1.1.15. ESN Consumer Testing Guidelines 3.1.1.16. Food Compositional data 3.1.1.20. Gluten free, allergen management and product development perspectives 3.1.1.28. How to determine shelf-life testing for food products 3.1.1.35. National nutritional database 3.1.1.36. New nutritional	x	x		

		recommendations for optimal health and quality of life in European elderly (NU-AGE diet) 3.1.1.38. PATHWAY-27 Industry Guidelines 3.2.1.9. Symposium with accompanying small trade fair				
Slovenia	Customized industry, adaptable to changes, resource efficient and internally and externally integrated	3.1.1.17. FoodManufuture 3.1.1.40. Predictive Microbiological Models	x			
Poland	Transparency of material and information flow in inter-organizational Supply Chains	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.19. fTRACE service 3.1.1.47. tsenso - temperature monitoring and last-mile disposition system for passive cooled delivery 3.2.1.10. Supply Chain Management online tool / ADINIS Cloud service	x	x		
Poland	Sorting fruits in terms of many market-relevant parameters	3.2.1.11. The sorting line with water unloading used for sorting and packing of fruits. 3.3.1.6. EN European Standards and Specifications by: CEN European Committee for Standardization website - www.cen.eu		x	x	
Hungary, South Transdanubia	Targeted initiatives to improve quality related skills of food company workers in terms white and black zones of production.	3.1.1.8. Chain management for SMEs 3.1.1.15. ESN Consumer Testing Guidelines 3.1.1.16. Food Compositional data 3.1.1.20. Gluten free, allergen management and product development	x	x		

		perspectives 3.1.1.22. Guide to the Management of Listeria in Food Processing 3.1.1.28. How to determine shelf-life testing for food products 3.1.1.35. National nutritional database 3.1.1.36. New nutritional recommendations for optimal health and quality of life in European elderly (NU-AGE diet) 3.1.1.38. PATHWAY-27 Industry Guidelines 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7) 3.2.1.9. Symposium with accompanying small trade fair				

3.3. Improving risk assessment and risk management

Regional needs		Tools and techniques	Indication whether it is related to food safety, quality and labelling (FS), mechatronics (MS), Food design (D)			Comments
			FS	MS	D	
Region	needs	Matching tools and techniques				
Slovakia	Purchasing of innovative technologies	3.1.1.2. Air fryer 3.1.1.3. Airflow puffing 3.1.1.18. Freeze drying 3.1.1.26. High Hydrostatic Pressure (HHP) 3.1.1.27. High-pressure water- jet cutting 3.1.1.43. Sonic dryer 3.1.1.44. Spray dryer for microencapsulation 3.2.1.4. In-pack atmospheric cold plasma (ACP)	x	x		The innovative machine technology replaces the original existing equipment, that have been technically and morally impaired
Italy, Emilia Romagna region	Supporting the capacity building process by trainings for competences and skills of food related SMEs.	3.1.1.11. Education and training paths 3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.8.Chain management for SMEs	x	x		

		3.1.1.9. Code of Best Practices for cleaning and disinfection of Minimally Processed Vegetables 3.1.1.11. Education and training paths 3.1.1.13. EHEDG Documents DOC 45 – Part 1. Cleaning validation in the food industry – General principles 3.1.1.21. Good Hygiene Practice guidelines (considering the main objectives of the I-CON project) 3.1.1.22. Guide to the Management of Listeria in Food Processing 3.1.1.23. Guideline for Cleaning Suited Equipment 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.25.Guidelines for the hygienic design, construction and layout of food processing factories G39 (Campden BRI) 3.1.1.38. PATHWAY-27 Industry Guidelines for developing products with health claims 3.1.1.39. Practical risk analysis, testing and action levels 2013 (Campden BRI UK), Allergen management guideline 3.1.1.40. Predictive microbiological models 3.1.1.46. Threat Assessment Critical Control Points (TACCP) 3.1.1.47. tsenso - temperature				

		monitoring and last-mile disposition system for passive cooled delivery 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7) 3.2.1.1. Experience exchange circle 3.2.1.9. Symposium with accompanying small trade fair				
Italy, Emilia Romagna region	The specific problem concerns how to concretely help micro and small companies, not enough structured, to turn an idea into a viable project. Specific needs: the challenge of integration between the different components of the supply chain and the lack of communication among the stakeholders involved; the limited contacts between the manufacturing industries and the advanced technology providers; low level of managerial skills: - involvement of product and process designers, interaction designers,	3.1.1.1.A sustainable network in food safety 3.1.1.8.Chain management for SMEs 3.1.1.11. Education and training paths 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers Visual thinking technique 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0. 3.3.1.1. Business model canvas for food design (synergies between food and ict, design and cultural and creative industries)	x	x	x	

	start-uppers; low international projection; the lack of digitalization of regional SMEs.					
Italy, Emilia Romagna region	Facilitate the access of micro and small businesses to the research community (laboratories, research centers, universities), in particular referring to innovation in the field of mechatronics. Knowledge transfer between companies and research representatives will skip "language" barriers and increase networking opportunities, in order to enable new technological or commercial partnerships.	3.1.1.12. EHEDG Documents 8, Guide to the "Hygienic Equipment Design Criteria" 3.1.1.19. fTRACE service 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centers, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0.	x	x		Within CNA ER system, CNA Innovazione is the accredited Center for the technological transfer process.
Slovenia	Introduction of the systems for remote management and monitoring, introduction of sensor systems	3.1.1.6. Biometric identification and access control 3.1.1.7.Biosensory system (lactate biosensor) that ensures quality and efficiency in the fruit juice industry 3.1.1.17. FoodManufuture 3.1.1.33. Light-emitting diodes (LED's) non-food contact surface 3.1.1.41. Simplified Industrial Risk Assessment	x			

Slovenia	Establishing an innovative and short supply chains for locally and produced foods with a guaranteed and recognized traceability from the field to the table	3.1.1.5. Best practice guideline on Transparency and inventory of best practices on food transparency 3.1.1.17. FoodManufuture 3.1.1.19. fTRACE service 3.1.1.31. INNOVATION in making self-adhesive labels more attractive 3.1.1.32. IQ-Freshlabel/Smart labelling 3.2.1.6. New innovative technological equipment to ensure food production and packaging of finished products 3.2.1.7. Powerkure ™ - compensation device to stabilize electric current supply and optimize the distribution according to processes needs	x	x		
Poland	Transparency of material and information flow in inter-organizational Supply Chains	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.19. fTRACE service 3.1.1.47. tsenso - temperature monitoring and last-mile disposition system for passive cooled delivery 3.2.1.10. Supply Chain Management online tool / ADINIS Cloud service	x	x		
Poland	Exchange of information and quality management	3.1.1.50.New labeling printing device	x			

Hungary, South Transdanubia	Easy to set-up/use/upgrade information technologies to monitor and intervene into the production process of the food processing companies.	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.17. FoodManufuture 3.1.1.19. fTRACE service 3.1.1.32. IQ-Freshlabel/Smart labelling 3.1.1.47. tsenso - temperature monitoring and last-mile disposition system for passive cooled delivery 3.2.1.10. Supply Chain Management online tool / ADINIS Cloud service	x	x		
Hungary, South Transdanubia	Tool for transferring and providing guidance on wholesale-retail needs of resellers/consumers of food goods to managers of food companies to identify and improve the operation of their facilities/product development.	3.1.1.8.Chain management for SMEs 3.1.1.11. Education and training paths 3.1.1.22. Guide to the Management of Listeria in Food Processing 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.46. Threat Assessment Critical Control Points (TACCP) 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7) 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0.	x	x	x	

		3.3.1.1. Business model canvas for food design (synergies between food and ict, design and cultural and creative industries)				

3.4. Regulations compliance and its assessment

Regional needs		Tools and techniques	Indication whether it is related to food safety, quality and labelling (FS), mechatronics (MS), Food design (D)			Comments
			FS	MS	D	
Region	needs	Matching tools and techniques				
Slovakia	To follow up new European standards and legislation	3.1.1.16. Food Compositional Data (FCD) 3.3.1.6. EN European Standards and Specifications by: CEN European Committee for Standardization website - www.cen.eu 3.3.1.8. Search Standards tool at website of European Committee for Standardization (CEN) 3.3.1.9. Technologies of multi-material packaging processing	x		x	in order to keep European standards producers have to comply with it in production process Actually there is an issue in Slovakia with dual quality of products which are imported to Slovakia under the same brand name. The Ministry of Agriculture and Rural Development of the Slovak Republic has analyzed the contents of 22 food products

						made by multinational companies under the same brands for Slovakia and Austria and found that in most cases the products for the Slovak market were of lower quality than those sold in Austria. The Ministry is calling for new EU-wide regulations that would stop making Slovaks a second-class consumers. The worst results were in soft drinks, spices, cheese, tea, and meat. Products sold in Slovakia had a lower share of protein, a higher share of fat, lower weight, more preservatives and artificial sweeteners, a lower share of natural substances, etc. The quality requirements in Slovakia are more stringent than in other countries,

						however, restrictive legislation does not affect imported goods. As long as EU legislation on labelling and safety is respected, products can differ from one country to another. As a result, companies can use different ingredients and sell their products at different final prices.
Italy, Emilia Romagna region	Supporting the capacity building process by trainings for competences and skills of food related SMEs.	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.8.Chain management for SMEs 3.1.1.9. Code of Best Practices for cleaning and disinfection of Minimally Processed Vegetables 3.1.1.11. Education and training paths 3.1.1.21. Good Hygiene Practice guidelines (considering the main objectives of the I-CON project) 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.25.Guidelines for the hygienic design, construction and layout of food processing factories G39 (Campden	x	x		

		BRI) 3.1.1.38. PATHWAY-27 Industry Guidelines for developing products with health claims 3.1.1.39. 3.1.1.39. Practical risk analysis, testing and action levels 2013 (Campden BRI UK), Allergen management guideline 3.1.1.40. Predictive microbiological models 3.1.1.46. Threat Assessment Critical Control Points (TACCP) 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7) 3.2.1.1. Experience exchange circle 3.2.1.9. Symposium with accompanying small trade fair				
Slovenia	Adequate support and knowledge transfer to entrepreneurs, the existing and future ones, from the registration of a company to later phases	3.1.1.8. Chain management for SMEs 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.11. Education and training path	x			
Slovenia	Improved provision of information regarding regulatory laws to SMEs	3.1.1.10.Differentiating between fresh and frozen thawed meat 3.1.1.11. Education and training path 3.1.1.50. New labelling printing device	x	x	x	

Poland	To follow up new standards for recycling of multi-material packaging and hazardous packaging	3.3.1.6. EN European Standards and Specifications by: CEN European Committee for Standardization website - www.cen.eu 3.3.1.8. Search Standards tool at website of European Committee for Standardization (CEN) 3.3.1.9. Technologies of multi-material packaging processing			x	
Poland	Transparency of material and information flow in inter-organizational Supply Chains	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.19. fTRACE service 3.1.1.47. tsenso - temperature monitoring and last-mile disposition system for passive cooled delivery 3.2.1.10. Supply Chain Management online tool / ADINIS Cloud service	x	x		
Poland	Sorting fruits in terms of many market-relevant parameters	3.2.1.11. The sorting line with water unloading used for sorting and packing of fruits.		x		
Poland	Exchange of information and quality management	3.1.1.50. New labeling printing device 3.2.1.1. Experience exchange circle 3.2.1.9. Symposium with accompanying small trade fair	x	x		

Hungary, South Transdanubia	Fostering the interest assertion organizations (chambers of agriculture, chambers of commerce, bottom-up organizations) to convey the regulation related needs of SMEs into the centralized decision making process.	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.8.Chain management for SMEs 3.1.1.9. Code of Best Practices for cleaning and disinfection of Minimally Processed Vegetables 3.1.1.11. Education and training paths 3.1.1.21. Good Hygiene Practice guidelines (considering the main objectives of the I-CON project) 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.25.Guidelines for the hygienic design, construction and layout of food processing factories G39 (Campden BRI) 3.1.1.38. PATHWAY-27 Industry Guidelines for developing products with health claims 3.1.1.39. Practical risk analysis, testing and action levels 2013 (Campden BRI UK), Allergen management guideline 3.1.1.40. Predictive microbiological models 3.1.1.46. Threat Assessment Critical Control Points (TACCP) 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue	x	x		

		7) 3.2.1.1. Experience exchange circle				
		3.2.1.9. Symposium with accompanying small trade fair				

3.5. Product performance and its assessment

Regional needs		Tools and techniques	Indication whether it is related to food safety, quality and labelling (FS), mechatronics (MS), Food design (D)			Comments
			FS	MS	D	
Region	needs	Matching tools and techniques				
Slovakia	Adapting to new trends in product performance	3.1.1.20. Gluten free, allergen management and product development perspectives 3.1.1.36. New nutritional recommendations for optimal health and quality of life in European elderly (NU-AGE diet) 3.1.1.38. PATHWAY-27 Industry Guidelines 3.2.1.8. Survey forms 3.3.1.4. EcoThrophelia competition	x	x	x	survey of customers
Italy,	Supporting the capacity	3.1.1.5. Best Practice Guide on Food	x	x		

Emilia Romagna region	building process by trainings for competences and skills of food related SMEs.	Transparency and Inventory of best practices on Food transparency 3.1.1.8.Chain management for SMEs 3.1.1.9. Code of Best Practices for cleaning and disinfection of Minimally Processed Vegetables 3.1.1.11. Education and training paths 3.1.1.21. Good Hygiene Practice guidelines (considering the main objectives of the I-CON project) 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.25.Guidelines for the hygienic design, construction and layout of food processing factories G39 (Campden BRI) 3.1.1.38. PATHWAY-27 Industry Guidelines for developing products with health claims 3.1.1.39. Practical risk analysis, testing and action levels 2013 (Campden BRI UK), Allergen management guideline 3.1.1.40. Predictive microbiological models 3.1.1.46. Threat Assessment Critical Control Points (TACCP) 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7) 3.2.1.1. Experience exchange circle				

		3.2.1.9. Symposium with accompanying small trade fair				
Italy, Emilia Romagna region	The specific problem concerns how to concretely help micro and small companies, not enough structured, to turn an idea into a viable project. Specific needs: the challenge of integration between the different components of the supply chain and the lack of communication among the stakeholders involved; the limited contacts between the manufacturing industries and the advanced technology providers; low level of managerial skills: - involvement of product and process designers, interaction designers, start-uppers; low international projection; the lack of digitalization of regional SMEs.	3.1.1.1.A sustainable network in food safety 3.1.1.8.Chain management for SMEs 3.1.1.11. Education and training paths 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers Visual thinking technique 3.2.1.3. Innovation voucher (only applicable in Austria) 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0. 3.3.1.1. Business model canvas for food design (synergies between food and ict, design and cultural and creative industries)	x	x	x	

Italy, Emilia Romagna region	Facilitate the access of micro and small businesses to the research community (laboratories, research centers, universities), in particular referring to innovation in the field of mechatronics. Knowledge transfer between companies and research representatives will skip "language" barriers and increase networking opportunities, in order to enable new technological or commercial partnerships.	3.1.1.12. EHEDG Documents 8, Guide to the "Hygienic Equipment Design Criteria" 3.1.1.19. fTRACE service 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.2.1.3. Innovation voucher (only applicable in Austria) 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0.	x	x		Within CNA ER system, CNA Innovazione is the accredited Center for the technological transfer process.
Slovenia	Support sustainable production and processing of food	3.1.1.1. A sustainable network in food safety	x	x	x	

Slovenia	Improving the product performance by successfully filling the defined niche on the global market	3.1.1.20. Gluten free, allergen management and product development perspectives 3.1.1.36. New nutritional recommendations for optimal health and quality of life in European elderly (NU-AGE diet) 3.1.1.38. PATHWAY-27 Industry Guidelines	x			
Slovenia	To develop and promote new and innovative (tourism) products	3.1.1.14. Emulsion done with sunflower oil as fat replacer and salt reduction 3.1.1.36. New nutritional recommendations for optimal health and quality of life in European elderly (NU-AGE diet) 3.1.1.28. How to determine shelf life testing of food products	x			
Poland	To follow up new standards for recycling of multi-material packaging and hazardous packaging	3.3.1.6. EN European Standards and Specifications by: CEN European Committee for Standardization website - www.cen.eu 3.3.1.8. Search Standards tool at website of European Committee for Standardization (CEN) 3.3.1.9. Technologies of multi-material packaging processing			x	

Poland	Transparency of material and information flow in inter-organizational Supply Chains	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.19. fTRACE service 3.1.1.47. tsenso - temperature monitoring and last-mile disposition system for passive cooled delivery 3.2.1.10. Supply Chain Management online tool / ADINIS Cloud service	x	x		
Poland	sorting fruits in terms of many market-relevant parameters	3.2.1.11. The sorting line with water unloading used for sorting and packing of fruits.		x		
Poland	exchange of information and quality management	3.1.1.50. New labeling printing device	x			
Hungary, South Transdanubia	Providing EU funding targeted along the product development needs of especially micro and small enterprises where capacities and financial means for such purpose are rather limited.	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.22. Guide to the Management of Listeria in Food Processing 3.1.1.28. How to determine shelf life testing of food products 3.1.1.31. INNOVATION in making self-adhesive labels more attractive 3.1.1.35. National nutritional database 3.1.1.38. PATHWAY-27 Industry Guidelines 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7)	x	x	x	
Hungary,	Providing beneficial opportunities / finance	3.1.1.15. ESN Consumer Testing Guidelines	x	x	x	

South Transdanubia	to test and introduce new food goods on local, national, international markets.	3.1.1.17. FoodManufuture - Integrated summary of long and short-term future needs for research infrastructure				

3.6. Information for users

Regional needs		Tools and techniques	Indication whether it is related to food safety, quality and labelling (FS), mechatronics (MS), Food design (D)			Comments
			FS	MS	D	
Region	needs	Matching tools and techniques				
Slovakia	Keep customer or potential customer informed	3.1.1.4. Anti-tempering smart labels 3.1.1.10. Differentiating between fresh and frozen-thawed meat 3.1.1.15. ESN Consumer Testing Guidelines 3.1.1.20. Gluten free, allergen management and product development perspectives 3.1.1.28. How to determine shelf life testing of food products 3.1.1.32. IQ-Freshlabel/Smart labelling 3.1.1.35. National nutritional database 3.1.1.36. New nutritional recommendations for optimal health	x		x	Consumers are the ones who ultimately decide which foodstuffs are offered in the market. They should prefer Slovak food products to increase the share of domestic products in the market (nowadays around 40%) and to help Slovak agriculture and food

		and quality of life in European elderly (NU-AGE diet) 3.3.1.7. PRETO Ryba Žilina changes logo, package design and has new marketing strategy for its product - cod in mayonnaise				industry. In August 2004 the Ministry of Agriculture of the SR put into practice the program of a national quality mark for Slovak agricultural products and foodstuffs. Its objective is to focus the attention of the consumer public on the issue of safety and quality, as well as on the origin and tradition of agricultural products and foodstuffs. The "quality mark" on a product is a guarantee for the consumer that this product was produced in compliance with requirements of national legislation and legislation of the EU, while the determined technological process was followed during the production. Observance of the requirements regarding product marking is being controlled by foodstuff control bodies in all phases of its production,

						including the processing of raw materials, transportation and sale of the product. Quality agricultural products and foodstuffs are identified in this manner on the domestic market, with the specifics of the Slovak consumer taken into account.
Italy, Emilia Romagna region	Supporting the capacity building process by trainings for competences and skills of food related SMEs.	3.1.1.11. Education and training paths 3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.8.Chain management for SMEs 3.1.1.9. Code of Best Practices for cleaning and disinfection of Minimally Processed Vegetables 3.1.1.11. Education and training paths 3.1.1.21. Good Hygiene Practice guidelines (considering the main objectives of the I-CON project) 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.25.Guidelines for the hygienic design, construction and layout of food processing factories G39 (Campden BRI) 3.1.1.38. PATHWAY-27 Industry Guidelines for developing products	x	x		

		with health claims 3.1.1.39. Practical risk analysis, testing and action levels 2013 (Campden BRI UK), Allergen management guideline 3.1.1.40. Predictive microbiological models 3.1.1.46. Threat Assessment Critical Control Points (TACCP) 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7) 3.2.1.1. Experience exchange circle 3.2.1.9. Symposium with accompanying small trade fair				
Slovenia	Support and promote understanding of obligatory information	3.1.1.11. Education and training path 3.1.1.29. ISO 22000 3.1.1.48. Understanding High Risk, High Care and Ambient High Care (BRC issue 7) 3.3.1.6. EN European Standards and Specifications by: CEN European Committee for Standardization website - www.cen.eu 3.3.1.8. Search Standards tool at website of European Committee for Standardization (CEN)	x		x	

Slovenia	Knowledge transfer and application	3.1.1.1. A sustainable network in food safety 3.1.1.8. Chain management for SMEs 3.1.1.11. Education and training path 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0.	x	x		
Poland	Transparency of material and information flow in inter-organizational Supply Chains	3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.19. fTRACE service 3.1.1.47. tsenso - temperature monitoring and last-mile disposition system for passive cooled delivery 3.2.1.10. Supply Chain Management online tool / ADINIS Cloud service		x		
Poland	exchange of information and quality management	3.1.1.50. New labeling printing device	x			

		3.1.1.1. A sustainable network in food safety				
Hungary, South Transdanubia	Trainings/capacity buildings of merchants of food industry SMEs to reach further target audiences / consumers through ICT based tools and community webpages	3.1.1.8. Chain management for SMEs 3.1.1.11. Education and training path 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0.	x	x		

3.7. User satisfaction and its assessment

Regional needs		Tools and techniques	Indication whether it is related to food safety, quality and labelling (FS), mechatronics (MS), Food design (D)			Comments
			FS	MS	D	
Region	needs	Matching tools and techniques				
Slovakia	User satisfaction	3.1.1.20. Gluten free, allergen management and product development perspectives 3.1.1.36. New nutritional recommendations for optimal health and quality of life in European elderly (NU-AGE diet) 3.1.1.38. PATHWAY-27 Industry Guidelines 3.2.1.8. Survey forms 3.3.1.4. EcoThrophelia competition	x	x	x	response to the customer ´s needs and wishes (e.g. gluten-free, dairy-free, vegan, raw food products)

Italy, Emilia Romagna region	Supporting the capacity building process by trainings for competences and skills of food related SMEs.	3.1.1.11. Education and training paths 3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.8.Chain management for SMEs 3.1.1.9. Code of Best Practices for cleaning and disinfection of Minimally Processed Vegetables 3.1.1.21. Good Hygiene Practice guidelines (considering the main objectives of the I-CON project) 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.1.1.25.Guidelines for the hygienic design, construction and layout of food processing factories G39 (Campden BRI) 3.1.1.38. PATHWAY-27 Industry Guidelines for developing products with health claims 3.1.1.39. Practical risk analysis, testing and action levels 2013 (Campden BRI UK), Allergen management guideline 3.1.1.40. Predictive microbiological models 3.1.1.46. Threat Assessment Critical Control Points (TACCP) 3.1.1.48. Understanding High Risk, High Care, and Ambient High Care (BRC Global Standard for Food Safety Issue 7)	x	x		

		3.2.1.1. Experience exchange circle 3.2.1.9. Symposium with accompanying small trade fair				
Slovenia	Generating a products with higher added value	3.1.1.14. Emulsion done with sunflower oil as fat replacer and salt reduction 3.1.1.20. Gluten free, allergen management and product development perspectives 3.1.1.36. New nutritional recommendations for optimal health and quality of life in European elderly (NU-AGE diet) 3.1.1.28. How to determine shelf life testing of food products	x		x	
Slovenia	Offer more complex products and services which follow the development requirements and trends of final producers and markets respectively	3.1.1.14. Emulsion done with sunflower oil as fat replacer and salt reduction 3.1.1.20. Gluten free, allergen management and product development perspectives 3.1.1.36. New nutritional recommendations for optimal health and quality of life in European elderly (NU-AGE diet) 3.1.1.28. How to determine shelf life testing of food products 3.3.1.2. Design and Development process for Food-related products-Non-food sensory analysis 3.3.1.4. EcoThrophelia competition	x		x	
Poland	exchange of information and quality management	3.1.1.50. New labeling printing device	x			

Hungary, South Transdanubia	It is needed to provide access managers and retail staff of food production enterprises in native (HU) language to I-CON / Central European Good Practices in this field.	3.1.1.1. A sustainable network in food safety 3.1.1.5. Best Practice Guide on Food Transparency and Inventory of best practices on Food transparency 3.1.1.8. Chain management for SMEs 3.1.1.11. Education and training path 3.1.1.15. ESN Consumer Testing Guidelines 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0.	x	x		

3.8. User's feedback and reaction

Regional needs		Tools and techniques	Indication whether it is related to food safety, quality and labelling (FS), mechatronics (MS), Food design (D)			Comments
			FS	MS	D	
Region	needs	Matching tools and techniques				
Slovakia	User's feedback to new logo, package design and marketing strategy for the product	3.1.1.4. Anti-tempering smart labels 3.1.1.31. INNOVATION in making self-adhesive labels more attractive 3.1.1.32. IQ-Freshlabel/Smart labelling 3.1.1.50. New labelling printing device 3.2.1.8. Survey forms 3.2.1.9. Symposium with accompanying small trade fair 3.3.1.7. PRETO Ryba Žilina changes logo, package design and has new marketing strategy for its product - cod in mayonnaise	x	x	x	better perception of customers
Slovenia	Prioritizing and promoting knowledge, competencies and global integration	3.1.1.1. A sustainable network in food safety 3.1.1.8. Chain management for SMEs 3.1.1.11. Education and training path 3.1.1.17. FoodManufuture 3.2.1.9. Symposium with accompanying small trade fair	x	x		

Slovenia	To develop and position Slovenia as an attractive ecological country of innovation, focused on the development of medium- and high-tech and comprehensive solutions	3.3.1.4. EcoThrophelia competition			x	
Hungary, South Transdanubia	It is needed to provide access managers and retail staff of food production enterprises in native (HU) language to I-CON / Central European Good Practices in this field.	3.2.1.8. Survey forms			x	

Regional needs		Tools and techniques	Indication whether it is related to food safety, quality and labelling (FS), mechatronics (MS), Food design (D)			Comments
			FS	MS	D	
Region	needs	Matching tools and techniques				
Slovakia	Qualified work force and better state support	3.1.1.11. Education and training paths 3.2.1.1. Experience exchange circle 3.2.1.9. Symposium with accompanying small trade fair 3.3.1.4. EcoTrophelia competition	x	x	x	actual problem of Slovak food SMEs are lack of qualified workforce and low state support for SMEs
Italy, Emilia Romagna region	Facilitate the access of micro and small businesses to the research community (laboratories, research centers, universities), in particular referring to innovation in the field of mechatronics. Knowledge transfer between companies and research representatives will skip “language” barriers and increase networking opportunities, in order to	3.1.1.12. EHEDG Documents 8, Guide to the “Hygienic Equipment Design Criteria” 3.1.1.19. fTRACE service 3.1.1.24. Guideline on effective knowledge and technology transfer activities to SMEs in the food sector with particular focus on traditional food manufacturers 3.2.1.3. Innovation voucher (only applicable in Austria) 3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and	x	x		

	enable new technological or commercial partnerships.	SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0. Finding effective partnering opportunities				
Slovenia	Upgrade to a higher development, technological and business level	3.1.1.2. Air fryer 3.1.1.3. Airflow puffing 3.1.1.7. Biosensor system (lactate biosensor) that ensures quality and efficiency in the fruit juice industry 3.1.1.18. Freeze drying 3.1.1.26. High hydrostatic pressure 3.1.1.27. High-pressure water-jet cutting 3.1.1.30. Inline NIR spectroscopy 3.1.1.33. Light-emitting diodes (LED's) non-food contact surface 3.1.1.43. Sonic dryer 3.1.1.44.Spray dryer for microencapsulation 3.2.1.3. Innovation voucher (only applicable in Austria) 3.2.1.9. Symposium with accompanying small trade fair	x	x		
Poland	Exchange of information and quality management	3.1.1.50. New labeling printing device 3.2.1.9. Symposium with accompanying small trade fair	x	x		Tracking & tracing, recall management

Hungary, South Transdanubia	To make/position food industry jobs as optional carrier opportunities especially in rural areas, to support the local population employed locally.	3.2.1.5. Knowledge transfer within Industrial Research Laboratories, Innovation Centres, Technopoles and SMEs, in particular related to the development of synergies 'with and for' mechatronics companies, towards INDUSTRY 4.0. 3.2.1.9. Symposium with accompanying small trade fair 3.3.1.4. EcoTrophelia competition		x	x	

3.10. Discussion

One regional need may be associated with several targeted benefits, and one tool and technique may be applicable to meet several regional needs and also may be relevant for more than one main discipline. The number of regional needs associated to different areas of targeted benefits and the number of matching tools identified is shown in Table 1.

Targeted benefits	Number of regional needs	Number of matching tools			Sum
		Food safety	Mechatronics	Design	
1. Improving cost efficiency	12	31	8	5	**44**
2. Improving quality assessment	9	27	5	2	**34**
3. Improving risk assessment and risk management	12	33	7	1	**41**
4. Regulations compliance and its assessment	9	17	3	3	**23**
5. Product performance and its assessment	13	26	6	3	**35**
6. Information for users	7	22	4	3	**29**
7. User satisfaction and its assessment	6	18	2	1	**21**
8. User's feedback and reaction	4	5	1	2	**8**
9. Other	5	15	4	1	**20**

Table 1: Statistics about the matching tools to different regional needs

3.10.1. Narrative for the sub-chapter on "Improving cost efficiency"

12 regional needs are listed in sub-chapter "improving cost efficiency". 44 matching tools in total (31 for food safety, quality and labelling; 8 for mechatronics and 5 for design) were identified. The tools related to trainings and good practice guidelines were applicable for several needs, the other tools were spread nearly evenly according to the needs. Some of the identified tools and techniques are new, advanced technologies and packaging solutions, while the rest of the tools and techniques focusing on knowledge transfer, capacity building.

The information collected within this deliverable shows that improving cost efficiency is one of the most relevant needs for food manufacturing SMEs in central Europe. Traditionally, energy efficiency, especially with the continuous rise of energy costs, has been a key issue related to the cost efficiency and profitability of SMEs. In addition, reduction of costs through more efficient use of the raw materials, ingredients, semi-finished products and packaging materials; water, machinery

operation time and labour provide significant opportunities for improving cost efficiency.

However, energy efficiency in production was only identified as an important need in Slovenia and Hungary. The identified SME needs from Slovakia, Italy and Poland are more oriented to increase the profitability in their business through:

- Acquisition of new innovative technologies facilities
- Trainings to improve competences and skills
- Improvement of knowledge transfer/communication between SMEs and donors (research institutions, universities, etc.)
- Increase of networking opportunities for SMEs

A large number of tools and techniques related to food safety, quality and labelling (FS), mechatronics (MS), and food design (D) have been collected answering the identified SME needs. For many of the collected techniques (e.g. spray dryer for microencapsulation) cost-estimation depends on a variety of factors but, in general, production costs are lower than most other methods.

The tools related to food safety, quality and labelling provide a wide choice to meet regional needs of SMEs.

The mechatronics sector offers a large variety of applications to improve cost efficiency. This can be machines to accelerate food production or handling, devices for tracing and tracking goods and many more. Especially according to the field of "Industry 4.0" production processes as well as logistics can be made faster with the implementation of digitization. To foster the know-how transfer from research institutions to food companies a so called "Innovation voucher" is offered in Austria, where SMEs are granted 5.000 € for "small" research activities. In other countries / regions such as in Hungary similar funding schemes are (up to 16000 €) existing. If not, these countries/ regions should take into consideration to introduce such small fundings for SMEs. In experience exchange rounds the companies can get inspirations from each other how to improve cost efficiency in their own business. Another origin of inspiration how to reduce costs can be taken from symposia and/or trade fairs, where new technologies and products are presented.

Through new uses of packaging fostered by design innovation cost efficiency can be achieved along the whole production chain, including end-of-life/new-life of the packaging part. In a well organized, reliable product development process is essential to integrate from the very beginning several aspects of the product characteristics, and use of the products by consumers and customers

can be integrated at the design operations, which may result in cost production and for increase of better value for money

3.10.2. Narrative for the sub-chapter on "Improving quality assessment"

9 regional needs are listed in sub-chapter "improving quality assessment". 34 matching tools in total (27 for food safety, quality and labelling; 5 for mechatronics and 2 for design) were identified for improving quality assessment which is one of the most frequently listed groups of needs.

Similarly as in the case of the improvement of cost efficiency, based on the collected needs for SMEs, improving quality assessment seems to be one of the most important issues. In the food industry, quality assessment is applied to ensure food safety and food quality to prevent liability claims and to build and maintain trust of consumers.

Some advanced techniques but mostly general knowledge transfer tools (guidelines, training, paths, best practices, models, etc.) have been compiled by I-CON partners matching these identified needs, most of them related to food safety, quality and labelling (FS), and mechatronics (MS). Mainly guidelines are identified. Most of these guidelines focus on the production, hygienic aspects, and product development documents. Other part is focusing on capacity building, maintaining knowledge transfer.

Applicable to other categories, the collected needs of SMEs and the large number of available tools/techniques/solutions to meet them, highlight the well-known problem associated to the knowledge transfer between research and industry, and especially to SMEs. Clear efforts and commitment have been done in Europe in the last years to foster knowledge transfer for food producer SMEs but, still there is much work ahead and the central problems like trust, language, legal, and educational, are still impeding the processes. Using a new and innovative consultation approach, the I-CON project will improve the transfer of knowledge for the targeted SMEs.

The applications of food safety, quality and labelling, chain management, health and nutritional claims, stable shelf-life determination and consumer testing are the topics which were identified most frequently.

For mechatronics, quality assessment of produced goods is on one hand demanded by the customer and described in agreed specifications on the other hand prescribed by norms and standards. As mentioned above, the know-how transfer via experience exchange circles, small funded R&D projects and symposia shall help the companies, especially the SMEs to introduce mechatronic systems, e.g. testing equipment into their production process.

Good design practice can support addition of new technical/monitoring capabilities to packaging and processes, and better communication for final customers.

3.10.3. Narrative for the sub-chapter on "Improving risk assessment"

12 regional needs are listed in sub-chapter "improving risk assessment" and 41 matching tools in total (33 for food safety, quality and labelling; 7 for mechatronics and 1 for design) were identified. The second largest group of matching tools were allocated to the needs related to improving risk assessment and risk management.

The identified SME needs from Slovakia, Italy, Slovenia and Poland for this category and the corresponding collected tools/techniques are very similar to category 3.1. "Improving cost efficiency".

Advanced, innovative technologies, monitoring system, predictive modelling systems are identified to help in improving risk assessment. Furthermore, guidelines for transparency and value chain management can contribute to risk assessment. There is a range of specific tools as TACCP, Listeria prevention, design of High risk and High care facilities, use of ICT based temperature measuring and lorry sealing tools, which can be used for improving risk assessment in the food safety, quality and labelling.
In the area of mechatronics, by applying mechatronic devices for quality control or access control the risk of contamination or damage of food products can be reduced.
New packaging solutions developed in a integrated development process, as needed by both large organizations and local short supply chains, can provide better traceability and information for transparency which in turn can facilitate a better assessment of risk related to food safety and food adulteration.

3.10.4. Regulations compliance and its assessment

9 regional needs are listed in sub-chapter "Regulations compliance and its assessment" and 23 matching tools in total (17 for food safety, 3 for mechatronics and 3 for design) were identified.

Mainly guidelines are matched to the regional needs. The specific tools for the area include best practice guides on food hygiene, on cleaning and disinfection. For labelling compliance has to be ensured to the regulation 1169/2011/EU on provision of food information to consumers and to regulation 1924/2006/EC on nutritional and health claims made on food. Beside the guidelines, a specific website is identified to help the companies to follow-up the changes in the regulations.
The needs for trainings in capacity building and help in adequate knowledge transfer were identified in more than one sub-chapter. In every relevant sub-chapter, the same tools and techniques are matched to these needs.
For design, the starting point is that the packaging material should be in compliance with the European legislation- such as Regulation 1935/2004/EC on Food Contact Materials and in related Regulations such as 1985/2005/EC, Reg. 2023/2006/EC; Reg. 282/2008/EC, Reg. 450/2009/EC; Reg. 10/2011/EC and further regulations.

3.10.5. Product performance and its assessment

13 regional needs are listed in sub-chapter "Product performance and its assessment" and 35 matching tools were identified in total (26 for food safety, quality and labelling, 6 for mechatronics and 3 for design).

In food safety, quality and labelling tools and techniques are identified which provide help in adapting new trends in product performance (gluten free products, products with health claims, dietary recommendations for elderly, food transparency), support to capacity building and support to sustainable production by establishing a network.

At mechatronics, as mentioned above, the know-how transfer via experience exchange circles and small funded R&D projects shall help the food-related companies, especially the SMEs to introduce mechatronic systems, e.g. testing equipment into their production process.
Additionally, surveys are commonly used in mechatronics to check whether the customer are satisfied with the product performance.
Design can contribute to the improvement of product performance adapting to "new" needs and trends, such as convenience of use easiness of handling, sustainability, use of recycled materials etc. A clearly stated and acknowledged Product Specifications Brief is essential to then correctly check and validate the product performance along the whole development process and the entire life of the product.

3.10.6. Information for users

7 regional needs are listed in sub-chapter “Information for users” and 29 matching tools in total (22 for food safety, quality and labelling; 4 for mechatronics and 3 for design) were identified.

In the area of food safety, quality and labelling, the identified tools and techniques are mostly related to labelling solutions, nutritional labelling and dietary recommendations, advanced tools for anti-tampering labels. Significant number of transparency and traceability tools are also listed, similarly to tools to enhance capacity and knowledge transfer.

For mechatronics, at symposia one can get informed about new trends about application of mechatronics in food production and further food-related topics. As this is in most cases on a more scientific level, it is not suitable for broad customer information.

Topic for the design here it's not just what information must/should/may be offered to the user, but better than that: how! Here is a specific situation where intention it's just the starting point, and the final effect is the real target. It's a basic example of the need to verify and possibly measure how the user perceive the given information and how much of it he/she really retains to eventually evaluate.

3.10.7. User satisfaction and its assessment

6 regional needs are listed in sub-chapter “User satisfaction and its assessment”. 21 matching tools in total (18 for food safety, quality and labelling, 2 for mechatronics and 1 for design) were identified.

The identified tools and techniques are targeted to satisfy the needs for high quality and value-added products (gluten free, products with health claims, nutritional recommendations, fat replacers, and food transparency), their processing and

labelling. The matched tools and techniques are appropriate to help SMEs in improving their competences and skills.

At the design level, the main topic is to determine the level of satisfaction of the user. It's a main topic for any design activity, as it represents the only way to assess if the intentions which guided the product development have been reached.
Having a grasp of how the user perceives all different aspects of a product is fundamental for evaluation and to improve any further design development

At mechatronics, surveys are commonly used to check whether the customer are satisfied with the product performance. Two cases have to be distinguished: surveys can be drawn by mechatronics device producers to check the satisfaction of the customer = food producer and secondly the end customer can be asked to fill in a questionnaire. In some cases this is combined with prize drawing in order to motivate customers to participate. At trade fairs customers can also be asked about their satisfaction with the product.

3.10.8. User's feedback and reaction

4 regional needs are listed in sub-chapter "User's feedback and reaction". 8 matching tools in total (5 for food safety, quality and labelling; 1 for mechatronics and 2 for design) were identified.

In the area of food safety, quality and labelling, the matching solutions do not show any trend, they spread evenly.

For mechatronics, at symposia one can get informed about new trends about application of mechatronics in food production and further food-related topics. As this is in most cases on a more scientific level, it is not suitable for broad customer information.

In the area of design, the main point is to open a path through which customers can use to let the designers know their opinions/feelings/proposals about the products.
It should be avoided to fall into that trap of assuming that we know what users are going to tell us. Let them speak and signal their problems/needs/appreciations, and let us restrain to elaborate this information as the starting point for improved products.
A full collection of tools is already at hand that range from direct answers (surveys) to measurement of perception (sensory analysis) to average reactions (statistical data). Two things needed:

1. Use (at least some of) these tools
2. Use the collected information, then!

3.10.9. Others

5 regional needs are listed in sub-chapter „Others". 20 matching tools in total (15 for food safety, quality and labelling; 4 for mechatronics and 1 for design) were identified. A range of matching tools were listed here which are not specific such symposiums with accompanying small trade fair, innovation voucher, student innovation competition etc.

The needs for trainings in capacity building and help in adequate knowledge transfer were identified.

4. Conclusions and recommendations for training and knowledge transfer

The results of matching the regional needs and the available tools show the followings. There is a need for a short basic training of facilitators on techniques applicable in the I-CON project offering solutions for knowledge transfer. The proposed length of this training should be cca. 4.5 hours. This general part is relevant for each discipline such as food safety, quality and labelling, mechatronics and design and should be delivered together to all trainees.

Recommended specific topics for training and capacity building on food safety, quality and labelling (6.5 hours)

- Principles of advanced food hygiene (high risk area, prevention of Listeria contamination, good cleaning practices)
- Compliance to labelling and consumer requirements, information (labelling according to 1169/2011/EC using nutritional databases, nutrition labelling, nutrition claims)
- Food transparency
- Food chain management
- TACCP
- Practical risk assessment
- Solutions for advanced process control including Future Internet based tools.

Recommended specific topics for training and capacity building on mechatronics (6.5 hours)

- Enabling solutions from mechatronics for improving cost efficiency in food processing
- Integrated sensor systems for food processing
- The application of Industry 4.0 in food processing
- Tools to improve energy efficiency

Recommended specific topics for training and capacity building on design (6.5 hours)

- Design and development practice for food products (packaging)
- New packaging strategies and solutions for the food industry

This recommendation is designed as an input to the Task 3 of the I-CON project for developing the training program.

5. References

Deliverable D.T1.2.3: Regional sector related knowledge diagnosis report

Deliverable D.T1.2.4: SMEs critical factor diagnosis report

Deliverable D.T2.1.1: Analysis report of existing advanced tools and techniques.