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D.T.2.3.1 Mechatronic assessment tool-kit

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

Deliverable D. T2.3.1:
Mechatronic assessment tool-kit

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

Activity:
Questionnaire-related tool focused on technology process control improvements related on cost efficiency, quality assurance or risk management.

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

1. Introduction

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.

In the previous phases of the I-CON project, advanced tools and techniques were identified (D.T2.1.1: Analysis report of existing advanced tools and techniques.) and good practice cases studies were collected (D.T2.2.1: Good practice guidelines; D.T2.2.2: Regional good practice case reports and D.T.2.2.3: Handbook tool) in order to provide support to the SMEs.

Based on the collected cases and existing tools, BIZ-UP elaborated the Deliverable D. T2.3.1: Mechatronic assessment tool-kit which helps to identify the gaps in the operation of the SMEs and in the same time provide possible solutions to them.

Within the framework of Activity A.T2.3- Developing assessment tools, two other SME assessment tool-kits were prepared by CBHU and UNISEF:

- Deliverable D.T2.3.2- Food safety and quality assessment tool-kit (Campden BRI Hungary).
- Deliverable D.T2.3.3- Design assessment tool-kit (UNISEF).

2. Mechatronic assessment tool-kit

2.1. First step: Basic information

2.1.1. Basic data

a) Name of company

b) Name of company representative

c) Position of company representative

d) Date of interview

2.1.2. Information about company

a) What is the company's core activity?

b) What is the turnover (last fiscal year)?

c) What is the number of employees in your company?

d) How many employees work in which areas in your company, e.g. engineering, production, packaging, commissioning, technics, maintenance, administration?

e) Which products or product groups do you manufacture or process in your company?

2.1.3. Information about production process

a) Intensity (production output): How many products do you manufacture/process?

b) Intensity: What is your estimate of the utilization rate (in percent) of your production plants?

c) Automation: How much do you rate the degree of automation of your company (in percent)?

d) Characteristics: What are the specific characteristics of your production process?

e) Challenges: What are your challenges in the production process?

2.1.4. Collection of already used mechatronic solutions

a) When you think about your entire production process: in which phases / areas are mechatronic technologies already used?
e.g. automation, robots, inline quality control, IT applications, …

b) In which areas could there be potential for improvement?
e.g. Quality control, production process, automation including internal logistics, IT, electrical/mechanical engineering

2.2. Second step: Select one of the specific topics

2.2.1. Inline quality control

a) How do you guarantee the quality of your products?

b) Do you have some issues with the quality of your products?

c) Which strategy do you apply for quality assurance?

d) Do you have a quality management process implemented in your company?

e) Which tools do you use for quality control?

f) Do you have an inline quality control in your production process?

g) How do you handle production disturbance?

h) (How) do you prevent production disturbance?

i) In which process step do you want/need to improve quality?

j) Which parameters of the product do you need / want to observe?

k) Which parameters of the process do you need / want to observe?

l) Do you have to fulfill quality regulations, standards and/or laws?

m) Do you use image processing for quality control?

n) Do you use spectroscopy for quality control?

o) Which other sensors do you use for quality control?

p) Do you have (certified) quality managers?

q) Is there a need for qualification of your employees regarding QM?

2.2.2. Optimizing production processes

a) Do you produce mainly manually or at least partly automated?

b) Do you have mainly mass production or many different products or product variants?

c) Do you have many different process steps?

d) Is your processes scalable to a larger scale?

e) Are the suppliers located locally or global?

f) Do you have a local warehousing or get the products just-in-time?

g) Is your ordering process done automatically (e.g. production machine orders raw material individually)?

h) Have you already implemented optimizations in your supply chain?

i) Do you see potential for further increasing the quality of your products?

j) Do you see potential for further increasing cost efficiency?

k) Do you see potential for further increasing volume capacity?

l) Do you see potential for further optimizing product performance?

2.2.3. Automation of Production

a) How is your automation status today (totally manual, hand tools, flexible machines, robots, fully automated or even I 4.0)?

b) Do you have many repetitive routine tasks?

c) Do you have some special process steps, which cannot be automated?

d) Do you see potential for further automation in your production?

e) What are the main areas where you see potential for further automation?

f) Is a fully automatic workflow desirable (Industry 4.0)?

g) Do you see the opportunity to implement automated purchasing?

h) Do you trace your (semi-finished) products with e.g. bar code or RFID?

i) Do you see the opportunity to implement automated in-house logistics, e.g. from warehouse to machine?

j) Do you see the opportunity to implement automated delivery?

k) Do you see potential to increase competitiveness with automation?

l) Are your employees educated in the field of automation?

2.2.4. Information Technology

a) Which digital processes have you implemented in your company?

b) Which IT activities and services are carried out in you company or have been outsourced?

c) In which IT related areas do you see potential for improvement?

d) Do you trace the products digitally from arrival to delivery?

e) Do you have an integration of your planning and production processes?

f) Do you use an enterprise-resource-planning (ERP) system?

g) Which parts are already implemented in the ERP system - whole process from purchase of goods to selling of final product or only production or only order processing?

h) Do you store process parameters in a database?

i) Do you store product parameters in a database?

j) How long do you need to store the (big) data?

k) Do you analyze the (big) data?

l) If yes, is the analyzed data used to improve the production parameters?

m) Do you use cloud services?

n) Do you apply simulation tools for e.g. product/process development, production/process planning, virtual commissioning ?

2.2.5. Mechanical/Electrical engineering in food producing industry

a) Do you have a mechanical/electrical engineering department in your company?

b) What is the purpose of this department: only maintenance and service or also construction and engineering of parts, or machines?

c) Do you (plan to) outsource mechanical/electrical engineering?

d) Which machines do you use in your company, off-the-shelf or special machinery?

e) Do you have a special supplier for tool / machines?

f) Do you have to meet special hygiene-standards , special regulations, standards, laws?

g) Do you have a wet environment (e.g. splashing water …)?

h) Do you need an uninterrupted cooling chain?

i) Do you have some hot process steps (e.g. boiling, frying …)?

j) Do you need to handle hazardous products?

k) Do you have a need for explosion-proof machinery?

3. Reference

The mechatronic assessment tool-kit has been developed together with University of Applied Sciences Upper Austria (Fachhochschule Oberösterreich).