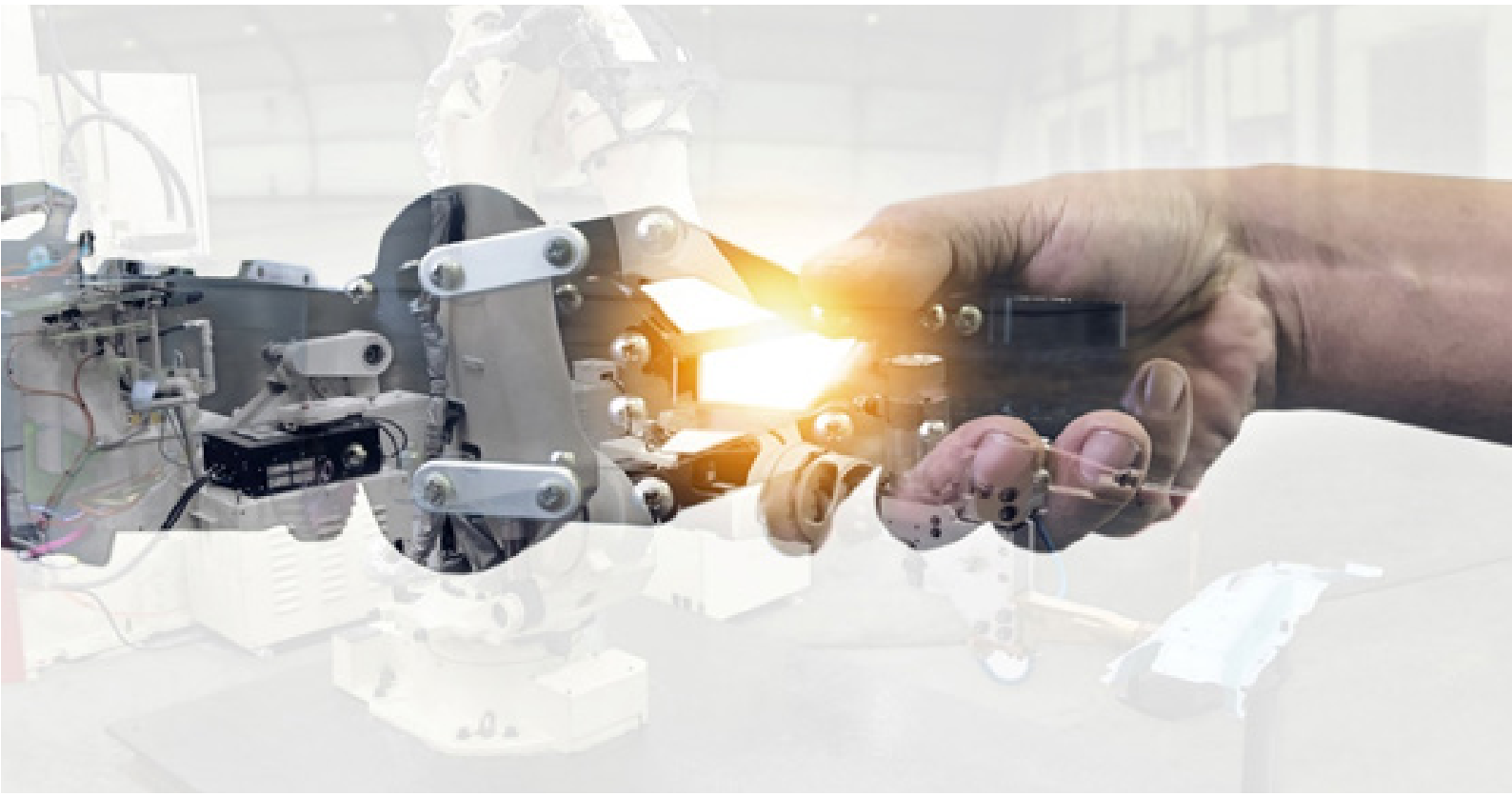
Training, education and recruitment of Industry 4.0 qualified staff

Work Package 5

Best practice report - January 2019



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Introduction

The Interreg North Sea Region (NSR) project "Growing into Industry 4.0 – Accelerate growth in manufacturing SME's" - GrowIn 4.0 - aims to build strong competences and tools in the participating regions for the benefit of manufacturing small and medium-sized enterprises (SME's). The overall objective is to raise the level of innovation and to create more growth within manufacturing SME's who are heading for Industry 4.0.

The project is working within the following three work packages:

- New business models and strategy development
- Better use of technology and development of products
- Training, education and recruitment of Industry 4.0 qualified staff

In each of these work packages all partner regions have gathered best practices (methods, tools and concepts) with focus on Industry 4.0 and described these in a common template. The intention is to make smart combinations of existing best practices in order to create new tools and methods, which will be tested in partner regions. The main target is to develop Industry 4.0 tools to assist manufacturing SMEs on their way towards digitization.

In total 27 best practices have been described. This report content an introduction to WP4 and the collection of tools gathered and described in this work package. tow other best practices reports have been made for work package 3 and 4.

Selection criteria for Good Practices

In the selection process in the project we have used the following criterias:

a) What makes a Good Tool interesting?

A Good Tool should be:

Simple –user-friendly, easy to understand, with potential to be implemented without large scale changes;

General – theme wide enough that different realities can find aspects of interest; not too specific but easily adaptable.

Applicable – to put into practise for training SME

b) Selection Criteria to identify suitable Good Tools:

The Good Tool examples selected and proposed by a partner should respect the following criteria:

1. Availability of results (meaning: initiatives already completed / at an advanced stage, which show concrete results – both qualitative and quantitative – on the level of skills and knowledge needed for implementation of I4.0 in SMEs)
2. Transferability (meaning: tools with potential to be replicated in another geographical area, available in English)
3. Level of Innovation (meaning: new in the context of industrial skills)
4. Long-term durability (meaning: financial sustainability – i. e. Affordable, payback/cost reduction; stakeholder/user participation, etc.).

Introduction to WP5

Interreg NSR GrowIn 4.0 aims to build strong competences and tools in the participating regions for the benefit of manufacturing SMEs. The overall objective is to raise the level of innovation and to create more growth within manufacturing SMEs who are heading for Industry 4.0.

Within the project the objective of WP5 is to increase the level of skills and knowledge needed for implementation of I4.0 in SMEs. Technology associated with I4.0 like Big Data, IoT, Robotics and Additive Manufacturing have many opportunities for manufacturing SMEs. In WP5 we want to persuade manufacturing SMEs to join I4.0 by co-creation of their human resources. Therefore it is necessary to develop knowledge to apply I4.0 technologies, but also (soft) skills like negotiation, networking, branding and teambuilding.

We collected several tools and methods to identify Skills and Knowledge in manufacturing SME's. We also collected several tools and methods to enhance Industry 4.0 Skills and Knowledge in manufacturing SME's. The tools are from all the regions. In this first phase we collected the material and described the tools in a template that we designed for this purpose. We presented these tools at the partner meeting in Braunschweig (14&15 March 2018), and at the meeting in Cambridge (2 July) and at the partner meeting in Groningen (6&7 November 2018). During the meetings we discussed the tools and came to a selection of tools.

In the collection and selection of tools we had several starting points. At first technological change requires/enables changes in work organization that

translates in different jobs & qualification requirements that require different employee competences. Theoretically, this could (should?) be planned in this logical order. In real life, firms are changing in all three areas (and not necessarily synchronous directions). Further, the entrepreneur (person) and his competences, the firm (collective actor) and its work organization, job definition, and (current) workers (persons) and their competences are all relevant targets to address. Our regional support portfolio should ideally offer help for each of these actors/ areas/phases, and firms already moving to I4.0 as well as those who are not yet involved.

The tools are put in templates. For this report the status of the tool mentions whether the tool is selected for testing, or whether the tool is not selected.

Conclusion

We collected 10 tools and described, viewed, reviewed and discussed them with the partners. From these tools we came to a selection of the ROSF game and assessment and the Job Openings Monitor. Because some tools were not free we had to find other tools which are quite the same, but free. Therefore we came to the Careerup tool and the Big Data Game. Some tools would be stronger if they are combined in a new tool – therefore we built the transition workshop.

In a schedule our tools look this way:

Tool Name	Tool Type	Purpose
ROSF GAME	I4.0 for layman-entrepreneur	Attract entrepreneurs to embark on their I 4.0 journey
ROSF assessment (+ workshop)	I4.0 for firm	I4.0 Maturity Assessment: from Ist to Soll
Big Data Game	I4.0 for employees	Experience Datadriven Innovation Competences
Transition Workshop	HRM for firm & employee: change management	Help individuals & team to explore & embrace change
Job Openings Monitor	HRM for firm: work organization redesign	Translate strategic change in new work organization (at job level)
Career Up	HRM for firm & employee: matching & (re) training)	Digital environment to confront changing job demands with employee competences

The Careerup tool, the Big Datagame and the Transition workshop will be finished and presented at the meeting in Groningen, 22 and 23 January. More Information about them follows by the end of January.

Annex: Register of tools found by WP4

In the following section you'll find an overview of the tools.

KODE@

1. General information		
Title of the tool	KODE® – KOmpetenzDiagnostik und –Entwicklung (COmpetence Diagnostics and Development)	
Main institution involved	Allianz für die Region GmbH / KODE GmbH	
Location of the practice	Country	Germany
	NUTS 1	
	NUTS 2	
	NUTS 3	

2. Detailed description	
Detailed information on the tool	KODE® is the first procedure in the world focused purely on the measurement of observable and developable competences and scientifically validated. The KODE® procedural system contains no personality tests and does not pursue psychometric or psychotherapeutic goals. Thus, KODE® differs fundamentally from all psychometric procedures used in Germany to capture personality traits. Personality traits are transitory and can hardly be changed. On the other hand, ability to act is developable and expandable. KODE® measures the four basic human competences: ▪ personal competence (P) ▪ activity and action-related competence (A) ▪ technical-methodical competence (F) ▪ as well as social-communicative competence (S) And subdivides each of the basic components into 16 subcompetences (Competence Atlas) In addition, KODE® measures the four levels of a human action: ▪ ideal of action ▪ expectation of action ▪ execution of action ▪ result of action Both the basic competences and the four levels of action are directly measured under normal as well as under difficult living and working conditions. This results in a differentiated picture of the personal, activity and action-related , technical-methodical as well as the social-communicative competences related to different requirement situations under normal and difficult living and working conditions. Contents of the evaluation: ▪ Profile statements: Visualization of the competency values and verbalized characteristic statements related to different requirement situations under normal and difficult living and working conditions. ▪ Distribution of competences: A differentiated picture of personal, activity and action-related, technical-methodical as well as social-communicative competencies. ▪ Competence-Balance sheet: Competence balance presentations and explanations of the four levels of action: Ideal of action, expectation of action, executio of action as well as result of action. ▪ Competence Atlas: Visualization of strengths in relation to 64 key competences under normal and difficult living and working conditions. ▪ Interpretation offerings: Verbalization of strengths and actions in relation to different requirement situations under normal and difficult living and working conditions. ▪ An assessment of long-term and short-term goals and value orientations. ▪ Detailed information on self-management (e.g. learning and time behavior. ▪ Varied and realistic suggestions, especially for improvement of: ▫ communication ▫ collaboration with others in groups and teams ▫ management of conflicts ▫ assertiveness ▫ physical and mental resilience ▫ conceptual work and systematic solution of problems

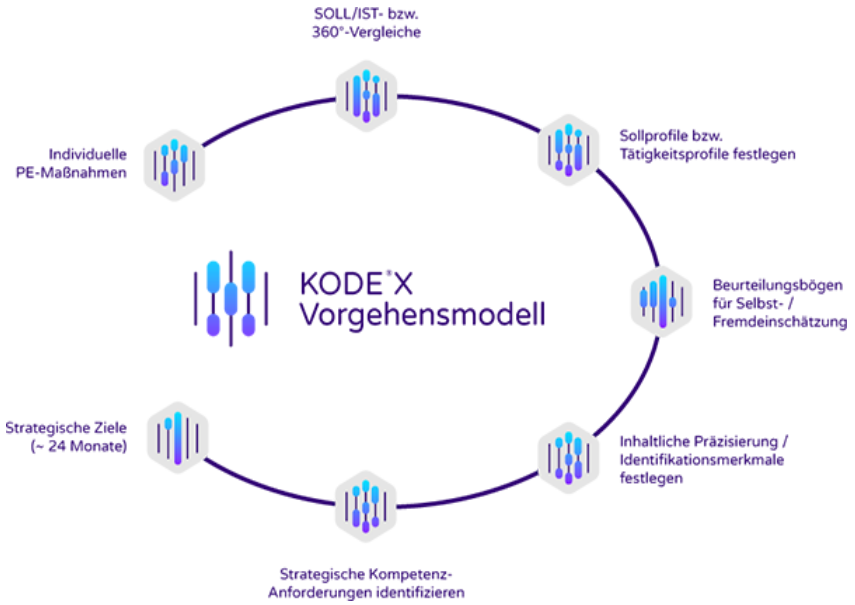
	▪ Exercise recommendations: Concrete suggestions for self-training. ▪ Competence cluster in the team: description of a person's contribution to a team. ▪ Various additional documents to support competence development (e.g. exaggerating skills, dealing with others, time management, learning behavior). ▪ Training modules: Modular information and training modules (MIT) for competence development, based on 64 key competences plus 16 MIT specifically for leadership-relevant key competences. The scope of an overall evaluation can be up to 43 DIN A4 pages. In addition to the pure evaluation information, explanatory texts help you to handle the evaluation. In addition, the evaluations present both normal living and working situations as well as difficult living and working situations (conflict situations etc.) in a personalized way. KODE® is strength-oriented, taking into account the strength-weakness paradox of Erich Fromm. In the case of overachievements, supplementary information is issued in the evaluations.
Resources needed	▪ Special KODE® software ▪ Training as KODE® Consultant ▪ An evaluation costs about 48 € Implementation in the company is possible - individual prices negotiable.
Timescale (start/end date)	▪ Completion of the questionnaire: 20 minutes ▪ Evaluation interview: 60-90 minutes ▪ Embedding in special programs / workshops / seminars: individual time requirements
Evidence of success (results achieved)	There are continuous surveys for optimization. Neutral third opinion confirms that KODE® has distinct advantages over other procedures by: ▪ clearly placing competence diagnostics and development at the center of the application and, for that, drawing on a mature theoretical model of action. ▪ structuring the competences that are sufficiently secured by empirics (Competence Atlas). ▪ not stopping at rigid typologies, but observing a variety of combinations of competences under different behavioral conditions and underpinning these combinations with adequate self-training offers. ▪ orienting towards organization-specific activity and function profiles and not linking competence statements to supersituational psychological norms (norm values), but rather to those actually given. Competence statements can be mirrored in organization-specific competence requirements. The latter is also highlighted in a report by the Vienna University of Economics and Business (2007). In April 2007, the Austrian Federal Economic Chamber had an independent report prepared by the Vienna University of Economics and Business on six procedures that might be of interest to the internal competence management of all Austrian chambers of commerce. The KODE® KODE®X system consistently received "very good" to "good" ratings and overall a "very good" rating. The following topics were examined: strategy orientation, manageability, quantification, qualification, marketability, breadth (circle of users), non-manipulability, IT / effort, scientific foundation, compatibility to tools for the development of human resources. Highlighted were amongst others the following aspects:

	▪ The only instrument with clear integration of corporate strategy in terms of strategic and operational competencies ▪ Coverage of central requirements for a competence management system ▪ Clear scientific foundation ▪ Clear practical benefits Since 2004, more than 50% of the revenues have been invested in the innovative development of KODE®, KODE®X and related software programs.
Difficulties encountered/ lessons learned	▪ The tool needs a process of introduction to the company. ▪ Not everyone in the company understands the term "competence". ▪ A common understanding of competences has to be created. ▪ Competence models.
Potential for learning or transfer	The instrument is very flexible in its application areas. Everywhere where changes in work processes, learning processes etc. take place in the company and adaptations in the competences of the employees / teams should / must take place, this instrument can be used. It measures and identifies the competences. Thereby an assessment can be made e.g. which employees are suitable for which tasks within a project team on the subject of digitization in the logistics processes. Further applications: ▪ Recruiting ▪ Learning at the workplace (highlighting learning outcomes) ▪ Team Selection ▪ Further education ▪ Train executives ▪ Training (of new employees) ▪ Reintegration of employees (after a long break or from abroad) ▪ etc. With respect to digitization, e.g. employees who could have a high affinity to the topic can be identified or project teams can be put together to accompany the change due to digitization. Learning outcomes / changes in competencies that take place through digitization processes in the company could also be identified.
Further information	The KODE® questionnaire is available in 16 languages. The translations of the questionnaire were made by specialist translators and verified by expert native speakers. The use of the questionnaire in the native language leads to much more precise results and excludes interpretation errors. This has created the basis for the international use of KODE®. The KODE® evaluation is available in German, English and French. KODE® is successfully used in a large number of international companies and organizations.
Contact details	
Name	
Organisation	
Email	
Status	The Kode tool is not selected for testing, because the costs were a problem in the project.

KODE-X

1. General information		
Title of the tool	KODE-X (Kompetenzexplorer) (Competence explorer)	
Main institution involved	llianz für die Region GmbH / KODE AGmbH	
Location of the practice	Country	Germany
	NUTS 1	
	NUTS 2	
	NUTS 3	

2. Detailed description	
Detailed information on the too	*Difference between KODE® and KODE®X:* With KODE®X, however, the starting point is the organization with its needs. KODE®X is a proven way to derive the competence requirements of the organization's strategy and specific challenges to the teams and people in the organization. With KODE®X a competence model can be developed in a pragmatic yet scientifically sound way. Competency models and job profiles are developed or used every day. Often, however, these appear very arbitrary and unbalanced or useless from a competence development point of view. Key questions that arise in this context are: ▪ What competences does an organization or a department really need to be successful or to become successful? ▪ Which concrete statements and observation features are hidden behind the individual competence terms? ▪ How can I align a competence model to the strategy of the organization (unit) that I am considering? ▪ For which positions / job families are job profiles necessary and which characteristics should the individual competences receive within the respective target profile? ▪ How can I involve people, teams or entire organizational units in the competence diagnostics and development? ▪ To what extent do the people involved already meet the competence requirements today and what are the parameters that can be used to set up personnel development? ▪ To answer these and other questions, KODE®X has been developed ▪ The COmpetence Diagnostics and Development eXplorer is designed to explore the detailed competence requirements and structures of individuals and teams in organizational units based on a single, but organization-specific competence model. Basically, you can perform KODE®X compatible with other instruments for the development of human resources. KODE®X is a scientifically based procedure with a clear practical relevance, consisting of seven clearly defined steps: target-performance / 360° comparisons

	 KODE®X is based on the extensive Competence Atlas, which contains 64 key competences with detailed definitions / explanations and observable behavioral characteristics as text building blocks for the four basic competence areas of personal, activity- and action-related, professional-methodical and social-communicative competences. In the context of competence modeling, you can make organizational adjustments according to defined rules in order to ensure that the questionnaires for self- and third-party assessment are suitable for the organization concerned. You can provide up to 360 ° feedback and individual HR development recommendations based on the competence-oriented target profiles.
Resources needed	▪ Special KODE®X software ▪ Training as KODE®X consultant ▪ Inclusion of many people to work out in the company (3-9 + trainer) ▪ Money
Timescale (start/end date)	▪ The development of a competence model with KODE®X takes about one day and will be developed in a workshop
Evidence of success (results achieved)	KODE®X has an important hinge function and combines scientifically proven and practically proven instruments of a competence-oriented personnel and organizational development. KODE®X: ▪ Includes an objectified and science-based competence measurement. ▪ Can be used across all organizational levels for managers and employees. ▪ Is based on a standardized procedure and can nevertheless be adapted to the specific organization. ▪ Allows comparison of target requirements with actual performance characteristics as well as the connection to KODE® (”bridge”). ▪ Provides objective statements for HR management and decision makers for continuous HR development. ▪ Works in a highly time-efficient, resource-saving and result-oriented way and is completely mapped via the KODE® software package (modeling, recording, evaluation).

Difficulties encountered/ lessons learned	▪ Developing the competence model with KODE®X can be time-consuming. ▪ Can identify weaknesses in a company's processes (especially in corporate culture).
Potential for learning or transfer	Creation of uniform competence models with regard to digitization and change processes in the company. The competence models then serve as a basis for measuring and developing competences of the employees / teams and their tasks. This could be done by KODE®.
Further information	The KODE®X represents the individual target profile / target requirements of the job / process or company by creating a competence model / system that is connected to the KODE®.
Contact details	
Name	
Organisation	
Email	
Status	The Kode tool is not selected for testing, because the costs were a problem in the project.

Benefits Realization

Title of practice	Benefits realization management
Detailed description	Please provide information on the practice itself In particular: ▪ Triggered by lack of ability to exploit technology change. ▪ It is implemented through a managed process of interactions within the firm (workshops) to identify technology enablers, link these to strategeic benefits and identify what firm changes need to occur to properly exploit the technology under discussion. ▪ The tool builds confidence in the investment, builds skills and directs management to problems and solutions. Leaves staff better informed and able to make better decisions in the future. It encourages rigorous and thoughtful decision manking around technology adoption and implimentations (e.g. also seeks to identify potential disbenefits).
Area of I4.0	The focus is very much on technology implementation but this can feed-back into future investment decisions.
Evidence of success (results achieved)	N/A but the tool is recommended by the UK Office of Government Commerce (now BIS).
Difficulties encountered/ lessons learned	Not following the process in an orderly manner. Needs tight supervision and understanding of the process. Requires time in workshops, writing up results, creating benenfits maps.
Potential for learning or transfer	The tool is designed for IT implementation in the US (lack of gains from IT being the problem solved) but it is certainly adadptable to Industry 4.0.
Target group	The level of the firm – it is an implementation tool.
Nature	The process should be run by consultants. As noted above it requires workshops to be run, maps to be created.
Proposal for modifications/sustainability	Please describe if there is suggestions of how to make the practice even better, and how the practice can evolve, need orientation, is integrated into the ecosystem/Smart specialization strategy and is supported by the community.
Resources needed	One or more workshops involving firm staff. Support in writing up results. E.g. Two half day worshops, 2 interviews / meetings with senior managers (two researchers/ consultants). 4-8 Full Time Equivellant days writing up results, creating maps.
Further information	There are plenty of resources on line.
Contact details	
Name	Chris Ivory
Organisation	ARU
Email	Chris.ivory@anglia.ac.uk
Status	The tool has also relations with WP 3 and is used in WP3.

Entrepreneurscan

1. General information		
Title of the tool	ENTREPRENEURSCAN www.entrepreneurscan.com	
Main institution involved	HANZE UNIVERSITY OF APPLIED SCIENCES	
Location of the practice	Country	THE NETHERLANDS
	NUTS 1	Drop-down list
	NUTS 2	Drop-down list
	NUTS 3	Drop-down list

2. Detailed description	
Detailed information on the tool	*Please provide information on the tool itself. In particular:* ▪ *Short description of the tool* ▪ *Function of the tool and which competencies are measured* ▪ *Give examples of applications within education and or industry* **Description and Function of the tool, competencies measured** The entrepreneurscan is developed by phd. Martijn Driessen, the Netherlands. The entrepreneurial competence is divided in four components: motivation, personal characteristics, Qualities and Knowledge & Experience. Based on this subdivision of the entrepreneurial competence the Entrepreneurscan is developed. The Entrepreneurscan enhances self-knowledge and entrepreneurial attitude among individuals. The Entrepreneurscan results gives insight in own entrepreneurial attitude and is suitable for coaching and training. The scan results are a specific individual measurement of the entrepreneurial competence. The scan results consist of a personal ' entrepreneurial web' with the components ' Need for Achievement, Need for Autonomy, Need for Power, Social Orientation, Self-belief, Endurance, Risk-taking, Market awareness, Creativity, Flexibility'. The scan results are integrated in a very clear and well written feedback report. Further explanation: Need for Achievement Successful entrepreneurs are achievers. In other words, their ultimate goal is to perform well. Keeping their business objectives in mind, they devote all their strength and energy in their company. They want to perform to the best of their abilities in everything they do, and always strive to do better than the last time. They want to distinguish themselves, and their motivation comes from within. Less successful entrepreneurs don't have as much need to perform well or a weaker will to succeed. They are easily satisfied with less. Need for Autonomy Independence is frequently the conscious or unconscious reason why some people choose the life of an entrepreneur. The need to make their own decisions and do what they want is very strong. Successful entrepreneurs act independently of others, make their own decisions, solve their own problems and successfully complete their activities on their own strength. Less successful entrepreneurs need support or aid and are inclined to leave the decision-making, more often than not, to others. Need for Power The need for power is to have control over others, to impose your will on them. The need for power can be a reason to become an entrepreneur, because then you are in charge. Successful entrepreneurs know what they want and how they can influence others in order to attain their goals. In the process, they simply assume that their authority or opinion is generally accepted. Less successful entrepreneurs are more timid; they prefer to stay in the background.

	Social Orientation Social orientation is the degree to which someone is focused on others. Successful entrepreneurs understand that people and networks are necessary to realize their ideas. They easily make contacts and permit business considerations to determine their social behaviour. Consequently, they can put their social needs aside and focus on their venture. Starting entrepreneurs frequently work alone, and it is no secret that self-employment can be a very solitary pursuit. Less successful entrepreneurs are more reserved and cautious when making contacts. Self Belief Self belief is the belief in your own abilities and in yourself relative to others. Successful entrepreneurs trust that they can reach their goals on their own strengths. They are not only convinced of their ability to complete every task successfully, this type of entrepreneur is convinced that their success depends primarily on themselves. This self-confidence also carries over into relations with others even with those who might be richer, more important or more powerful. Less successful entrepreneurs believe less in their own strengths and live with the idea that their success is dependent upon the prevailing circumstances. Endurance Endurance is continuing strongly in spite of negative developments or objections, even in the longer term. Successful entrepreneurs have great endurance. With a solid and clear goal in mind, they eventually overcome each hurdle to achieve success. Also, if they do not make immediate progress, they persist. They cling to their work and do not stop before their goal has been reached. Less successful entrepreneurs display a lack discipline and are quicker to put the blame for their lack of success on fatigue or trouble. Risk Taking Risk taking is being able to cope with uncertainties and the willingness to take losses. Successful entrepreneurs are active risk takers. They spot chances pro-actively, and do it with energy, initiative and the willingness to realise the chance of a desired outcome, despite the risks inherent to the change. Their goals are more set on improving their lives than on maintaining it. Unsuccessful entrepreneurs are passive risk takers. They approach risk more carefully and more defensive and often only react to what crosses their path, and what they cannot avoid. Market Awareness Market Awareness refers to the ability to visualize the needs of existing or potential customers and linking them to your own company. Successful entrepreneurs anticipate the specific needs of a clearly defined target group. They can also indicate precisely what their competitors do. They follow developments reported in magazines and trade journals and talk with customers to be able to anticipate changes in the market. Less successful entrepreneurs barely have an eye for the needs of their customers. They are frequently more product-orientated and have no clear target group in mind. Creativity Creativity is the capacity to ”play” with thoughts and ideas and to see new possibilities. Successful entrepreneurs are open to what is happening in their surroundings. In doing so, they are not hampered by restrictions of the situation, but rather challenged by the possibilities. They have the capacity to think from different

	angles and choose the path less travelled. As a result, they can convert problems into new opportunities and dare to take risks. Less successful entrepreneurs are limited in their manner of thinking and are less anxious to experiment. Flexibility Flexibility is based on the ability to adapt. Successful entrepreneurs react to changes they observe in their environment. Such as new wishes of customers or new competitors in the market. They interpret the effects of opportunities or threats and adjust their strategy or business plan accordingly. Unsuccessful entrepreneurs are hardly willing to adapt. They resist change and can be inflexible and stubborn. **Examples, applications** From 2009 Entrepreneurscan works with partners in the UK, Belgium, Finland, USA and South Africa. The scan is widely used in European universities among which is the Hanze University and small and medium sized companies for trainings purposes. The scan aims to enhance performance of entrepreneurs or entrepreneurial attitude among individuals such as students, employees and employers.
Resources needed	*Please specify the amount of funding/financial resources used and/or the human resources required to implement the tool.* The scan is accessible online and available in English. Participants fill in an online questionnaire, place the order (scan) and pay online. After payment the scan results and feedback report are automatically produced and sent via email to the participant. If companies participate, we can request an online account to make it easier for employees to apply. Payment can be done by the Growin project or corporate management. Costs: ca. 15 euro's per scan, can be done online via www.entrepreneurscan.com. Payment via online banking
Timescale (start/end date)	Is not relevant, the Entrepreneurscan is permanent available online and is always accessible.
Evidence of success (results achieved)	Why is this tool considered as good? Please provide factual evidence that demonstrates its success or failure (e.g. measurable outputs/results). Though the Entrepreneurscan seems to be developed for entrepreneurs only, we have very good results in our Hanze University bachelor programmes with this scan. Application of the test leads to more entrepreneurial attitude and entrepreneurship among students. More information on https://research.hanze.nl/en/organisations/research-centre-entrepreneurship. See also under further information the literature/publication/research from Martijn Driessen. The Entrepreneurscan is suitable for GrowIn because it supports in enhancing entrepreneurial attitude among employees to overcome uncertainties, deal with novities, adapt new technologies and become more market sensitive. By applying this test on employees, insights are gained and in addition trainings can be developed how to overcome theese obstacles on a personal and working level to adapt new IT technology.
Difficulties encountered/ lessons learned	No difficulties are encountered, the online facilities are good and reliable.

Potential for learning or transfer	*Please explain why you consider this tool (or some aspects of this tool) as being potentially interesting for other regions to learn from. If possible relate to other provided tools /knowledge provided in this project GrowIn 4.0 and generate suggestions for applications.* The Entrepreneurscan is suitable for GrowIn because it supports in enhancing entrepreneurial attitude among employees to overcome uncertainties, deal with novities, adapt new technologies and become more market sensitive. By applying this test on employees, insights are gained and in addition trainings can be developed how to overcome these obstacles on a personal and working level to adapt new IT technology. Does the tool meet the tool selection criteria (see top of the template)? The Entrepreneurscan tool is simple, general and applicable to all our European partners in the GrowIn project. The tool is low-cost, easy accessible and available in English. Also the tool provides quickly individual scan results and feedback reports. The tool taps into the need of the needed industrial competencies for the future IT employees by focussing on soft skills with regard to dealing with uncertainty, adaptability, creativity, flexibility and market sensitivity. In conclusion: the Entrepreneurscan fulfils the tool criteria of ' availability of results, transferability, level of innovation and long term durability.
Further information	**Additional literature:** Driessen, M. (2014) The Golden Egg, a scientific approach on how to become a successful entrepreneur. Utrecht: Entrepreneur Scan Driessen, M. (2010). De ondernemende ondernemer. Leer jezelf ontwikkelen tot een entrepreneur. Utrecht: Entrepreneur Consultancy bv (10e druk). Driessen, M. (2008). Kzie, kzie, wat jij niet ziet. Onderneem zonder eigen bedrijf. Utrecht: Entrepreneur Consultancy bv (1e druk) Driessen, M. (2005). E-Scan ondernemerstest: beoordeling en ontwikkeling ondernemers Competentie [E-Scan entrepreneur test: assessment and development of entrepreneurial competence]. PhD Disseration. Groningen: Rijksuniversiteit Groningen. [english summary available] Lex van Teeffelen, Edwin Weesie, Lorraine Uhlaner (2014) Altering student preferences toward takeover entrepreneurship: Action research study based on threshold theory International Journal of Entrepreneurship and Small Business 23: 4. 568-586. **Publications:** Lex van Teeffelen, Lorraine Uhlaner, Martijn Driessen (2011) The Importance of Specific Human Capital, Planning and Familiarity in Dutch Small Firm Ownership Transfers: a Seller's Perspective International Journal of Entrepreneurship and Small Business 14: 1. 127-148. Oosterbeek, H., Van Praag, M., IJsselstein, A. (2010) The impact of entrepreneurship education on entrepreneurship competencies and intentions: An evaluation of the Junior Achievement Student Mini-Company Program European Economic Review 54(3): 442-454.

	Driessen, M. P., & Zwart, P. S. (2006), De E-Scan Ondernemerstest ter beoordeling van ondernemerschap, Maandblad voor Accountancy en Bedrijfseconomie, juli/augustus 2006, 382-391. [also available in english: Entrepreneur Scan measuring characteristics and traits of entrepreneurs] PDF | citations **Research Reports:** Breanna James (2016) Generating Entrepreneurial Success: strategic entrepreneurship in relationship to motivation and personal entrepreneurial competences, Doctoral Dissertation Research, Argosy University, USA [research reports] Björn Giesbergen (2016) Ondernemerschap als sleutel voor meer verdienvermogen, RaboResearch, Economisch onderzoek. Rabobank [research reports] link Yvonne Prince, Wilma van Rijt en Johan Snoei (2016) IkStartSmart en IkGroeiSmart Gelderland Evaluatie 2012-2015 EIM / Kamer van Koophandel [research reports] OECD (2014), "Netherlands: "IkStartSmart" Gelderland", in The Missing Entrepreneurs 2014: Policies for Inclusive Entrepreneurship in Europe, OECD Publishing, Paris. DOI: link Overweel, M., Van Rijt-Veltman, W. & Snoei, J. (2011) Een succesvolle start op maat EIM / Kamer van Koophandel [research reports] Tansley, G (2010) Supporting Disabled Adults Into Self Employment, Etete Ltd issued by Department of Work and Pensions, UK. [research reports] Van den Tillaart, H. (2009) Ikstartsmart Salland, effectmeting coaching van startende ondernemers. ITS-Radboud Universiteit Nijmegen [research reports] Van den Tillaart, H. (2008) Effectmeting Start Smart Project. Begeleiding van startende ondernemers ITS-Radboud Universiteit Nijmegen. [research reports]
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Organisation	Hanze Unviersity of Applied Sciences Institute of Communication, Media & IT
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Status	The Entrepreneurships can is not selected for testing, because the costs were a problem in the project.

Job Openings Monitor

1. General information		
Title of the tool	Job Openings Monitor	
Main institution involved	Hanze University of Applied Sciences Groningen	
Location of the practice	Country	The Netherlands
	NUTS 1	Drop-down list
	NUTS 2	Drop-down list
	NUTS 3	Drop-down list

2. Detailed description	
Detailed information on the tool	*Please provide information on the tool itself. In particular:* ▪ *Short description of the tool* ▪ *Function of the tool and which competencies are measured* ▪ *Give examples of applications within education and or industry* Hanze University's Marian van Os Centre for Entreneurship develop a job openings monitor. It is a pragmatic tool developed to acquire detailed labour market information across multiple firms, in a form which SME's themselves can use for HRM planning. It was developed in pilot with a regional employers' association (SBE) and nine companies. Previously, a fear for future personnel shortages led various actors in the area, in particular the regional employers' association Samenwerkende Bedrijven Eemsdelta (SBE) and the Seaports Experience Center (SXC), to organize short employer surveys in 2008 and 2011, asking them for their employment expectation. Results showed the threat of increasing worker shortages, in particular for technical occupations. The acquired information, however, was too general (only three skill levels, and only differentiated between 'technical' and 'other'). Resulting action to address potential skills gaps requires more specific and detailed information, specified per occupation for educational levels and vocations. But SMEs generally lack their own HRM personnel to make such detailed plans, and the funds to hire one. To break this stalemate, KCA developed a pilot project with SBE and its member companies . The goal was to come up with a method that succeeds in tempting firms to map their future personnel needs. That requires a simple and efficient method of data collection to acquire the necessary detailed data in individual firms, on the basis of which insight is gained into employment chances and challenges – both at the level of the individual firms, and across them, at the regional level. The research question was: in what type of project can (in particular) small and medium-sized employers be 'tempted' to generate detailed information on their current and future demand for personnel and workforce, in order to gain insight at the firm and regional level in expected labor market discrepancies? The tool was a format developed in excel – to ensure that firms can use and update the files themselves. It concentrated on essential information to keep costs down, but made sure that that essential information (in particular, occupation and education type) is coded at the most detailed level (ISCO for occupations, the national qualification framework for education). Firms are asked to map current supply and demand for each occupation in their organization, and required to specified the preferred education and training for recruit, now and in 5 year' s time. The pilot was considered a success and has resulted in the tool being used in a recent has been included in a regional labor market program (cf. Van Lieshout et al., 2016). !). The tool has been applied for 108 companies in the Groningen labor market region (Van Lieshout et al, 2017) for a skills gap analysis It continues to be used in ongoing projects.

	In this project, we will translate the format in English, German and Danish to allow for specific and precise transnational measurement of current and expected occupational skill needs due to the advanced. Translation will require more than sheer language translation: the Dutch benchmark used in the tool will not apply to other countries, so national/regional alternatives have to be found. The tool (and the research applying it for a specific SME, in up to three visits) helps SME's to detail their current skills needs, and possible future ones. It requires time investment from the firm (up to 20 hours) and of the researcher (up to 30 hours). Ideally, other tool(s) in our project will have helped the entrepreneur to orient on his long term strategy; the excel format will then help him translate general market strategy in a specific HRM strategy & tactic.
Resources needed	*Please specify the amount of funding/financial resources used and/or the human resources required to implement the tool* The tool will be made available by the Hanze University but has to be translated in three other languages, and adapted for use within each (i.e. choosing a region-specific benchmark for skill shortages) as well as in this transnational project (i.e. agreeing on one transnational coding for education, and possible expanding upon the ISCO occupational qualification. Hanze will train researchers in it use at one of our conferences. Count on 30 hours of time of the researcher for each firm, as well as 20 hours of time for the firm itself.
Timescale (start/end date)	We can start work on the translation immediately, and can conclude the process within three months with training the researchers at one of our conferences.
Evidence of success (results achieved)	*Why is this tool considered as good? Please provide factual evidence that demonstrates its success or failure (e.g. measurable outputs/results).* A successful pilot under 9 firms (van Lieshout et al, 2016) resulted in implementation of the tool in a project among 108 firms in the Groningen labour market region (van Lieshout et al, 2017). The firms received their own excel for continued use, and a regional report on potential skills shortages across them was presented to them, their associations, and labour market authorities.
Difficulties encountered/ lessons learned	We encountered some technical problems in data copying between different excel users and SPSS. We would like to develop a separate digital online tool for data collection in the future. The process is worthwhile for firms expecting signicant change, skill shortages or redundant parts of their workforce.
Potential for learning or transfer	*Please explain why you consider this tool (or some aspects of this tool) as being potentially interesting for other regions to learn from. If possible relate to other provided tools /knowledge provided in this project GrowIn 4.0 and generate suggestions for applications.* Changing technology requires changes in human capital. National education systems are notoriously slow in their responsiveness. However: the first mover in terms of responsiveness must be the individual firm itself. Far too often firms stick to the same work organisation and recruitment & training policies while already planning significant changes. This tool is a (relatively) easy but comprehensive tool that forces firms to detail required changes in human capital over the next five years, and assists them in doing so. It complements tools focussing on the entrepreneur himself, and on strategic change in market strategy, and this project will allow us to develop such tools in a comprehensive and integrated fashion, and test their use in five regions.

Further information	
Contact details	
Name	Dr. Harm van Lieshout
Organisation	Professorship Human Capital Marian van Os Centre for Entrepreneuship Hanze University of Applied Sciences
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Status	The tool is selected for testing.

Consensus Workshop Method (ICA)

Title of practice consensus workshop method: www.ica-uk.org.uk	
Detailed description	*Please provide information on the practice itself In particular:* *What is the problem addressed and the context which triggered the introduction of the practice.* *How does the practice reach its objectives and how is it implemented.* *Specific information for each WP.* The consensus workshop method is developed by the institute of Cultural Affairs, a global community of non-profit organisations advancing human development in over 40 countries worldwide. More info on: www.ica-international.org The Consensus workshop method is used to facilitate group consensus-based decisions that respect the diversity of perspectives within the group, inspire individual action and move the group toward joint resolve and action. Individual participation is honoured by focusing on the insight within each idea. The Consensus method raises consciousness about new relationships between data and acknowledges the level of the group's consensus at any given moment. In a nutshell: Engaging, exploring individual views, develop group consensus, building effective teams and triggers creativity and open communication. To increase skills for Industry 4.0 readiness we need a tool to enhance the ten Industry 4.0 competencies as defined by the World Economic Forum, such as creativity, people management skills, communication skills, team collaboration and problem solving skills (p123 and further, Ustundag & Cevickan, Industry 4.0: managing the digital revolution). To adhere to the GROWIN project goals we need a tool or method suitable for improving soft, hard and knowledge skills and make the connection between the strategic development tools and IT knowledge tools in WP 3 and 4. The consensus workshop method supports in reachting these goals. Overall project goal is to support SME with Change and see the Bigger Picture, from an organisational and peoples perspective (p123 and further, Ustundag & Cevickan). The consensus workshop supports in achieving this goal.
Area of I4.0	Could be the level of I4.0/digitization the practice is focusing on. Support employees/employers in change to Industry 4.0 readiness and see the bigger picture by engaging all ideas and opinions to reach group consensus on strategy and IT knowledge development, taken into account the ' human element' how to deal with uncertainty and fear (also check template good tool Entrepreneurscan) and strategy needs from the organizational and management perspective (alignment with ROSF tool smart factory competency scan, SAT/NAV, problem solving skills bachelor thesis (VIA) and Future literacy).

Evidence of success (results achieved)	*Why is this practice considered as good? Please provide factual evidence that demonstrates its success or failure (e.g. measurable outputs/results).* The consensus workshop method is worldwide used to create support organisations in change and encourages group consensus in decision making, improving organisational processes etc.
Difficulties encountered/ lessons learned	*Please specify any difficulties encountered/lessons learned during the implementation of the practice.* None It is an innovation if we would use the consensus workshop method in combination with other selected WP 3, 4 and 5 tools with the aim to support sme in dealing with change and see the bigger picture related to Industry 4.0.
Potential for learning or transfer	*Please explain why you consider this practice (or some aspects of this practice) as being potentially interesting for other regions to learn from. This can be done e.g. through information on key success factors for a transfer or on, factors that can hamper a transfer. Information on transfer(s) that already took place can also be provided.* The consensus workshop is transferable and easy to apply. A manual is available.
Target group	*Specify the target group of the practice at if possible the level of I4.0/digitization.* Sme, cross sectoral, with the intention to get ready for Industry 4.0.
Nature	*Please explain whether the practice is a tool for SMEs to use themselves, a method used by ex. consultants, a program having a broader objective etc.* Project participants can apply the method with the help of the manual or instructions.
Proposal for modifications/sustainability	*Please describe if there is suggestions of how to make the practice even better, and how the practice can evolve, need orientation, is integrated into the ecosystem/Smart specialization strategy and is supported by the community.* The consensus workshop method supports in engaging all participants in a workshop by using energizes, visuals and creative methods. The overall structured approach supports in reaching consensus on decisions, strategies or see the 'bigger picture'. The method can be used in combination with other WP5 tools. By engaging all participants and stimulating collaboration all participants feel 'heard' and make them feel at ease. The method can be modified and extended with other facilitation tools, free accessible (website is mentioned under ' further information').
Resources needed	If applicable - please specify the amount of funding/financial resources used and/or the human resources required to set up and to run the practice. Instruction consensus workshop free, is taken from the ICA's database. If requested: half day training consensus workshop ca. 300 euro, ICA The Netherlands or UK.

Further information	Link to where further information on the good practice can be found www.ica-uk.org.uk Free accessibility facilitation methods online: https://www.sessionlab.com/library/iafmethods/generating_ideas
Contact details	
Name	Trienke Drijfhout Ma Senior Lecturer international communication Associate ICA The Netherlands
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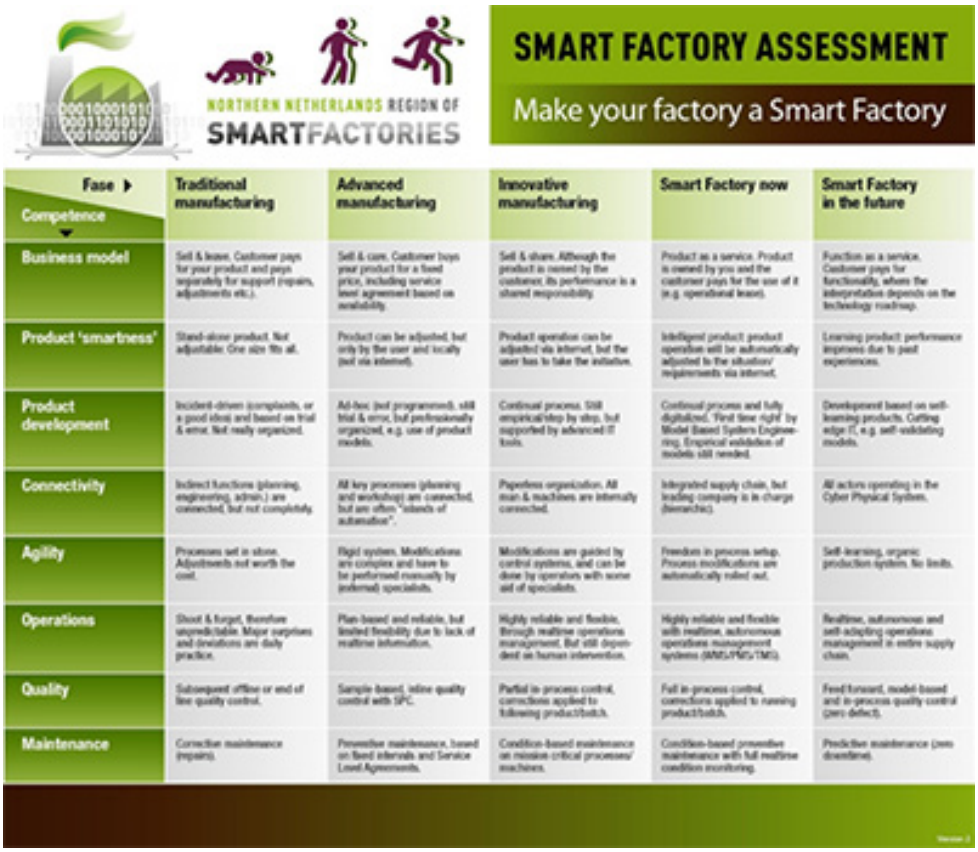
Email	t.drijfhout-roeters@pl.hanze.nl
Status	Some parts of this tool are integrated in the new developed tool, the transition workshop.

Region of Smart Factory Tool (ROSF)

1. General information		
Title of the tool	Smart Factory Assessment by the SME consortium Region of Smart Factories	
Main institution involved	Manufacturing companies and manufacturing technology suppliers; Universities and knowledge institutes (40 partners)	
Location of the practice	Country	Netherlands, region Northern Netherlands
	NUTS 1	Drop-down list
	NUTS 2	Drop-down list
	NUTS 3	Drop-down list

2. Detailed description	
Detailed information on the tool	*Please provide information on the tool itself. In particular:* ▪ *Short description of the tool* ▪ *Function of the tool and which competencies are measured* ▪ *Give examples of applications within education and or industry* The RoSF Assessment describes the roadmap between nowadays traditional manufacturing toward the smart factory (or Industry 4.0) now and in the future in competences and 5 maturity levels (see the figure). For manufacturing firms it enables them to assess their own position ("How smart is your factory?") and to set target for the future. Although it is a general framework that needs to be customized for individual companies, it is broadly recognized as a very useful guidance to SME's, in their unavoidable transformations towards a smart factory, which will be the standard for manufacturing. For technology providers the assessment helps them to improve their 'smart factory solutions'. The RoSF Assessment is developed via an open innovation process (everybody can contribute) by the RoSF companies themselves but not (yet) based on scientific research. It is still under construction and consists of several applications (questionnaire, maturity assessment, game) and can be used in different situations: on line, in bilateral contacts, as a tool for management teams and via a standardized masterclass. The game version can be found at: https://www.smartfactorygame.com/. The next edition of the Assessment will published this spring. An special version for the process industry is exacted end of this year.



Link: https://smart-industry-assessment.nl/questions/introduction

Framework of the RoSF Maturity Assessment

Resources needed	*Please specify the amount of funding/financial resources used and/or the human resources required to implement the tool.* The current version of the RoSF Assessment is free and can be used as a self-assessment tool, although professional support by experienced consultants is required to get the maximum benefits out of it. Beware that the RoSF Assessment covers the whole spectrum from market strategy to product development and manufacturing this support so the support should be broad too.
Timescale (start/end date)	Only if applicable. Not relevant.
Evidence of success (results achieved)	*Why is this tool considered as good? Please provide factual evidence that demonstrates its success or failure (e.g. measurable outputs/results).* Since the introduction (Q2 2017) the RoSF Assessment is used in approx. 10 masterclasses (100 users) and the game version is popular at trade fairs for example the Hannover Messe. Other numbers are not knows as it is free to use via internet. At the moment, the RoSF assessment is regarded as the main Smart Factory guideline in the Netherlands with a growing popularity. Scientific research to validate (and improve) the assessment is underway.

Difficulties encountered/ lessons learned	Success factors are: Simple, practical and 'on-topic', made by companies themselves (no 'consultancy speak'), and well accessible. Nevertheless it is important to use the assessment in the right way.
Potential for learning or transfer	*Please explain why you consider this tool (or some aspects of this tool) as being potentially interesting for other regions to learn from. If possible relate to other provided tools /knowledge provided in this project GrowIn 4.0 and generate suggestions for applications.* It as a general and well evaluated tool that covers issues that are relevant for all manufacturing firms in western countries. It is composed in that way that it is relevant (unavoidable) to all firms.
Further information	www.rosf.nl (in Dutch) with some parts in English: http://rosf.nl/pilot-projects-eng/ and http://rosf.nl/7-reasons/ International presentation for example: http://rosf.nl/wp-content/uploads/2017/10/Vilnius-Innovation-Drift.pdf
Contact details	
Name	Region of Smart Factories, RoSF. www.rosf.nl
Organisation	Nom Investment and Development Agency for the Northern Netherlands as coordinator of the consortium
Email	Hans Praat, NOM: Praat@nom.nl Contact GROWIN project, Hanze University, Trienke Drijfhout: t.drijfhout-roeters@pl.hanze.nl
Status	The tool is selected for testing: as well as the ROSF game and the assessment. The tool is also tested at the partner meeting in Groningen.

Future Literacy

Title of practice: Future Literacy (UNESCO)	
Detailed description	*Please provide information on the practice itself In particular:* ▪ *What is the problem addressed and the context which triggered the introduction of the practice* ▪ *How does the practice reach its objectives and how is it implemented* ▪ *Specific information for each WP* The Future Literacy (FL) method started in 2013 and was developed by Riel Miller, Unesco. The FL aims to enhance a different way of thinking at the present, stimulates new ways how to look at the future and how to use the future. FL supports in dealing with assumptions such as 'change', helps to deal with uncertainty and fear. By stimulating people's imagination about how the future looks like and how to anticipate on the future, FL creates a different mindset, triggers anticipatory behaviour and reframes people's minds that for instancy uncertainty is a ' resource' to use for the future, it shifts origins of fear and projects hope towards the future. FL supports in giving people confidence for the future by offering practical tools/ cues how to anticipate for the unknown. Currently FL works with more than 30 partners worldwide. The Hanze University is a partner of FL Unesco and has offered workshops, one till five days training on FL for master programmes and clients. Application in the project: FL deals with the motivational factors among employees to acquire new knowledge/skills, helps to see the bigger I4.0 picture and not to be afraid for the unknown I4.0 future.
Area of I4.0	Could be the level of I4.0/digitization the practice is focusing on. ▪ A new way of thinking, triggering creativity, imagination and creating a new frame how to see/use the future by giving practical tools for anticipatory behaviour.
Evidence of success (results achieved)	*Why is this practice considered as good? Please provide factual evidence that demonstrates its success or failure (e.g. measurable outputs/results)?* ▪ Started from 2013, was aligned to the Millennium Development goals, more than 30 partners, still growing the partner network world wide ▪ Very successful practices FL in the Hanze University.
Difficulties encountered/ lessons learned	*Please specify any difficulties encountered/lessons learned during the implementation of the practice.* None
Potential for learning or transfer	*Please explain why you consider this practice (or some aspects of this practice) as being potentially interesting for other regions to learn from. This can be done e.g. through information on key success factors for a transfer or on, factors that can hamper a transfer. Information on transfer(s) that already took place can also be provided.*

	▪ FL gives a hands on method how to deal with uncertainty / fear, triggers creativity and helps to reframe the future ▪ FL is a ' prerequisite' before starting a training on I4.0 strategy development/ IT specific trainings etc., because it starts with a new mindset how to see the future I4.0.
Target group	*Specify the target group of the practice at if possible the level of I4.0/digitization.* ▪ Employees, management sme.
Nature	*Please explain whether the practice is a tool for SMEs to use themselves, a method used by ex. consultants, a program having a broader objective etc.* ▪ The FL method has to be applied by a trainer/consultant.
Proposal for modifications/sustainability	*Please describe if there is suggestions of how to make the practice even better, and how the practice can evolve, need orientation, is integrated into the ecosystem/Smart specialization strategy and is supported by the community.* None.
Resources needed	*If applicable - please specify the amount of funding/financial resources used and/or the human resources required to set up and to run the practice.* ▪ When we include master students to develop FL in combination with other WP5 trainings tools, then no financial resources are needed.
Further information	Link to where further information on the good practice can be found https://en.unesco.org/sites/default/files/myreformstory_riel-miller.pdf https://en.unesco.org/events/transforming-future-presentation-unesco-s-work-futures-literacy-member-states (watch the video: transforming the future: anticipation in the 21st Century).
Contact details	
Name	Trienke Drijfhout
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Status	Some parts of this tool are integrated in the new developed tool, the transition workshop

Best practice ' problem solving in bachelor thesis'

Title of practice : ' problem solving skills related to bachelor thesis'	
Detailed description	*Please provide information on the practice itself In particular:* ▪ *What is the problem addressed and the context which triggered the introduction of the practice* ▪ *How does the practice reach its objectives and how is it implemented* ▪ *Specific information for each WP* This is an overview of collection of methods used by VIA University in Denmark. It entails enhancing creative and problem solving skills. It is applied in the teaching during the graduation period, writing the bachelor thesis for a real life assignment , provided by a business client The purpose of the Bachelor Project 2 is to evolve the student's ability to solve a relevant ICT Engineering problem and document the solution. In a group, students must be able to analyze, design, implement and test complex problems and be able to carry out well-documented and tested solutions. Knowledge: After having completed this course, the students must master the knowledge about: ▪ Searching and scoping relevant project information. ▪ Project and team work planning. ▪ Communication and documentation skills. ▪ Testing. Skills: After having completed this course, the student must master to: ▪ Identify and justify problems and their context. ▪ Select and argue for choice of method and reflect critical and said methods. Find and assess relevant literature within the problem domain. ▪ Present the result for an audience of engineers. Competencies: After having completed this course, the students must be able to: ▪ Describe and delimit a large ICT Engineering Project. ▪ Select and use relevant theories and methods to solve the problem. ▪ Plan and structure the project within the BPR2 time frame. ▪ Initiate the preliminary steps in a system development process, leading to a clearly defined requirements capture, use cases as well as object and behavior analysis. ▪ Work successfully in a project group with the objective of solving a well-defined engineering problem. Topics: The Bachelor Project (BPR2) is based on an ICT Engineering problem with a project description made in the BPR1 course. Teaching methods: Supervision, theory and independent work, project documentation and presentation. It is relevant for WP5, it entails creative methods for creative thinking, idea generalization and collaboration.

Area of I4.0	*Could be the level of I4.0/digitization the practice is focusing on.* Enhancing creative thinking, idea generalization and collaboration.
Evidence of success (results achieved)	*Why is this practice considered as good? Please provide factual evidence that demonstrates its success or failure (e.g. measurable outputs/results).* Many experiences in teachings during the graduation period in Denmark. The results are stored in the VIA University college Pure library system that can be assessed by all VIA employees
Difficulties encountered/ lessons learned	*Please specify any difficulties encountered/lessons learned during the implementation of the practice.* None.
Potential for learning or transfer	Please explain why you consider this practice (or some aspects of this practice) as being potentially interesting for other regions to learn from. This can be done e.g. through information on key success factors for a transfer or on, factors that can hamper a transfer. Information on transfer(s) that already took place can also be provided. The techniques used: 1. SCRUM for collaboration agile process with students/sme client and SWOT method. In the ICT Bachelor projects the SCRUM model is used for the agile process handling and the V-model is used for documentation purposes. Project stages: According to make SME digitalization project in GrowIn 4.0 the SME's are in a almost similar situation as the bachelor project students. The educational starting points and project period length might be different. In the SME company's and for the ICT students it is recommendable to start with small analyse of employees/ICT students interest, capability, maturity and mutual chemistry to make the best possible teams for the project execution. When team are created and the project is generally defined then it's time to start the formalised project process for the real verification, coding and validation. Team capabilities: Make team capability by using the SWOT tool. A SWOT analysis is a relatively simple but effective tool that can help you analyze the capabilities of your team and pinpoint where there's room for improvement. SWOT stands for:

SWOT: Strengths, Weaknesses, Opportunities, Threats.

	Strengths	Weaknesses
	Close customer contact Engagement Local knowledge Good reputation	Poor profiling Liquidity Heavy Investment Theoretical background
Opportunities New markets New Products Technological development Environmental Interests	Communicate environmental awareness Seizing the public by extending business	More training Invest when interest rates are low
Threats Competition Rising interest rates Invest Ring Needs	Profile of products by specialization	Profile products Establish operational communities

2. Creative Techniques : brainstorming techniques and Six Hat method (Debono) and how to move from idea generalization to SMART formulated objectives.

Brainstorm: Use this template for the initial capture and review /revision of the brainstormed ideas. As the ideas are discussed, you can also capture any associated comments or follow-up tasks. If you need to prioritize items to help the team know what's important to focus on, you can use the ranking column to record their consensus rank.

Potential Uses:

- To identify possible causes of a problem.
- To generate possible improvement suggestions or alternatives.
- To begin a discussion of business, system, application, or other types of requirements.

- To generate ideas around functions or features desired in a new tool, application, product or service.
- To define all the tasks necessary to build an action plan.
- To collect key points from various discussions occurring in sub-teams.
- To demonstrate to members of a polarized group.
- that there are more than just two competing alternatives.

Template:

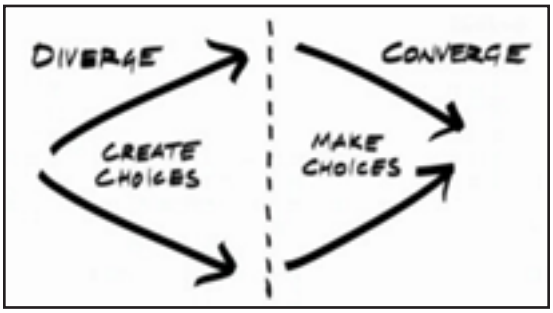
Type the question or problem being brainstormed here

#	IDEA	COMMENTS / FOLLOW-UP TASKS	RANK
1	*Use this column to capture the initial brainstorming responses. ..*	*Use this column to capture any comments or follow-up task needed to further research or clarify the idea. Each task should identify a responsible party & due date.* ▪ ▪ ▪	*Use this column to rank items so you can focus on the highest priorities. The ranking scale should be identified prior to brainstorming exercise.* *For example:* *H – High* *M – Medium* *L – Low*
2			
3			
4			
5			
6			

Convergent/divergent thinking styles:
"Convergent" and "divergent" thinking represent two different ways of looking at the world.

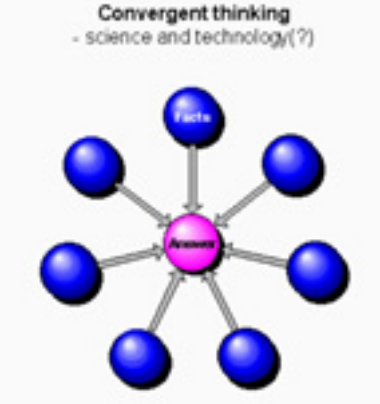
1. A convergent thinker sees a limited, predetermined number of options (word "converging" = "coming together").

2. By contrast, a divergent thinker is always looking for more options (word divergent ="developing in different directions").



Many of us get stuck in convergent thinking and, as a result, don't see the many possibilities available to us. Let's have a look at both types of thinking.

Convergent Thinking Styles

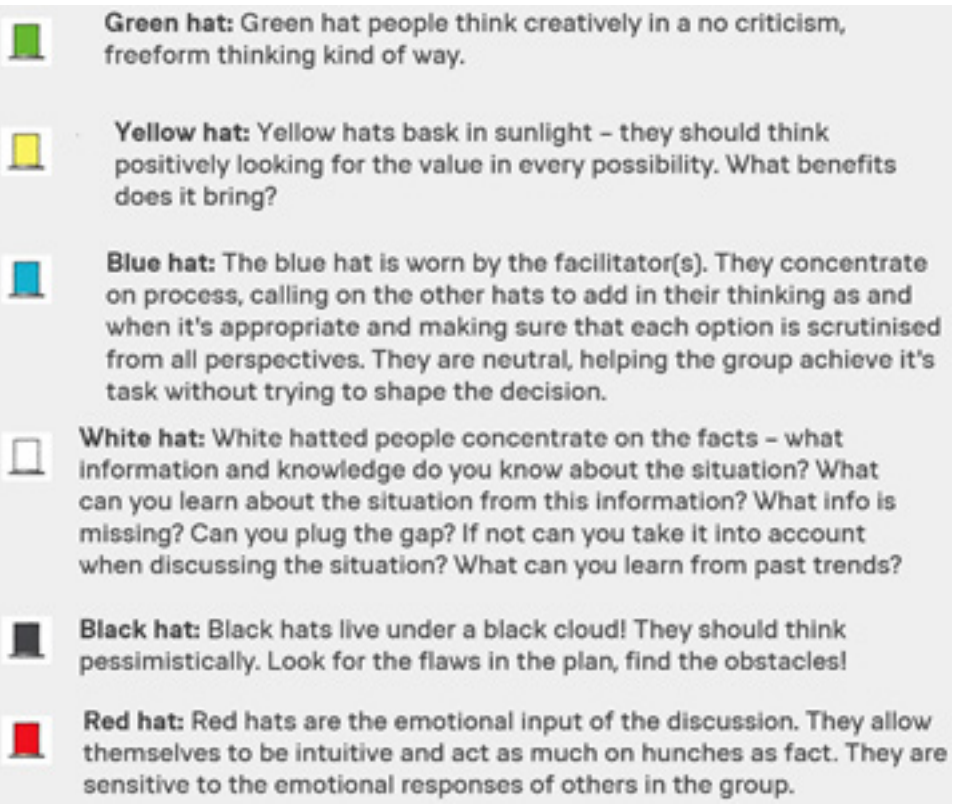


At "convergent" thinking the person is good at bringing material from a variety of sources to bear on a problem, in such a way as to produce the "correct" answer. This kind of thinking is particularly appropriate in science, maths and technology.

Divergent Thinking Styles

At "divergent" thinking the persons skill is in broadly creative elaboration of ideas prompted by a stimulus, and is more suited to artistic pursuits and study in the humanities.

Six thinking hats (check on quality ideas): Each of the Six Thinking Hats represents a different direction or type of thinking, which is identified by a color. The roles the 'hats' bring give you a chance to thoroughly examine every option and to priorities or choose the best one(s).



This tool actively seeks out the optimistic analysis, the pessimistic analysis etc., so every idea is thoroughly tested and when the decision is made, it's made on the basis of a creative and thorough process.

SMART principles:

Set **S**pecific Goals. Research shows that specific goals are the most motivating. A specific goal is to reduce your 5K time by 30 seconds within 6 months. Many people just say they want to get faster. This goal is far too general to really motivate you in your training.

Set **M**easurable Goals. Simply saying that you want to get faster is not enough detail. You need to be able to chart and document progress toward your goal. One way to measure your progress is to document your performance at set intervals. In the above example you may want to time your 5K performance once a month so you have a good measurement.

Set **A**djustable Goals. This means your goals are flexible enough to accommodate unexpected challenges without becoming obsolete. An injury may force you to modify your goal. If you goal is too run a certain marathon and you are injured, you may need to change your goal to do the half marathon, or some other event. An injury doesn't need to mean you abandon all your plans. At the same time, you may find you are progressing quickly and need to raise your goal.
Set Action-Oriented Goals Another important aspect of goal-setting to to keep them focused on personal action. Don't forget to consider not only what you want to achieve, but how you plan to achieve it. Consider reading How to Design a Personal Exercise Program and The Principles of Sports Conditioning for tips on fitness training plans.

Set **R**ealistic Goals. Start where you are, and increase your goals accordingly. If you haven't ever run a 5K it's probably not a wise goal to say you want to run a marathon. While that may be your long-term goal, in the short-term you may want to shoot for the 5K and 10K and half marathon on the way to your marathon goal. This sort of progression is healthy and realistic. Also, keep in mind that as you become more and more fit and near your full potential the room for continued improvement gets smaller. Similarly, if your goals are too simple, you won't feel much satisfaction by attaining them. Only you truly know what is realistic for you.

Set **T**ime-based Goals. Look again at first example: reduce your 5K time by 30 seconds within 6 months. This is specific and time-based. Without a time line there is a tendency to procrastinate or get bored. You may also need to set interim goals with shorter timelines to keep you on track. Consider the previous example of working up to a marathon by completing shorter distances first. each of those because a separate goal with a shorter timeline. In general, goals that stretch out beyond 6 months are too long to keep you interested and motivated. Try to re-evaluate your goals every 2-3 months.
Goal setting is an art as well as a science, but if you make sure your goals follow the S.M.A.R.T. formula, you will find you are more likely to stay motivated and reach goal after goal.

Target group	*Specify the target group of the practice at if possible the level of I4.0/digitization.* It can be used for employees within SME or students involved in the project.
Nature	*Please explain whether the practice is a tool for SMEs to use themselves, a method used by ex. consultants, a program having a broader objective etc.* SME can use tools like brainstorming, scrum etc.
Proposal for modifications/sustainability	*Please describe if there is suggestions of how to make the practice even better, and how the practice can evolve, need orientation, is integrated into the ecosystem/Smart specialization strategy and is supported by the community.* The practice entails a nice set of tools which can aligned to other tools/or combined.
Resources needed	*If applicable - please specify the amount of funding/financial resources used and/or the human resources required to set up and to run the practice.* None.
Further information	Link to where further information on the good practice can be found ▪ Several handouts , hard copy /digital materials provided by VIA University
Contact details	
Name	Poul Væggemose
Organisation	Via University, ICT department, Denmark
Email	pov@via.dk
Status	This tool is not selected, but plays a role in the development of tools in WP 3 and 4.

SAT NAV: Working with a smile: a tool for motivation and employee satisfaction

Title of practice: SAT NAF: Working with a smile: a tool for motivation and employee satisfaction. Issued by Wellness work, partners Chamber of Commerce East-Flaunders (VOKA) and ESF-Ambassadeur	
Detailed description	*Please provide information on the practice itself In particular:* ▪ *What is the problem addressed and the context which triggered the introduction of the practice* ▪ *How does the practice reach its objectives and how is it implemented* ▪ *Specific information for each WP* SAT NAF is a tool for motivation and employee satisfaction. It focuses on creativity, idea generation, motivational factors and how employees can influence. It is a workshop with brainstorming techniques and methods such as ' consensus workshop method' . It focuses on soft skills, motivational factors, creativity, idea generalization and collaboration.
Area of I4.0	*Could be the level of I4.0/digitization the practice is focusing on.* ▪ Idea generalization, creativity and teambuilding
Evidence of success (results achieved)	*Why is this practice considered as good? Please provide factual evidence that demonstrates its success or failure (e.g. measurable outputs/results).* It is an existing training, successful in Flaunders.
Difficulties encountered/ lessons learned	*Please specify any difficulties encountered/lessons learned during the implementation of the practice.* Not known so far. The recommendations from companies are good.
Potential for learning or transfer	*Please explain why you consider this practice (or some aspects of this practice) as being potentially interesting for other regions to learn from. This can be done e.g. through information on key success factors for a transfer or on, factors that can hamper a transfer. Information on transfer(s) that already took place can also be provided.* ▪ The tool is aligned to entrepreneurial scan (The Netherlands), brainstorming techniques (Denmark), covers partly the KODE/KODEX tool (Germany) and can be applied to benefits realization (UK).
Target group	*Specify the target group of the practice at if possible the level of I4.0/digitization.* ▪ ME's.
Nature	*Please explain whether the practice is a tool for SMEs to use themselves, a method used by ex. consultants, a program having a broader objective etc.* ▪ The tool has to be developed/combined with other WP3, 4, or 5 tools and executed by a professional trainer.
Proposal for modifications/sustainability	*Please describe if there is suggestions of how to make the practice even better, and how the practice can evolve, need orientation, is integrated into the ecosystem/Smart specialization strategy and is supported by the community.* See above.

Resources needed	*If applicable - please specify the amount of funding/financial resources used and/ or the human resources required to set up and to run the practice.* ▪ We can use parts of this tool to develop our own tool in the form of a workshop.
Further information	Link to where further information on the good practice can be found ▪ No link. ▪ There is one hard copy of company manual and trainers manual and work sheets in one package.
Contact details	
Name	Els Delaere
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Status	Some parts of this tool are integrated in the new developed tool, the transition workshop.

Plato Roos

Title of practice: Plato Roos	
Detailed description	*Please provide information on the practice itself In particular:* ▪ *What is the problem addressed and the context which triggered the introduction of the practice* ▪ *How does the practice reach its objectives and how is it implemented.* ▪ *Specific information for each WP* This instrument is used since 2 years within Voka to scan and benchmark enterprises in different fields. These groups of enterprises are considered as "Plato Learning Networks". The Plato Methodology is recognised by the Flemish Government as "best practice". CEO's of SMEs meet monthly during 1 year, guided by mentors coming from Corporate Companies, such as Volvo, Honda, Callebaut... They set their own agenda regarding the topics they want to learn more about. The mentors look for a mix of theoretical and practical presentations. The main aim is stimulating knowledge exchange between the companies,who can benefit from the academic input as well as personal testimonies from fellow participants. We start with an "as is" measurement, in which the CEO has to complete a set of questions on different aspects of 1 theme. In our case : where is my company situated in the upskilling of the personnel towards the transition into Industrie 4.0." It consists of 10 subsections with each maximum 10 questions, after which the CEO can view the results displayed in the Roos (rose or spiderweb). Subsequently, after a series of workshops, the situation at the end of the training is measured again. The CEO completes the same questions and can see on the initial Roos a new line which shows the progress he/she/the organisation has made. An example is attached with this good tool template.
Resources needed	Very little, the instrument is an Excel file with MACRO elements. When the company is trained in the framework of GrowIn, they need no further financial investment, except providing the time for their employees/managers to be trained.
Evidence of success (results achieved)	Voka runs 15 Plato groups per year, all using this tool. The Flemish Government has selected this tool as best practice and introduced it to every training organisation dealing with management and grow.
Difficulties encountered/ lessons learned	If you want to have the maximum impact, you need to foresee training between the "as is" and "end" situation, otherwise the company has only a full report of the present situation, and can't compare its progress after being accompanied towards Industry 4.0

Potential for learning or transfer	It can be transferred very easily. Themes of training and subcategories can be defined in every region, and questions can be collected in every language.
Further information	*Link to where further information on the good practice can be found.* ▪ No link. ▪ There is one hard copy of company manual and trainers manual and work sheets in one package.
Contact details	
Name	Els Delaere
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Status	Platos Ross has not been selected for testing.

Big Data Game

1. General information		
Title of the tool	Big Data Game	
Main institution involved	Hanze UAs, developed by TNO	
Location of the practice	Country	Netherlands
	NUTS 1	Drop-down list
	NUTS 2	Drop-down list
	NUTS 3	Drop-down list

2. Detailed description	
Detailed information on the tool	*Please provide information on the tool itself. In particular:* ▪ Short description of the tool Data driven innovations have lots of opportunities in the Smart Industry. New Services and Products rely for a very large part on the acquisition, storage and analysis of data. Despite the opportunities only a few companies know where to start. ▪ Function of the tool and which competencies are measured The Big Data Game focusses on the following questions: *Can the DDI be implemented by one organization, or is collaboration needed? With whom?* *What is more important, having the data, having the algorithm, having the market?* *What assets need to be developed, and in which order?* *How can I exploit important assets, like a unique dataset?* The objective of the Big Data Game is to give players insight in the data driven innovations through the experience of a game.
Resources needed	A trainer The board Game  A room Players
Timescale (start/end date)	About 3 – 4 hours
Evidence of success (results achieved)	The Big Data Game has been practiced by several Dutch companies in sessions of the Chambre of Commerce. The Big Data Game was developed in a professional and scientific way bij TNO.

Difficulties encountered/ lessons learned	
Potential for learning or transfer	The big Data Game has opportunities to think with different companies in an open setting to experience innovations of one Industry 4.0 technology (Big Data) and discusses the way companies can use this in their own companies for innovation.
Further information	http://bigdatagame.eu/wp/index.php/gamesession/
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Status	Big Data Game has been selected for testing.

Transition workshop

Transition Workshop	
Detailed description	*Please provide information on the practice itself In particular:* ▪ *What is the problem addressed and the context which triggered the introduction of the practice* ▪ *How does the practice reach its objectives and how is it implemented* ▪ *Specific information for each WP* The Future Literacy (FL) method started in 2013 and was developed by Riel Miller, Unesco. The FL aims to enhance a different way of thinking at the present, stimulates new ways how to look at the future and how to use the future. FL supports in dealing with assumptions such as 'change', helps to deal with uncertainty and fear. By stimulating people's imagination about how the future looks like and how to anticipate on the future, FL creates a different mindset, triggers anticipatory behaviour and reframes people's minds that for instancy uncertainty is a ' resource' to use for the future, it shifts origins of fear and projects hope towards the future. FL supports in giving people confidence for the future by offering practical tools/ cues how to anticipate for the unknown. Currently FL works with more than 30 partners worldwide. The Hanze University is a partner of FL Unesco and has offered workshops, one till five days training on FL for master programmes and clients. Application in the project: FL deals with the motivational factors among employees to acquire new knowledge/skills, helps to see the bigger I4.0 picture and not to be afraid for the unknown I4.0 future.
Area of I4.0	*Could be the level of I4.0/digitization the practice is focusing on.* ▪ A new way of thinking, triggering creativity, imagination and creating a new frame how to see/use the future by giving practical tools for anticipatory behaviour
Evidence of success (results achieved)	*Why is this practice considered as good? Please provide factual evidence that demonstrates its success or failure (e.g. measurable outputs/results)?* ▪ Started from 2013, was aligned to the Millennium Development goals, more than 30 partners, still growing the partner network world wide. ▪ Very successful practices FL in the Hanze University.
Difficulties encountered/ lessons learned	*Please specify any difficulties encountered/lessons learned during the implementation of the practice.* None.
Potential for learning or transfer	*Please explain why you consider this practice (or some aspects of this practice) as being potentially interesting for other regions to learn from. This can be done e.g. through information on key success factors for a transfer or on, factors that can hamper a transfer. Information on transfer(s) that already took place can also be provided.* ▪ FL gives a hands on method how to deal with uncertainty / fear, triggers creativity and helps to reframe the future.

	▪ FL is a ' prerequisite' before starting a training on I4.0 strategy development/ IT specific trainings etc., because it starts with a new mindset how to see the future I4.0.
Target group	*Specify the target group of the practice at if possible the level of I4.0/digitization.* ▪ Employees, management sme.
Nature	*Please explain whether the practice is a tool for SMEs to use themselves, a method used by ex. consultants, a program having a broader objective etc.* ▪ The FL method has to be applied by a trainer/consultant.
Proposal for modifications/sustainability	*Please describe if there is suggestions of how to make the practice even better, and how the practice can evolve, need orientation, is integrated into the ecosystem/Smart specialization strategy and is supported by the community.* Thinking of the future is relevant for sme in industry 4.0. Therefore the following Futures Literacy phases are relevant and applied to our target group: ▪ A way of looking at the future: hopes/predictions (phase 1), testing assumptions (phase 2), new questions (phase 3).
Resources needed	*If applicable - please specify the amount of funding/financial resources used and/ or the human resources required to set up and to run the practice.* ▪ When we include master students to develop FL in combination with other WP5 trainings tools, then no financial resources are needed.
Further information	Link to where further information on the good practice can be found: https://www.hanze.nl/nld/onderzoek/overzichten/FutureLiteracyKnowLabs https://en.unesco.org/events/transforming-future-presentation-unesco-s-work-futures-literacy-member-states (watch the video: transforming the future: anticipation in the 21st Century) https://www.hanze.nl/nld/onderzoek/overzichten/FutureLiteracyKnowLabs
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Status	The Transition Workshop has been selected for testing.

Who is involved?

Anglia Ruskin University

ALLIANZ FÜR DIE REGION

midt Central Denmark Region

OMC

Ostfalia Hochschule für angewandte Wissenschaften

SNN

SPK

FLANDERS MAKE

VIA University College

Hanzehogeschool Groningen University of Applied Sciences

TWI

VÆKSTHUS MIDTJYLLAND

Kamer van Koophandel Oost-Vlaanderen

Interreg North Sea Region GrowIn 4.0

European Regional Development Fund

EUROPEAN UNION

More information: https://northsearegion.eu/growin4/