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Report on Findings and Recommendations

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Summary:
This report outlines the data that was collected to obtain information about needs, challenges and requirements as expressed in a European wide available questionnaire in various languages distributed to the European food industry in 13 countries. 337 replies, mainly from SMEs could be analysed. Based on the findings, the report contains a set of recommendations as a solid basis for further work and proceedings of the EU FooD-STA project.

According to competences and skills required in food and drink industry the following has been found:

- **Technical skills** have been rated by 67% of the participants as very important, followed by **practical skills** (58%), **Communication skills** (36%), **Managerial and business skills** (35%), **Marketing and commercial skills** (24%) and **ICT skills** (18%).
  To have a rational collection of results the questions have been divided in four macro-areas: "Manufacturing and food processing", "Food safety, food quality and certifications", "Marketing", "Management and Administration".
- in the ***Manufacturing and food processing area***, the attribute "Very important" is mainly assigned to the "**capacity to check compliance with current legislation**" (48%), the second competence considered very important is the "**promotion of innovation in working methods and optimisation of production**" (43%).
- Concerning the ***Food safety, food quality and certification area*** the priority is to competences related to **Food safety management, food hygiene & food safety control** (77%) and **compliance with legislation** (50%).
- In the ***Marketing area*** the priority is to competences related to **Study competitors** (41%), followed by **Export management** (38%) and the **capacity to do market research** (37%)
- In the ***Management and Administration area*** the priority is to competences related to **problem solving capacity** (69%), followed by **Leadership and people management** (62%). A good importance is also attributed to **Communication skills** (53%), **Organisational ability** (56%), **Planning skills** (54%) and **Customer orientation** (52%).

Summarizing, the main skills and competences for companies are:

1. Technical skills related to food processing, food technology and other disciplines;
2. Practical skills and expertise. Food legal knowledge;
3. Capacity to check compliance with current legislation
4. Promotion of innovation in working methods and optimisation of production
5. Management and control of food safety
6. Product quality, legislation and health.
7. Study competitors
8. Export management
9. Do market research
10. Problem solving capacity
11. Leadership and people management

12. Planning skills
13. Communication skills
14. Organisational ability
15. Customer orientation

Further the following main findings and recommendations have been identified:

- It is necessary to provide support to companies for the development of career paths
- apprenticeship is an important route in the recruitment. All actors in the food sector need to be convinced of the real long-term benefits of apprenticeship agreements
- Stakeholders need to support a range of measures that better link the worlds of business and education. It is important to activate programmes which enable teachers/lecturers to spend time in the FDMP industry, as well as those which help employees from the sector to engage directly with young people about the realities of working in the FDMP sector.
- higher education institutions and trainers should be required to have their courses validated on a regular basis by food and drink industrial representatives in order to ensure that their educational content is relevant to the modern requirements of the sector and that their equipment and techniques remain up to date.
- implementation of a continuous monitoring system of training needs in food and drink industry sector;
- evaluation of the potential value of having regional training initiatives that would enable groups of SMEs to collaborate in order to allow employees to attend training courses whilst still allowing individual companies to meet their production demands;
- industry should establish co-operations with universities/training institutes for the exchange of students for training purposes

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Introduction

The following report is part of the work-programme of the European project EU FooD-STA (European Food Studies & Training Alliance) co-financed under the ERASMUS + programme.

The project purpose is to establish and provide a required frame for collaborations between the industry and academic sector to enable the exchange of knowledge, demands, ideas, training and staff.

The EU Food Industry represents the single largest manufacturing sector in the EU in terms of turnover, added value and employment. However, the labour productivity is lower than in most other industry sectors, the percentage of higher-level skilled staff is low as well as the ranking in innovation performance. In EU food industry the number of research publication is increasing but the transfer of scientific knowledge & innovation to the industry is limited and for SMEs it is very difficult to get access to and to implement new technologies & knowledge coming from universities.

In the context of EU FooD-STA project, the purpose of this report is compiling, structuring and analyzing collected data based on a European wide available questionnaire towards the European food industry in order to obtain information about needs, challenges and requirements related to food production and training and education in the food field.

Based on these findings a set of recommendations is postulated to build a solid basis for further work and proceedings of the EU FooD-STA project.

1. Research Needs and Barriers faced by Food Companies

Needs and requirements of the food industry in diverse terms have been identified by a number of precursor projects. The needs, which have been postulated set a clear focus on barriers to the uptake of innovation and generated research by the Food Industry.

The **TRADEIT** Network project (www.tradeitnetwork.eu) for example gives precise information about these needs.

Following a series of consultation workshops in which the research needs and barriers to innovation of traditional food SMEs were examined, it was very apparent that, unless an SME was encountering a very specific technological problem, little thought was given to research needs. Indeed, while most wished to expand their businesses and engage in product innovation, the barriers could be listed as:

- Lack of time for adequate innovation;
- Difficulties of access to finance for innovation;
- The unsuitable size and cost of new processing equipment for delivering product innovations;
- Problems in creating adequate distribution networks;
- The problem of innovation awareness

It quickly became apparent that the needs were as much in the human and organisational sciences as in the technological and physical sciences. Indeed, from other Strategic Research and Innovation Agendas such as that of the European Technology Platform Food for Life, it can be seen that the problem of innovation awareness is one of the most critical. Many SMEs do not have the scientific resources to readily access novel technological developments and even where this is not the case, they are too burdened with day-to-day management issues in their enterprises to devote sufficient time to innovation. This confirms the earlier statement that human and organisational barriers dominate the area.

However, there are many scientific issues that are of concern to SMEs as they embark on the innovation journey. Food safety, with its own set of regulatory barriers, must be addressed. Likewise, sustainability issues must be treated, if a profitable development is to be achieved. Finally, consumer issues must be fully understood, especially since food

product innovation has traditionally had a very low success rate. Language issues become equally important here since, while basic outcomes such as the continuing changes in eating habits across Europe can be understood, the language used by food scientists, consumer scientists and SME managers is not necessarily the same and a very close dialog between all three is essential for success.

Another source for identified barriers arises from the actions carried out by the **TRUEFOOD** project (www.truefood.eu) in the field of innovation and technology transfer – especially traditional food producing SMEs.

The overall objective of the TRUEFOOD Integrated Project was to bring innovations to the traditional food industry. This sector includes not only protected and patented foods, but also other traditional regional and national specialties. Innovations improve the competitiveness in the sector through higher food quality and safety standards as demanded by consumers, but will ensure that the essential characteristics of these culturally important foods are not sacrificed. The project brought research and industry closer and facilitate effective collaboration and technology transfer.

Several research results and practical experiences show that one of the main barriers in effective knowledge transfer is the difference in the way of thinking and priorities of industry and researchers. There are significant differences also between the approach and the opportunities of large companies and SMEs. While researchers usually focus on scientific excellence expressed in validated statements and methods, based on substantial proofs and think over a longer time period, SMEs need a solution for a problem, which can be implemented easily - in many cases with limited resources - and quickly.

While in scientific statements the level of uncertainty has to be minimised, in the decisions in industry a level of uncertainty is nearly always present, which is acceptable, if it is clearly indicated and the related risks are manageable. There is a significant difference in the style of scientific communications and style and way in which information is communicated within industry. Therefore scientific statements and descriptions have to be converted to solutions, described in the language of the industry, before they can be absorbed and applied by industry personnel. This conversion requires specific skills and usually designated people like professional knowledge transfer mediators.

These cultural differences cause, in many cases, misunderstandings, communication problems and stress, which lead to lack of trust between the partners. Since food products are eaten, and are thus incorporated into the human body, the consumer's perception of changes differs significantly from those products, which are used without having a direct influence on the functioning of the body. When radical changes are made in the nature, structure or properties of food, food safety concerns are raised or the products are rejected simply because their sensory properties are different from those sensory attributes to which the consumers had been used and for which their preference has evolved through long experience.

Therefore in the food sector incremental innovation is more typical than radical change. Consumers prefer the diversity and variety of foods. It is relatively easy to copy a successful innovative product by a competitor without investing major efforts into the innovation. A slight modification of the composition can result in a product which has somewhat different sensory properties, and therefore it can be claimed as being different from the original product which was copied. Thus in many cases it is relatively difficult to identify such distinguishable properties or functions of a food product, which can form such an intellectual property that can be protected and enforced.

Therefore senior managers of many SMEs, particularly in the new member states, do not trust in the feasibility of investing efforts and financial resources into application of research results for innovation.

To improve knowledge transfer in the food sector, more efforts have to be made on making the decision makers of SMEs aware of the availability of the new knowledge and convince them of the feasibility of investing in research based innovation.

Therefore establishing trust between the partners has a primary importance, which can be improved if long term collaborations are built up through understanding and considering each other's needs, expectations, way of thinking and priorities.

Other typical barriers to knowledge transfer in food SMEs include lack of skills of the SMEs in working with researchers, lack of information on consumers' needs and market, and on accessible financial support schemes, limited business, management and marketing skills, and lack of management time and resources.

Completing the whole picture the EU FooD-STA project aim to integrate results and conclusions coming out from different and previous researches to find out the necessary need for competences, skills and expertise in education, which are important to overcome existing limitations in technology transfer, boosting competitiveness and successful innovation uptake.

Based on these findings recommendations for the adaption and improvement of education and training programmes as well as study curricula will be developed.

2. Findings about needs in F&D sector identification – Tools and channels

In order to ensure a comprehensive and complete analysis of the training needs of the European food industry, different instruments and also relevant channels were used.

Analysing the results of previous projects (trafoon, fast track, true food, smes net) the FOOD-STA partnership developed a questionnaire through which to carry out an exploratory survey about the main training needs of the European food industry. The survey was launched on June 2015 and has been kept open for several months.

The survey unfortunately started in a very difficult period since concomitant with EXPO 2015 during which the companies had a very little incentive to be involved. For this reason, the survey was supplemented with other additional information from different sources as described in the following sections.

2.1 The EU FooD-STA survey

The EU FooD-STA survey was carried out in different ways applying corrective actions as requested. The first tool used is an online questionnaire, developed with the collaboration of all partnership, available in seven different languages (English, French, German, Italian, Greek, Portuguese, and Spanish)[1]. The questionnaire was disseminated by each project

[1] English: http://surveyonline-euproject.limequery.com/index.php/973124/lang-en
French: http://surveyonline-euproject.limequery.com/index.php/973124/lang-fr
Greek: http://surveyonline-euproject.limequery.com/index.php/973124/lang-el
Italian: http://surveyonline-euproject.limequery.com/index.php/973124/lang-it
Portuguese: http://surveyonline-euproject.limequery.com/index.php/973124/lang-pt
Spanish: http://surveyonline-euproject.limequery.com/index.php/973124/lang-es
German: http://surveyonline-euproject.limequery.com/index.php/973124/lang-de

partner by means of many channels like social networks, mailing list, F&D Associations, publication on websites, etc.

At the beginning of the questionnaire a brief introduction of the project and a section concerning the privacy management is included.

Then, after the choice of language a series of optional questions for the identification of the enterprise typology (food sector, size, employees, etc.) and identification of respondent (position in organization) are proposed.

Follow a series of questions related to general skills. The respondent was asked to indicate a competence as more or less important/useful.

Then, for survey about specific skills the questions have been divided in four main macro-area: “Manufacturing and food processing”, “Food safety, food quality and certifications”, “Marketing”, “Management and Administration”.

The answers to the questionnaire will be collected and elaborated in order to have information and results for the first drafting of the Food and Drink EU training findings.

The questionnaire was launched officially on June 2015. The number of answers received was 661 but only 337 were utilisable.

First available results have been elaborated in order to identify the typology of respondents, country and company general data. Taking into account the results, it is clear that the main typology of respondent is “Quality/Safety manager” (39%) and that participation by sector is equilibrate with very low differences between the several food sectors involved.

13 countries participated to the survey with higher respondent from Austria (25%), Portugal (18.7%), Italy (18.4%), France (15.1%), Germany (11.4%) and Spain (8.7%). Considering the actual European definition of SMEs (number of employee < 250 and turnover < 50 K) we can presume that the major part of respondents are SMEs.

The following analysis results from answers to questions related to the level of importance that respondents give to the competences listed.

The question n° 7 aggregates the main competences in 6 groups:

1. Technical skills related to food processing, food technology and other disciplines;
2. Practical skills and expertise. Food legal knowledge;
3. Marketing and commercial skills;
4. ICT - information and communication technology - skills, office management;

5. Managerial and business skills;
6. Project planning and management;
7. Communication skills (language, cultural issues, etc);

The answers show that the competence groups that are considered “Very Important” from the major part of respondents are the first two above mentioned. The competence about Marketing and commercial skills and ICT/office management are considered “Important”.

In general, all the competences are considered useful resulting in the fact that the answers “Very important” and “Important” sum up to at least 70%.

The survey proceeds with issues related to specific competences.

According to the answers, in the Manufacturing and food processing area, the attribute “Very important” is mainly assigned to the capacity to check compliance with current legislation (48,4%), the second competence considered very important is the “promotion of innovation in working methods and optimisation of production” (43%).

The competences are generally retained important but it is just to take into account that some competences are considered not that important as well (sum of “Low importance” and “Neutral” values) with a value higher than 20%:

- Consumer and Nutritional Sciences
- Engineering maintenance
- Food waste and losses management
- Renewable energy and energy efficiency management
- Test prototypes, components or finished products
- Check the logistics and functioning of systems or machinery

Concerning the Food safety, food quality and certification area the priority is reserved to competences related to the management and control of food safety, probably for legislation requirement. Then, the attention is pointed on product quality, legislation and health.

Already a first look on the results of the marketing area shows a significant difference with the first two groups of results. The attribute “Very important” only in 1 case is higher than 40% (Study competitors) and is related to a competence that can bring upon competitive advantage. Also the Export management (38.2) and the capacity to do market research (37%) are considered as very important competencies.

In general, a high part of listed skills is considered Important with values that are higher than 30%.

In the area of Management and Administration, the competence that achieved the higher importance from the major part of respondents is the problem solving capacity (69%), followed by Leadership and people management.

A good importance is also attributed to Planning skills (53.7), Communication skills (53.4%), Organisational ability (55.5), Planned skills (57.9) and Customer orientation (51.9%).

Summarizing, from survey the main skills and competences for companies are:

16. Technical skills related to food processing, food technology and other disciplines;
17. Practical skills and expertise. Food legal knowledge;
18. Capacity to check compliance with current legislation
19. Promotion of innovation in working methods and optimisation of production
20. Management and control of food safety
21. Product quality, legislation and health.
22. Study competitors
23. Export management
24. Do market research
25. Problem solving capacity
26. Leadership and people management
27. Planning skills
28. Communication skills
29. Organisational ability
30. Customer orientation

2.2 CLUSTER AGRIFOOD ITALY

The CL.USTER "A.GRIFOOD" N.AZIONALE – "CL.A.N."– is promoted by Federalimentare, the Italian Federation for Food Industry, and by Aster, a Consortium that gathers the Emilia Romagna regional authority, universities, research bodies and associations of entrepreneurs.

The Cluster CL.A.N. mission is the safeguard and increase of the national economic system's competitiveness with regards to the food-production chain in all its parts, from agricultural production to processing and to the related industrial sectors (e.g. packaging, logistics etc.), up to the distribution and consumption, through the stimulation of innovation, the promotion of findings coming from scientific and technologic research and the collaboration among research bodies, companies and public administration.

The Cluster CL.A.N. represents the evolution of a path which has started at the beginning of the 2000s as a response of stimulus coming from the European Commission and that has been shared by the main national actors in the whole of the food-production industry, in scientific and industrial research, in the production activities and in the suitable territorial institutions.

In the context of the CLUSTER AGRIFOOD and its training strategy a set of educational profiles have been detected from European enterprises and food stakeholder (such as technologists, manager, production experts, etc.) in order to respond to current concrete needs, and this makes them extremely useful.

The competences acquired will make very interesting candidates able to place themselves in the sector thanks to the development of specific technical-scientific and managerial skills in the agro-food industry, characterized by a high degree of interdisciplinarity.

Summarising the results from Cluster Agrifood consultations at European level, the following desirable competences/skills have been selected with respect to different areas.

Food nutrition Area:

- Highly qualified researchers in the nutritional value of primary production;
- Highly qualified researchers in technologies of extraction and purification of bioactive compounds in food;
- Highly qualified researchers in fermentation processes for the development of probiotics and use in functional foods;

- Researchers with advanced skills in the technologies, oriented to the formulation and development of foods with high nutritional value;
- Researchers with high expertise in nutrition, oriented to formulation and development of foods with high nutritional value from innovative functional ingredients.

Food Safety Area:

- Quality and safety of the food and agriculture system;
- Development of preventive methods qualifying the food and agriculture industry;
- Project Manager experts in the management and development of innovative projects in the field of quality and safety of the food and agriculture system.

Food Production Area:

- expert in innovative agri-food technologies with a specialization in agri-food chain (knowledge of raw materials, processing, parameters indicating quality and safety condition, coactive and voluntary rules leading the sector development).
- Management knowledge;
- Access to community resources;
- Rules for the management of human resources;
- The raw materials for food industry;
- Technology of the fresch products preserved;
- Technological innovations in food processing;
- Biotechnology applied to food industry;
- Parameters and technologies for quality control;
- Regulations and quality and certification systems for agri-food sector;
- Project Management and Risk Management of the innovation;
- community funding: access, management and reporting;
- Expertise of sale on fields of high technical content;
- Basic elements of business management and Business plan.

Food Sustainability Area:

- The environmental sustainability of agro-food processes;
- Elements of plant genetic and breeding;
- Industrial and environmental biotechnologies;
- Environmental chemistry;

- Technologies for the environment;
- Sustainability of cropping systems;
- Sustainable cereal productions;
- Laboratory for chemical and physical analysis; Genetics and genomics; Proteomics and Metabolomics; Microbiology; Mycology; Molecular Biology; Bacteriology;
- Sustainability and bio-security pre-harvest;
- New technologies in food preservation;
- Quality and foods preservations;
- Programming, strategic management and evaluation of R&D cooperative projects;
- European projects;
- Companies and processes management;
- Project management for the industrial research.

2.3 Other European Project: FOODLAB

FOODLAB is an ERASMUS plus European project and is dedicated to the development of a new learning and teaching methodology and the related tools to improve the transversal competences of students and develop entrepreneurship. One of the aim of FOODLAB project is related to the idea that the investment in education and training is essential to boost growth and competitiveness. In order to do that, particular attention will be dedicated to the development of entrepreneurial skills to contribute to new business creation and also to the employability of young people.

From FOODLAB activity, a set of training needs has been individuated according with feeling of SMEs, trainers and students:

- Sensory analysis
- Nutritional quality
- Product development
- Project management
- Creativity
- Food law
- Packaging
- Business plan
- Production planning
- Industrialization

- Formulation
- Quality and safety
- Supply chain
- Project management

3. Recommendations

Collectively, the Food and Drink manufacturing & processing sector employs approximately 4.5 million people across the 27 member states, of which 4.1 million are employees with the remainder being self-employed. Women represent approximately 43% of all employees which, although lower than the male share of employment, is three percentage points more than the corresponding figure from a decade earlier. Women are, however, under-represented in managerial and technical level roles[2].

The FDMP sector is affected by having an ageing workforce and has experienced a drop of between 30-40% of young employees between the ages of 15-24 over recent years. The sector has witnessed a corresponding growth in the volume of prime-age and older workers, that has raised the average age of the sector's workforce.

There is a large degree of consensus amongst academics that the ability to anticipate future demands for skills and then plan effectively to respond to them is a key component of an effective labour market. The type and level of sophistication of forecasting labour market needs varies dramatically across EU countries. The evidence shows a continuing reduction in the volume of jobs requiring either no or low qualifications and an increase in the demand for employees with high (graduate level) qualifications. This means that unemployment may remain high even if the EU economy returns to high levels of growth because unemployed individuals lack the skills and qualifications to access to new job opportunities.

Apart from the current overall deficit in the demand for labour, the main causes of Europe's skills mismatch are identified as being a combination of asymmetric information between employers and potential employees, imperfect information on the labour market and differences between people and transaction costs.

[2] Ensuring Sustainable Employment and Competitiveness in the EU Food and Drink Industry: **Meeting the Challenges of the Labour Market.** A joint initiative of the Social Partners in the EU Food and Drink Industry (FDE)

➔ ***National governments and other partners should improve the quality of labour market forecasts and achieve a standard of quality for all Member States. The sharing of good practices should be encouraged and facilitated.***

➔ ***It is necessary to provide support to companies in the food and drink for the development of career paths that enable people to progress from entry level to higher managerial or technical positions.***

In the FDMP sector 30% of the workforce possessing only low-level qualifications (compared with 21% of the workforce overall EU), while only 14% have qualifications of the higher level (compared to 30% of the general workforce EU)[3]. In general, companies use FDMP training and workforce development to comply with the laws and regulations, as well as requirements of their key customers. Much of the training activities are focused on food safety, health and safety and induction of employees.

Training is untapped as a tool to guide and enhance the development of the business through the building of a more productive and efficient employment organization.

➔ ***Avoid that training is considered a cost and provide arguments, studies, data showing that training is an investment (exactly as innovation) that can bring real benefits and financial business to the company.***

European Food and Drink companies, to meet the challenges of globalization and remain competitive, must continue to invest in training and skills development. Changes in

[3] Source: Fooddrinkeurope

technology require employees who are adaptable, as food engineers and high quality managers and supervisors to implement new production techniques and food processing. The workforce has to be able to keep pace with changes and understand how best to adapt the production processes, both to meet the needs of customers and ensure sustainability. There is also a need to develop basic skills as managers and supervisors, business negotiation, internationalization, leadership, project planning and communication. This will help to drive competitiveness.

Considering that the sector is not regarded positively by young people in terms of career opportunities, given the demographic changes and an aging workforce and the difficulty in recruiting some of the required skills, the very danger is the possible labour shortage for industry in the next 15-20 years.

➔ ***It is necessary to identify problems and misconceptions associated with the sector's poor image in each Country and disseminate what in reality means effectively to work in the FDMP sector and the career opportunities that it provides.***

➔ ***Employers in the FDMP industry need to be persuaded of the benefits of improving succession planning in order to help address the industry's shortage of first line supervisors and managers. The job profiles developed as part of this research could, perhaps, be used to help show the range of career progression routes that are available.***

Recruitment difficulties were highlighted by several parties (industry experts, employers, etc.) in particular for higher roles/positions. Scientists and food technologists often are reluctant to enter the industry, as it is considered not very attractive compared to other sectors, such as pharmaceuticals, automotive and aerospace.

In many EU countries, due to the high incidence of university education among young people, there are not enough potential candidates for posts in production.

It is believed that young people are often unprepared to meet the needs of labour in manufacturing and that employers are forced to up-skill new recruits;

over the past 20 years, the decline of educational standards has forced businesses to act on training also for basic levels. All this has to do with the poor image of the industry, which seems to lack clear career opportunities and an economically attractive outlook. Thus, work in FDMP does not attract young and/or skilled employees.

➔ ***Employers have to test different forms of recruitment. For example increasing use of social media or improving career guidance.***

➔ ***The full potential of apprenticeship programs should be used in all EU countries. The apprenticeship is an important route in the recruitment industry and all actors in the sector need to be convinced of the real long-term benefits of apprenticeship agreements effective. Again, the sharing of best practices in the EU countries, Examples that work well would be helpful***

➔ ***To encourage social dialogue between employers and employees can help to foster good industrial relations in the workplace and help in designing effective solutions to training and skills issues***

It is stated, that building effective education-business links is crucial in order to explain the wide diversity of roles and career opportunities in the FDMP industry.

➔ ***Stakeholders need to support a range of measures that better link the worlds of business and education. It is important to activate programmes which enable teachers/lecturers to spend time in the FDMP industry, as well as those which help employees from the sector to engage directly with young people about the realities of working in the FDMP sector.***

➔ ***Employers need to redesign work roles in order to avoid concerns about the repetitive and uninteresting nature of some roles in the FDMP sector.***

There are different views among countries and interest groups about the effectiveness of current education and vocational training systems to satisfy the needs of the sector FDMP.

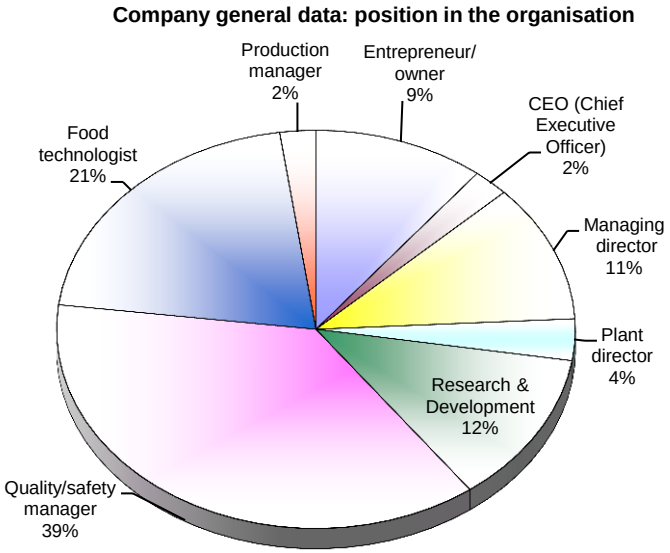
In general, it is considered that the development of academic competences was not sufficiently focused on the development of skills that are actually needed in the workplace. The major gap concerns above all the absence of practical experience and the lack of development of commercial/business skills in academic training. Often the best graduates have no knowledge of how a business actually operates, such as budgeting, exporting and accountancy.

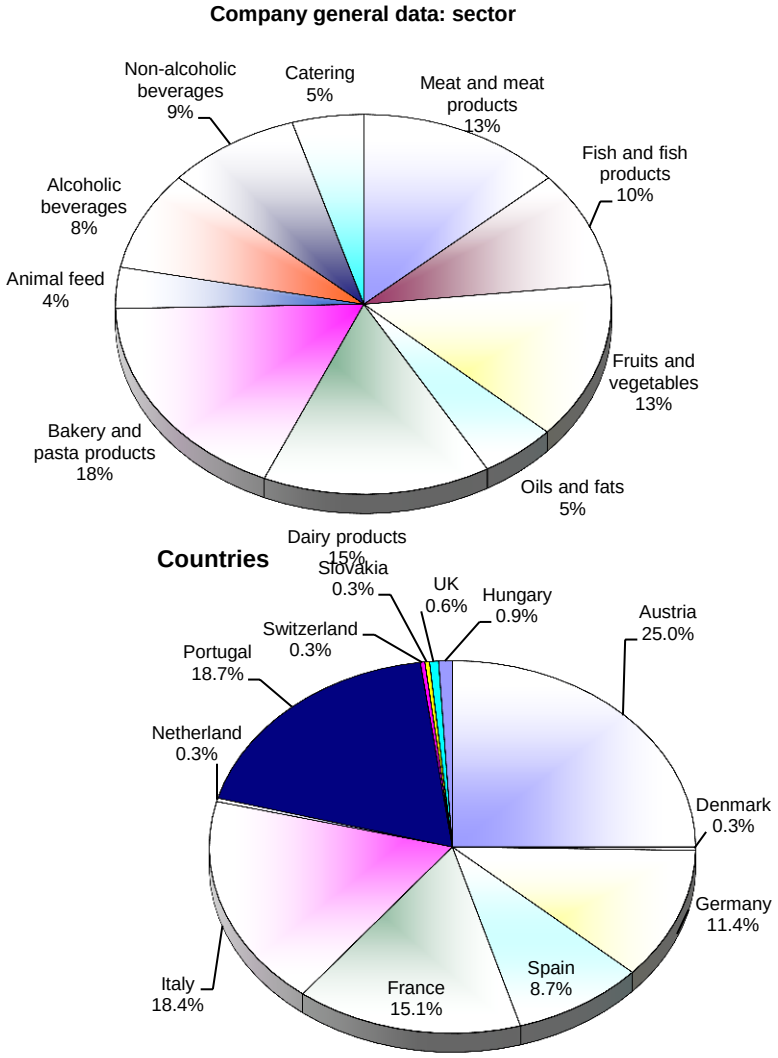
The main final recommendations are:

- higher education institutions and trainers should be required to have their courses validated on a regular basis by food and drink industrial representatives in order to ensure that their educational content is relevant to the modern requirements of the sector and that their equipment and techniques remain up to date.
- implementation of a continuous monitoring system of training needs in food and drink industry sector;
- evaluation of the potential value of having regional training initiatives that would enable groups of SMEs to collaborate in order to allow employees to attend training courses whilst still allowing individual companies to meet their production demands;
- industry should establish co-operations with universities/training institutes for the exchange of students for training purposes

4. Appendix

Figure 1 - Company general data

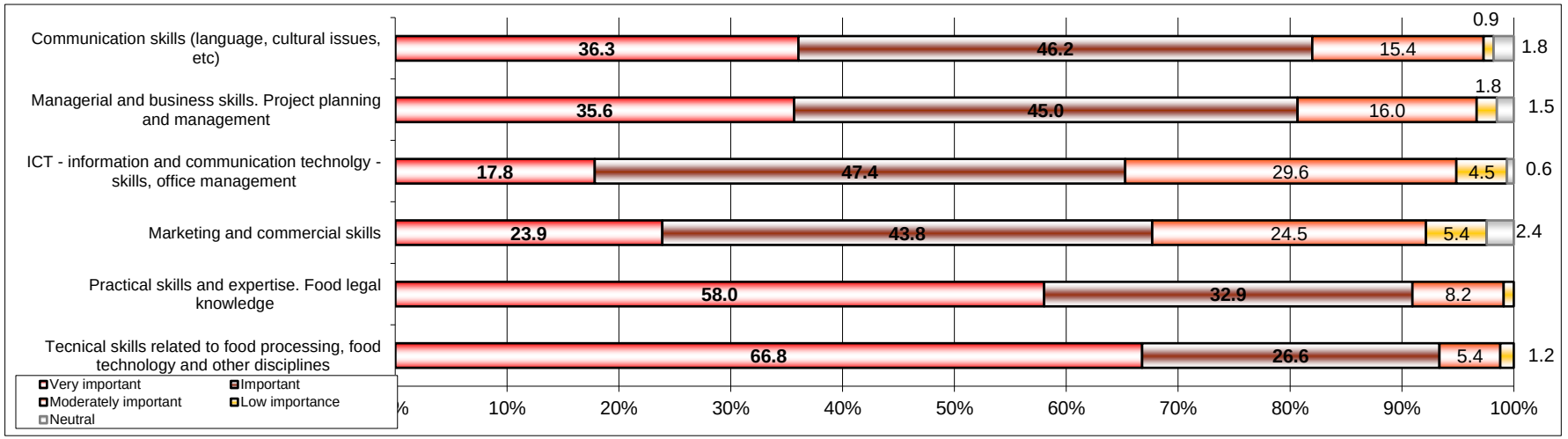




Questions about competences and skills required in food and drink industry

7. Based on the experience of your organisation, please appreciate the importance of the following competencies (%)

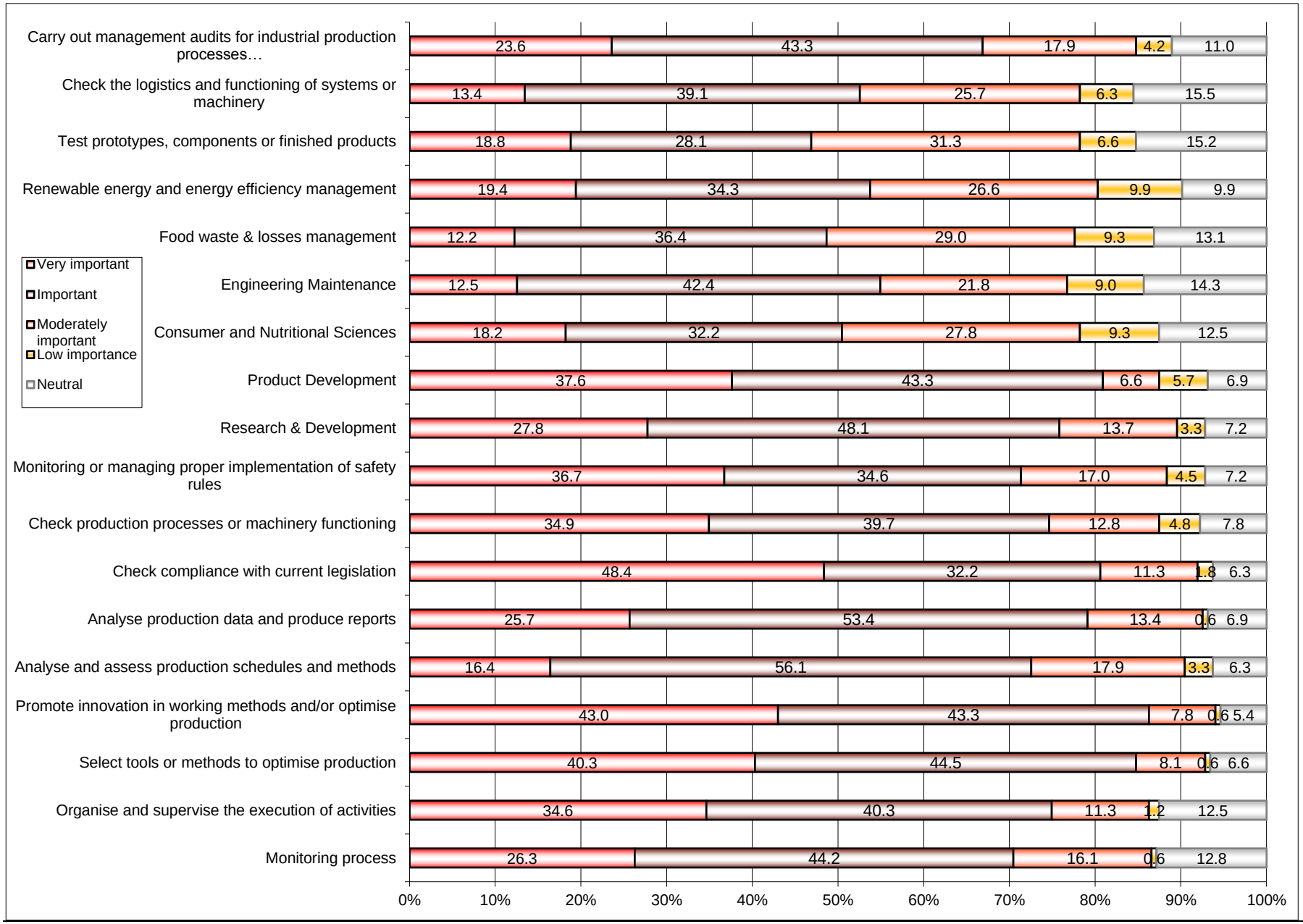
	Technical skills related to food processing, food technology and other disciplines	Practical skills and expertise. Food legal knowledge	Marketing and commercial skills	ICT - information and communication technolgy - skills, office management	Managerial and business skills. Project planning and management	Communication skills (language, cultural issues, etc)
Very important	66,0	57,3	23,6	17,6	35,2	35,8
Important	26,3	32,5	43,3	46,9	44,5	45,7
Moderately important	5,4	8,1	24,2	29,3	15,8	15,2
Low importance	1,2	0,9	5,4	4,5	1,8	0,9
Neutral	1,2	1,2	3,6	1,8	2,7	2,4



Manufacturing & food processing - (8) Based on the experience of your organisation please indicate how much you consider helpful to include, within the professional qualification standards, other food specific competences/skills as following (%):

	Monitoring process	Organise and supervise the execution of activities	Select tools or methods to optimise production	Promote innovation in working methods and/or optimise production	Analyse and assess production schedules and methods	Analyse production data and produce reports	Check compliance with current legislation	Check production processes or machinery functioning	Monitoring or managing proper implementation of safety rules
Very important	26,3	34,6	40,3	43,0	16,4	25,7	48,4	34,9	36,7
Important	44,2	40,3	44,5	43,3	56,1	53,4	32,2	39,7	34,6
Moderately important	16,1	11,3	8,1	7,8	17,9	13,4	11,3	12,8	17,0
Low importance	0,6	1,2	0,6	0,6	3,3	0,6	1,8	4,8	4,5
Neutral	12,8	12,5	6,6	5,4	6,3	6,9	6,3	7,8	7,2

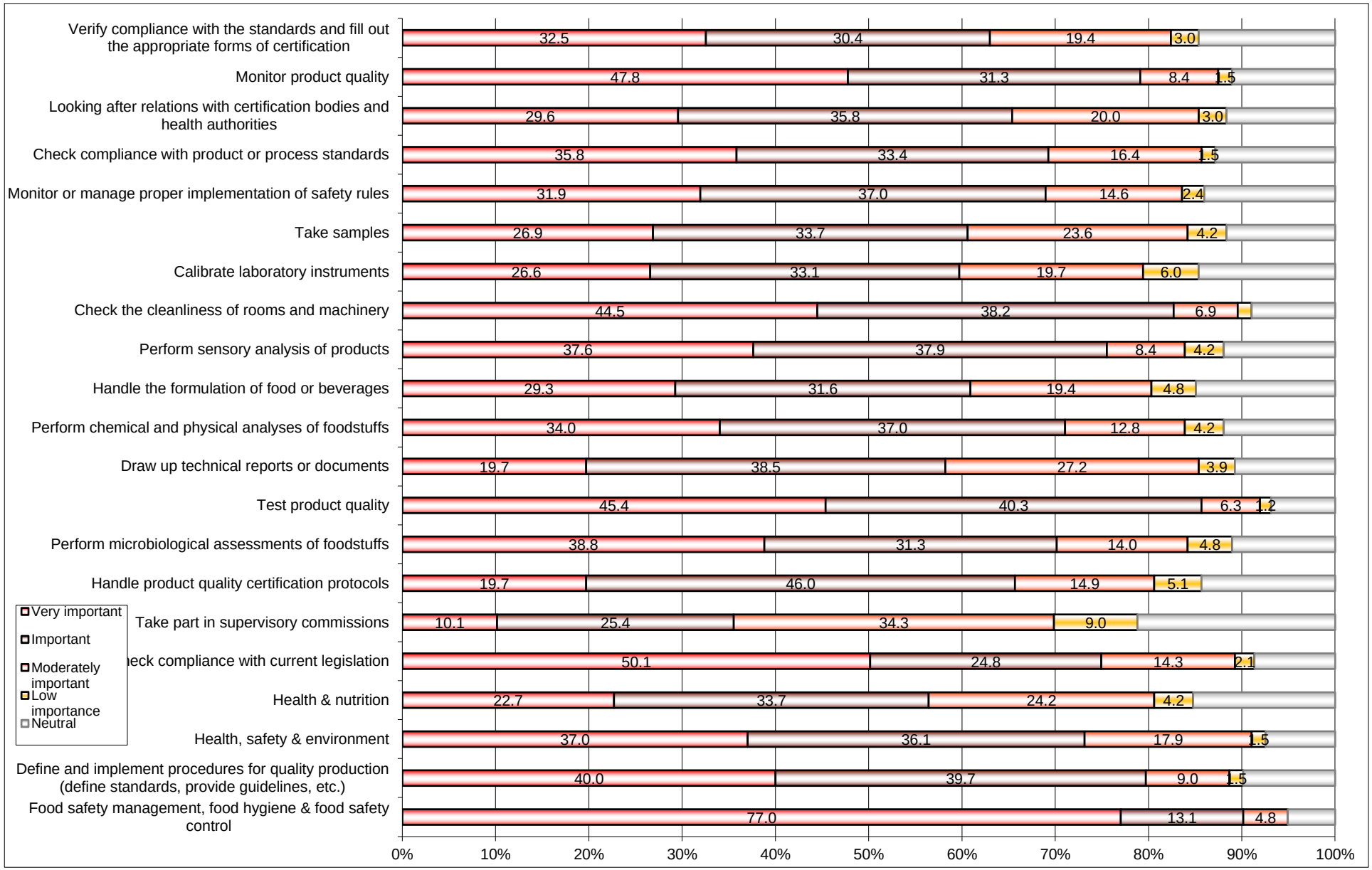
	Research & Development	Product Development	Consumer and Nutritional Sciences	Engineering Maintenance	Food waste & losses management	Renewable energy and energy efficiency management	Test prototypes, components or finished products	Check the logistics and functioning of systems or machinery	Carry out management audits for industrial production processes
Very important	27,8	37,6	18,2	12,5	12,2	19,4	18,8	13,4	23,6
Important	48,1	43,3	32,2	42,4	36,4	34,3	28,1	39,1	43,3
Moderately important	13,7	6,6	27,8	21,8	29,0	26,6	31,3	25,7	17,9
Low importance	3,3	5,7	9,3	9,0	9,3	9,9	6,6	6,3	4,2
Neutral	7,2	6,9	12,5	14,3	13,1	9,9	15,2	15,5	11,0


Carry out management audits for industrial production processes… 23.6 43.3 17.9 4.2 11.0
Check the logistics and functioning of systems or machinery 13.4 39.1 25.7 6.3 15.5
Test prototypes, components or finished products 18.8 28.1 31.3 6.6 15.2
Renewable energy and energy efficiency management 19.4 34.3 26.6 9.9 9.9
Food waste & losses management 12.2 36.4 29.0 9.3 13.1
Engineering Maintenance 12.5 42.4 21.8 9.0 14.3
Consumer and Nutritional Sciences 18.2 32.2 27.8 9.3 12.5
Product Development 37.6 43.3 6.6 5.7 6.9
Research & Development 27.8 48.1 13.7 3.3 7.2
Monitoring or managing proper implementation of safety rules 36.7 34.6 17.0 4.5 7.2
Check production processes or machinery functioning 34.9 39.7 12.8 4.8 7.8
Check compliance with current legislation 48.4 32.2 11.3 1.8 6.3
Analyse production data and produce reports 25.7 53.4 13.4 0.6 6.9
Analyse and assess production schedules and methods 16.4 56.1 17.9 3.3 6.3
Promote innovation in working methods and/or optimise production 43.0 43.3 7.8 0.6 5.4
Select tools or methods to optimise production 40.3 44.5 8.1 0.6 6.6
Organise and supervise the execution of activities 34.6 40.3 11.3 1.2 12.5
Monitoring process 26.3 44.2 16.1 0.6 12.8
Very important
Important
Moderately important
Low importance
Neutral
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Food safety, food quality, certification - (9) Based on the experience of your organisation please indicate how much you consider helpful to include, within the professional qualification standards, other food specific competences/skills as following (%):

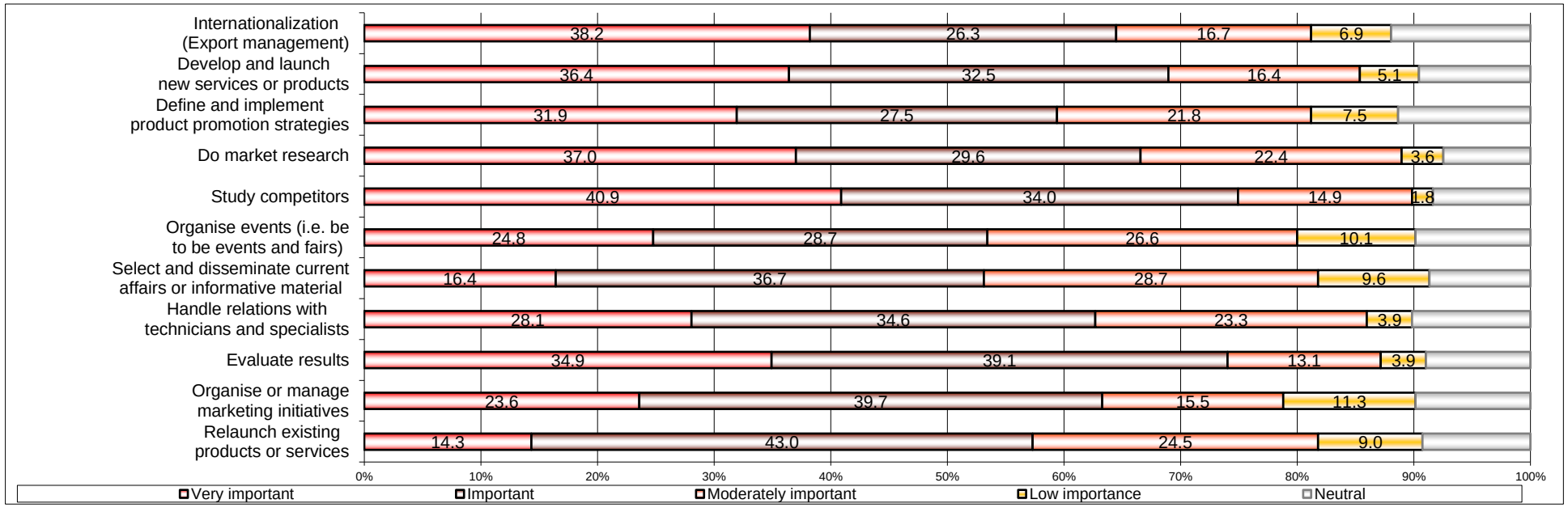
	Food safety management, food hygiene & food safety control	Define and implement procedures for quality production	Health, safety & environment	Health & nutrition	Check compliance with current legislation	Take part in supervisory commissions	Handle product quality certification protocols	Perform microbiological assessments of foodstuffs	Test product quality	Draw up technical reports or documents	Perform chemical and physical analyses of foodstuffs
Very important	77,0	40,0	37,0	22,7	50,1	10,1	19,7	38,8	45,4	19,7	34,0
Important	13,1	39,7	36,1	33,7	24,8	25,4	46,0	31,3	40,3	38,5	37,0
Moderately important	4,8	9,0	17,9	24,2	14,3	34,3	14,9	14,0	6,3	27,2	12,8
Low importance	0,0	1,5	1,5	4,2	2,1	9,0	5,1	4,8	1,2	3,9	4,2
Neutral	5,1	9,9	7,5	15,2	8,7	21,2	14,3	11,0	6,9	10,7	11,9

	Handle the formulation of food or beverages	Perform sensory analysis of products	Check the cleanliness of rooms and machinery	Calibrate laboratory instruments	Take samples	Monitor or manage proper implementation of safety rules	Check compliance with product or process standards	Looking after relations with certification bodies and health authorities	Monitor product quality	Verify compliance with the standards and fill out the appropriate forms of certification
Very important	29,3	37,6	44,5	26,6	26,9	31,9	35,8	29,6	47,8	32,5
Important	31,6	37,9	38,2	33,1	33,7	37,0	33,4	35,8	31,3	30,4
Moderately important	19,4	8,4	6,9	19,7	23,6	14,6	16,4	20,0	8,4	19,4
Low importance	4,8	4,2	1,5	6,0	4,2	2,4	1,5	3,0	1,5	3,0
Neutral	14,9	11,9	9,0	14,6	11,6	14,0	12,8	11,6	11,0	14,6


Verify compliance with the standards and fill out the appropriate forms of certification
32.5
30.4
19.4
3.0
Monitor product quality
47.8
31.3
8.4
1.5
Looking after relations with certification bodies and health authorities
29.6
35.8
20.0
3.0
Check compliance with product or process standards
35.8
33.4
16.4
1.5
Monitor or manage proper implementation of safety rules
31.9
37.0
14.6
2.4
Take samples
26.9
33.7
23.6
4.2
Calibrate laboratory instruments
26.6
33.1
19.7
6.0
Check the cleanliness of rooms and machinery
44.5
38.2
6.9
Perform sensory analysis of products
37.6
37.9
8.4
4.2
Handle the formulation of food or beverages
29.3
31.6
19.4
4.8
Perform chemical and physical analyses of foodstuffs
34.0
37.0
12.8
4.2
Draw up technical reports or documents
19.7
38.5
27.2
3.9
Test product quality
45.4
40.3
6.3
1.2
Perform microbiological assessments of foodstuffs
38.8
31.3
14.0
4.8
Handle product quality certification protocols
19.7
46.0
14.9
5.1
Very important
Important
Moderately important
Low importance
Neutral
Take part in supervisory commissions
10.1
25.4
34.3
9.0
eck compliance with current legislation
50.1
24.8
14.3
2.1
Health & nutrition
22.7
33.7
24.2
4.2
Health, safety & environment
37.0
36.1
17.9
1.5
Define and implement procedures for quality production (define standards, provide guidelines, etc.)
40.0
39.7
9.0
1.5
Food safety management, food hygiene & food safety control
77.0
13.1
4.8
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

Marketing area - Level of importance for the inclusion of other food specific competences/skills within the professional qualification standards
Question 10 - Based on the experience of your organisation please indicate how much you consider helpful to include, within the professional qualification standards, other food specific competences/skills as following (%):

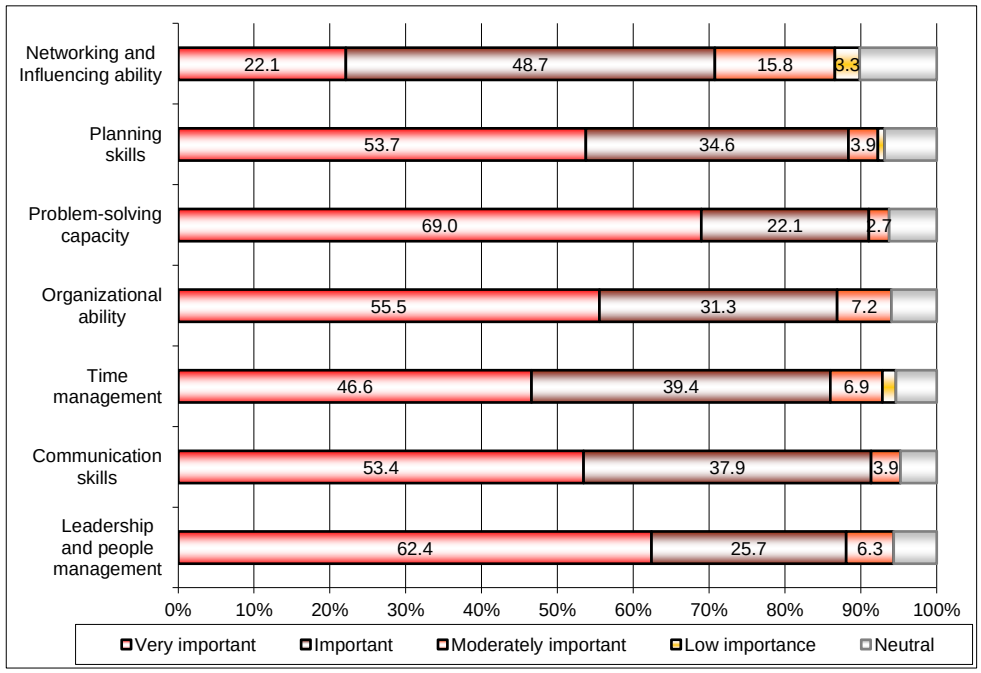
	Relaunch existing products or services	Organise or manage marketing initiatives	Evaluate results	Handle relations with technicians and specialists	Select and disseminate current affairs or informative material	Organise events (i.e. be to be events and fairs)	Study competitors	Do market research	Define and implement product promotion strategies	Develop and launch new services or products	Internationalization (Export management)
Very important	14,3	23,6	34,9	28,1	16,4	24,8	40,9	37,0	31,9	36,4	38,2
Important	43,0	39,7	39,1	34,6	36,7	28,7	34,0	29,6	27,5	32,5	26,3
Moderately important	24,5	15,5	13,1	23,3	28,7	26,6	14,9	22,4	21,8	16,4	16,7
Low importance	9,0	11,3	3,9	3,9	9,6	10,1	1,8	3,6	7,5	5,1	6,9
Neutral	9,3	9,9	9,0	10,1	8,7	9,9	8,4	7,5	11,3	9,6	11,9

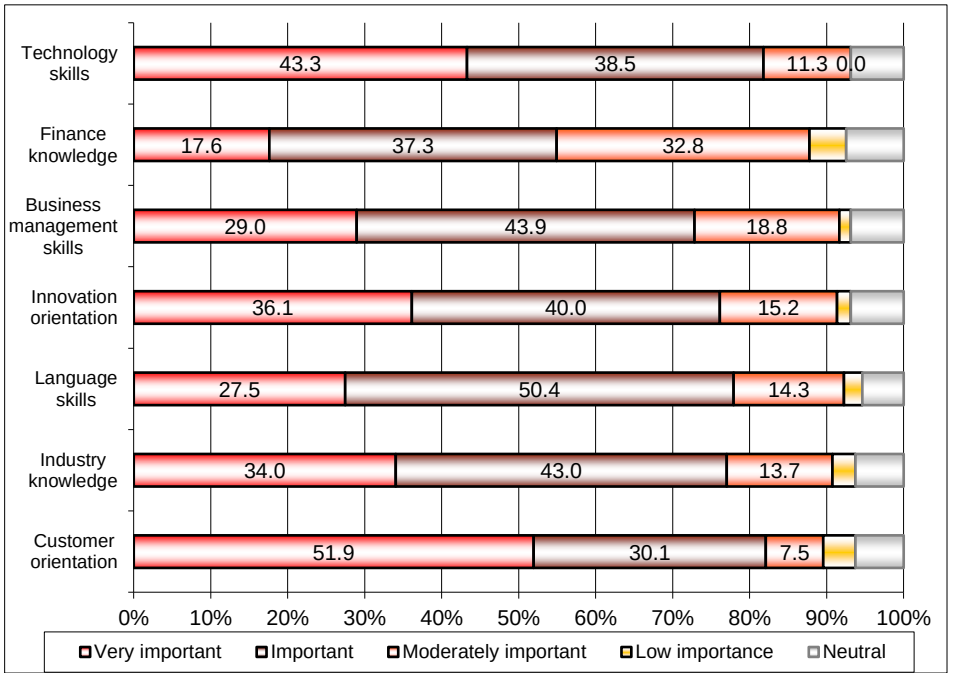


Management and Administration - (11) Based on the experience of your organisation please indicate how much you consider helpful to include, within the professional qualification standards, other food specific competences/skills as following (%):

	Leadership and people management	Communication skills	Time management	Organizational ability	Problem-solving capacity	Planning skills	Networking and Influencing ability
Very important	62,4	53,4	46,6	55,5	69,0	53,7	22,1
Important	25,7	37,9	39,4	31,3	22,1	34,6	48,7
Moderately important	6,3	3,9	6,9	7,2	2,7	3,9	15,8
Low importance	0,0	0,0	1,8	0,0	0,0	0,9	3,3
Neutral	5,7	4,8	5,4	6,0	6,3	6,9	10,1

	Customer orientation	Industry knowledge	Language skills	Innovation orientation	Business management skills	Finance knowledge	Technology skills
Very important	51,9	34,0	27,5	36,1	29,0	17,6	43,3
Important	30,1	43,0	50,4	40,0	43,9	37,3	38,5
Moderately important	7,5	13,7	14,3	15,2	18,8	32,8	11,3
Low importance	4,2	3,0	2,4	1,8	1,5	4,8	0,0
Neutral	6,3	6,3	5,4	6,9	6,9	7,5	6,9


Networking and Influencing ability
22.1
48.7
15.8
3.3
Planning skills
53.7
34.6
3.9
Problem-solving capacity
69.0
22.1
2.7
Organizational ability
55.5
31.3
7.2
Time management
46.6
39.4
6.9
Communication skills
53.4
37.9
3.9
Leadership and people management
62.4
25.7
6.3
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Very important
Important
Moderately important
Low importance
Neutral


Technology skills
43.3
38.5
11.3
0
0
Finance knowledge
17.6
37.3
32.8
Business management skills
29.0
43.9
18.8
Innovation orientation
36.1
40.0
15.2
Language skills
27.5
50.4
14.3
Industry knowledge
34.0
43.0
13.7
Customer orientation
51.9
30.1
7.5
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Very important
Important
Moderately important
Low importance
Neutral