TECH GROW
VET training on technological watch

Guide for VET centres

Recommendations for a VET course on technological watch for SMEs

Co-funded by the European Union

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Abbreviations and Acronyms

ACT	Activity
CETEM	Centro Tecnológico del Mueble y la Madera de la Región de Murcia
CLUTEX	Klastr Technicke Textilie
CTCP	Centro Tecnológico de Calçado de Portugal
CI	Competitive Intelligence
CWF	Critical Watch Factor
EC	European Commission
ECVET	European Credit Transfer for Vocational Education Training
EQAVET	European Quality Assurance for Vocational Education Training
EQF	European Qualification Framework
EU	European Union
FEDIT	Federación Española de Centros Tecnológicos
KSC	Knowledge Skills Competences
LO	Learning Outcomes
OER	Open Educational Resources
R&D	Research & Development
SME	Small & Medium Enterprises
SWOT	Strengths, Weaknesses, Opportunities, Threats
TW	Technology Watch
VET	Vocational Education and Training

Content

Introduction

Why this Guide

In the current rapidly evolving scenario, technological watch is a key element in ensuring the competitiveness and success of companies and research organisations. It is a strategic tool that allows organisations to monitor the latest technological advances, market trends and innovations, enabling informed and agile decision-making. For small and medium-sized companies in the traditional manufacturing industry, such as the footwear, textile and furniture sectors, implementing an effective technological watch system is essential to remain competitive and innovative in a constantly evolving market.

With the aim of conveying and sharing knowledge and practices and training companies and their employees and other research organisations to face this reality, the project partners invited representatives of each one of their own clusters to participate in several workshops on technology watch, an initiative integrated within the scope of the TECHGROW project https://www.techgrow-project.eu/ aiming at disseminating the project innovative tools allowing the participants to access to up-to-date information, as well as learn how to implement effective technological watch processes in companies and other organisations within their own cluster.

Based on the TECHGROW experience and the mentioned workshops conclusions, the consortium worked out in a guide with recommendations for any VET provider that want to use the developed materials and/or implement a training course on Competitive Intelligence / Technology Watch, customized to their own reality. In addition, the guide provides customize recommendations to

implement and mainstream the training material in different sector which have as common point, the traditional character.

This activity is connected to the project Activity 2 which dealt with the development of training paths and training material on Technology Watch applied to traditional clusters, and the virtual TW information platforms., which CETEM, CTCP and CLUTEX customized or the 3 correspondent clusters – Furniture, Footwear and Textile - and aims at preparing guidelines to support the design of future training paths and adaptation of the training materials for other manufacturing sectors besides those the TECHGROW project targeted to., using the knowhow and results from the workshops.

It is generally proved within project activities that the basic concepts related to Competitive Intelligence and Technology Watch are totally applied to other manufacturing sectors. At this point, this statement is supported by the validation of training paths developed, which was tested and validated by the stakeholders during the workshops.

The objective of this Guide is to diverge from the actual developed training paths and training material prepared to furniture, textile and footwear clusters, to other industries and clusters. Therefore, let us find out how it can be issued and, more important, how new training paths may be designed taking TECHGROW outcomes as a common ground.

CI & TW Framework

The European Commission takes a proactive role in leveraging technology watch and competitive intelligence as key tools to promote economic development and ensure the competitiveness of industries within the European Union.

The European Commission views technology watch and competitive intelligence as integral to shaping an innovative, sustainable, and competitive economy. By closely monitoring technological advancements and market trends, the EC aligns its policy initiatives to strengthen industries, drive economic development, and maintain global leadership in key sectors. This strategic approach is underpinned by robust legislative frameworks, funding programs, and cross-border cooperation. It adopts a strategic perspective on technology watch and competitive intelligence to support the competitiveness of European industries and drive sustainable economic growth. Technology watch refers to the systematic monitoring and analysis of emerging technologies, R&D trends, and global innovation activities. By leveraging this approach, the Commission identifies opportunities and risks associated with technological advancements, enabling European industries to stay ahead of global competition. This practice is not merely about observing trends but involves actively shaping research and innovation priorities to align with broader EU goals, such as sustainability, digital transformation, and industrial resilience.

Similarly, competitive intelligence, which entails gathering and analysing data on market trends, competitors, and economic conditions, plays a vital role in informing strategic policy decisions. The European Commission uses competitive intelligence to support the Single Market's dynamism, ensure fair competition, and equip European businesses with the insights necessary to navigate rapidly changing global landscapes. This approach allows industries to capitalize on market opportunities, adapt to external challenges, and foster long-term competitiveness.

Together, technology watch and competitive intelligence form the backbone of the Commission's efforts to future-proof European industries. They are integral to achieving objectives such as promoting innovation, driving economic resilience,

and ensuring that European companies remain at the forefront of technological and market developments. These strategies are particularly significant in the context of global shifts, including the green and digital transitions, where the early identification of emerging technologies and market dynamics can provide a decisive competitive edge for European industries.

By embedding these tools into its broader policy framework, the European Commission fosters a culture of innovation, anticipates technological disruptions, and ensures that the EU remains a leader in the global economy. These efforts are crucial for aligning industrial growth with sustainable practices and preparing European industries for future challenges and opportunities.

The European Commission views technology watch and competitive intelligence as critical drivers of industrial growth and broader economic development within the European Union. These strategic tools enable industries to anticipate technological trends, adapt to market dynamics, and respond effectively to emerging global challenges. By systematically monitoring advancements in areas such as artificial intelligence, renewable energy, biotechnology, and advanced manufacturing, technology watch ensures that European industries remain at the forefront of innovation. This proactive approach encourages the adoption of transformative technologies, thereby boosting productivity, fostering resilience, and enhancing global competitiveness across various sectors.

In particular, technology watch plays a pivotal role in supporting the digital transformation of industries. By identifying and promoting cutting-edge technologies such as 5G, blockchain, and the Internet of Things, the European Commission facilitates the modernization of traditional industries and the development of new high-tech sectors. This technological evolution is essential for maintaining the EU's competitive edge in a rapidly changing global economy. Moreover, the focus on sustainable technologies, aligned with the goals of the European Green Deal, ensures that industrial development is environmentally responsible, contributing to the EU's commitment to climate neutrality by 2050.

Competitive intelligence complements technology watch by equipping industries with the insights needed to navigate complex market conditions and seize emerging opportunities. This includes understanding shifts in consumer demand, assessing the competitive landscape, and identifying potential disruptions in

global supply chains. Such intelligence is particularly crucial for small and medium-sized enterprises (SMEs), which often lack the resources to conduct extensive market analysis independently. By providing SMEs with actionable information, competitive intelligence supports their integration into global value chains, fostering growth and innovation at all levels of the economy.

The combined impact of technology watch and competitive intelligence extends beyond individual industries to the broader economic landscape. These tools drive innovation, which is a key engine of economic growth, creating high-value jobs and enhancing the EU's overall productivity. They also strengthen economic resilience by enabling industries to adapt to external shocks, such as geopolitical tensions or technological disruptions. In doing so, they contribute to a more dynamic, robust, and sustainable European economy, ensuring long-term prosperity and global leadership in critical sectors. Through these strategic initiatives, the European Commission aligns industrial and economic policies with its overarching vision for a competitive, inclusive, and environmentally sustainable Europe.

The EU's legal framework is designed to support technology watch through a multifaceted approach. By promoting digital transformation, fostering research and innovation, advancing sustainability, and ensuring data governance and security, the European Union creates a conducive environment for monitoring and leveraging emerging technologies. This legislative ecosystem ensures that European industries remain competitive, resilient, and aligned with global technological trends.

The 3 clusters in TECHGROW project: Furniture, Footwear, Textile

Technology watch and competitive intelligence play pivotal roles in revitalizing and sustaining the competitiveness of traditional industries such as furniture, footwear, and textile clusters, which are deeply rooted in Europe's cultural and economic heritage. These industries, characterized by artisanal craftsmanship and historical significance, have long formed the backbone of many regional economies. However, their traditional nature also poses challenges, as global competition, shifting consumer preferences, and the rapid pace of technological change demand constant innovation and adaptability. Through technology watch,

these clusters gain the ability to monitor advancements in materials science, production techniques, and design trends, enabling them to integrate modern technologies while preserving their traditional essence.

In the **furniture** industry, for instance, technology watch allows manufacturers to identify innovations in sustainable materials, such as bioplastics or reclaimed wood, and integrate smart functionalities, like IoT-enabled furniture, to meet

contemporary consumer demands. Similarly, competitive intelligence provides insights into emerging markets, consumer preferences for eco-friendly products, and competitors' strategies, helping furniture makers refine their offerings and strengthen their market position. By combining these tools, furniture clusters can evolve from purely traditional production to a hybrid model that values both heritage and innovation.

The **footwear** industry, another sector with strong traditional foundations, benefits immensely from technology watch by adopting advanced manufacturing techniques, such as 3D printing and automation, which enhance precision and reduce costs. Monitoring developments in wearable technology also allows footwear clusters to incorporate health-monitoring features or energy-storing soles, transforming shoes from everyday items into technologically advanced products. Competitive intelligence further supports this transformation by identifying global trends, such as the growing demand for sustainable and vegan

footwear and guiding clusters to align their production processes and marketing strategies accordingly.

Textile clusters, often emblematic of regional identities, face similar pressures but also immense opportunities through technology watch and competitive intelligence. Advances in smart textiles, nanotechnology, and biodegradable fabrics can revolutionize traditional production, enabling textile clusters to produce innovative, high-value products like temperature-regulating fabrics or garments with embedded sensors. Meanwhile, competitive intelligence aids these clusters in navigating volatile markets, assessing the impact of fast fashion, and positioning themselves as leaders in sustainable and ethical clothing. By leveraging these tools, textile clusters can maintain their historical significance while adapting to the demands of modern global markets.

The synergy between technology watch and competitive intelligence fosters a dual approach for these traditional industries: safeguarding their cultural and artisanal roots while embracing innovation to remain relevant. This dynamic interplay ensures that furniture, footwear, and textile clusters not only survive but thrive in an era defined by technological transformation and global interconnectedness. It allows them to leverage their traditional strengths as a foundation for modern competitiveness, ensuring their continued contribution to Europe's economic and cultural landscape.

Beyond the TECHGROW clusters:

The strategic application of technology watch and competitive intelligence extends beyond furniture, footwear, and textile clusters to a broad range of other traditional sectors that hold cultural and economic significance. These sectors, including ceramics, glassmaking, wine production, leather goods, and even regional food specialties, share a common challenge: preserving their heritage while adapting to the demands of a rapidly evolving global market. By leveraging technology watch, these industries can identify and integrate cutting-edge innovations that enhance quality, efficiency, and sustainability, ensuring their long-term viability and relevance.

In ceramics and glassmaking, industries renowned for their artistry and historical roots, technology watch opens doors to advancements in materials science and production processes. For instance, breakthroughs in energy-efficient kilns, eco-friendly glazing techniques, and additive manufacturing (such as 3D printing with ceramics or glass) can help these sectors reduce costs and environmental impact while maintaining their aesthetic and functional integrity. Competitive intelligence complements this by providing insights into global design trends and consumer preferences, enabling these sectors to balance tradition with contemporary appeal.

Wine production, deeply intertwined with regional identities and centuries-old techniques, is another sector ripe for the benefits of technology watch. Precision viticulture, driven by advancements in drone technology, satellite imagery, and IoT sensors, allows winemakers to monitor soil health, weather patterns, and grape maturation with unprecedented accuracy. Meanwhile, competitive intelligence aids in understanding shifting consumer tastes, such as the growing demand for organic and biodynamic wines and navigating challenges like climate change's impact on traditional grape varieties. By adopting such tools, winemakers can enhance both the quality of their products and their market positioning.

Leather goods, a sector famed for its craftsmanship and luxury appeal, also benefits from the integration of innovative practices identified through technology watch. Sustainable tanning methods, alternative materials like lab-grown leather, and automation in cutting and stitching processes present opportunities to modernize production while retaining the artisanal nature of the industry. Competitive intelligence helps leather clusters identify emerging global markets and consumer expectations, such as increasing interest in ethical sourcing and sustainability, allowing them to adapt and thrive.

Traditional food production, spanning regional specialties like cheese, olive oil, and cured meats, is particularly sensitive to the insights provided by technology watch and competitive intelligence. Advances in food safety, packaging technology, and supply chain management can enhance quality and shelf life, while automation and robotics streamline production without compromising authenticity. Competitive intelligence informs producers about global demand patterns, trade regulations, and competitor strategies, helping them position their products effectively in international markets.

In the cork industry, technology watch helps manufacturers identify advancements in harvesting techniques, material processing, and applications beyond traditional bottle stoppers. For example, monitoring innovations in composite materials and sustainable production methods enables cork producers to diversify into new markets, such as construction, fashion, and green technologies. Competitive intelligence further supports this by analysing market trends, such as the increasing demand for eco-friendly and renewable materials, and by providing insights into the strategies of competitors and substitutes like

synthetic alternatives. These tools help cork clusters enhance efficiency, reduce waste, and strengthen their position as leaders in sustainable materials.

In the **stone crafts sector**, technology watch enables artisans and manufacturers to adopt modern tools and techniques, such as laser cutting, digital sculpting, and robotic carving. These innovations improve precision and productivity while allowing the preservation of intricate designs and traditional aesthetics. Competitive intelligence provides critical insights into architectural and design trends, global demand for bespoke stone products, and emerging markets where high-quality stonework is valued. By aligning their offerings with these insights, stone craft clusters can expand their reach, enhance their value proposition, and maintain relevance in an increasingly mechanized world.

For the **moulds** industry, which often serves as a backbone for advanced manufacturing sectors like automotive, aerospace, and packaging, technology watch is crucial for staying ahead in a highly technical and competitive market. Monitoring advancements in materials (e.g., lightweight alloys, polymers) and manufacturing

technologies (e.g., 3D printing, CNC machining) allows mould-makers to improve their processes and meet the evolving needs of their clients. Competitive intelligence complements this by tracking global supply chain dynamics, emerging markets for customized moulds, and shifts in client industries. These insights empower mould clusters to

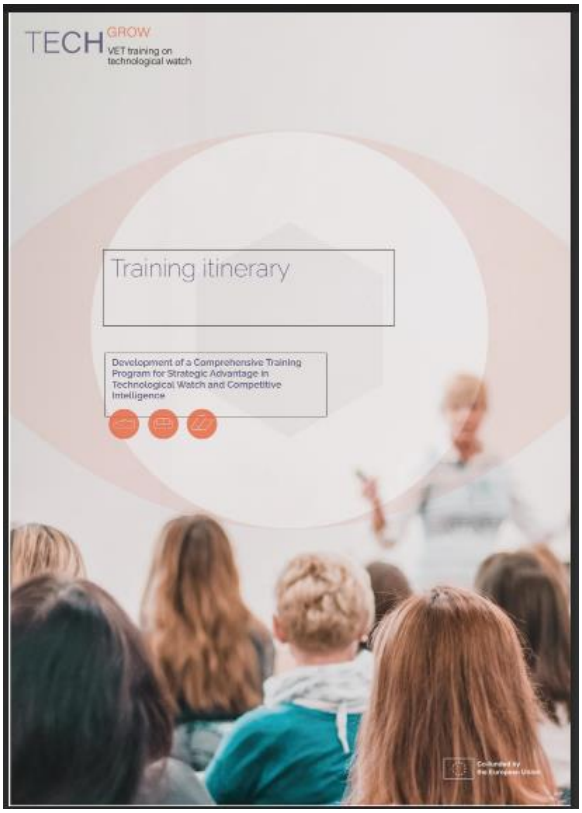
remain indispensable partners in high-tech production ecosystems while exploring new opportunities for growth.

Even sectors like traditional boatbuilding, papermaking, and heritage crafts such as weaving or woodworking are influenced by these tools. Technology watch allows these industries to incorporate advanced tools and materials, such as lightweight composites or computer-aided design, into their processes, ensuring precision and sustainability. At the same time, competitive intelligence enables them to market their products as unique, high-value offerings that cater to niche markets, emphasizing their cultural and artisanal significance.

In all these sectors, technology watch and competitive intelligence act as transformative forces, guiding traditional industries through the complexities of modernization. These tools allow such industries to honour their historical legacies while embracing innovation, ensuring that they remain vital contributors to regional economies and cultural landscapes. By adopting a forward-looking approach, these sectors can adapt to modern challenges and opportunities, achieving a sustainable balance between tradition and progress.

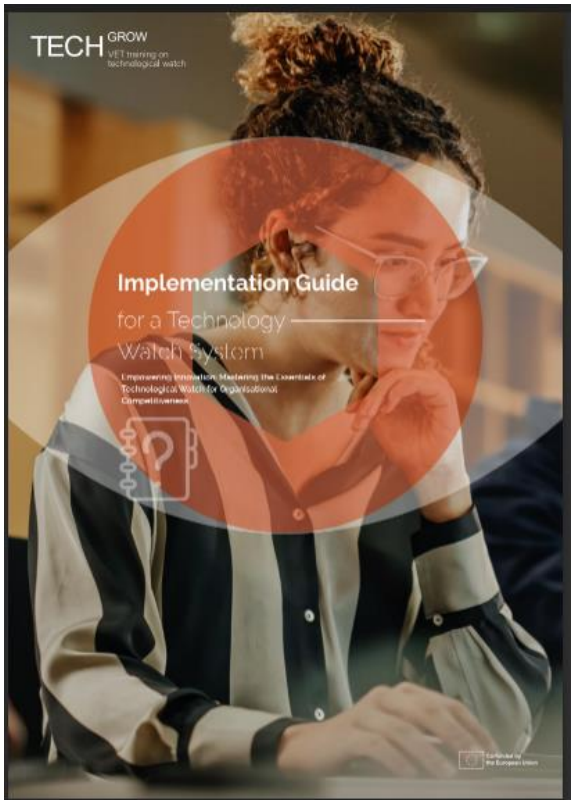
Training materials and technology watch tools

Within the Activity 2 - Training resources and systematic technology watch process development - the project consortium developed innovative training materials and digital tools to increase the knowledge on technology watch and facilitate the implementation of systematic practices. Training materials with a similar graphic design, and licensed under OER, such as creative commons, to ensure free and open access to all materials for a wider project impact., includes 4 learning topics:



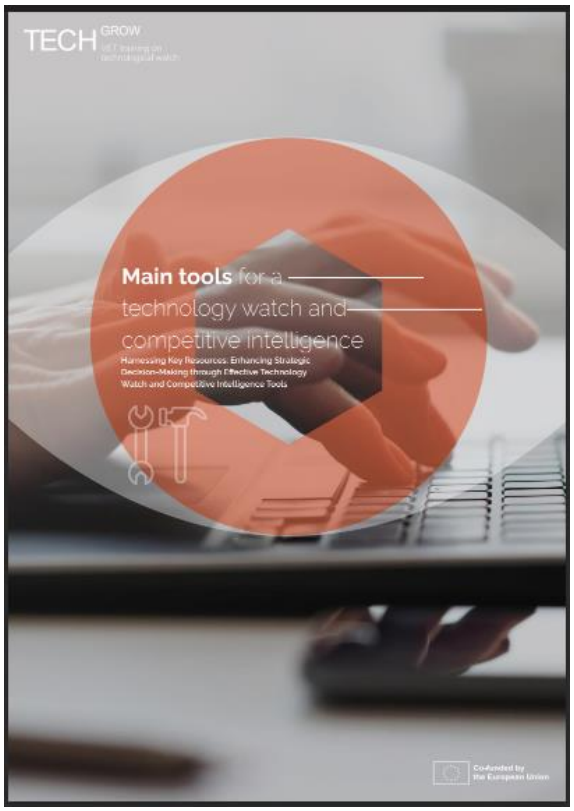
It was drafted a training itinerary for the topic CI/TW that allows current and future workers and managers to learn on how to establish systematic processes in their companies, supported by the developed digital tools. The training itinerary aims at enhancing participants' proficiency in Technological Watch and Competitive Intelligence.

The overarching objective of these modules is to empower participants to leverage technological watch and competitive intelligence effectively within their respective organizations. By immersing learners in a structured learning journey, we aim to foster a culture of innovation, strategic decision-making, and competitive advantage. By the end of the training initiative, learners will possess the necessary knowledge, skills, and competences to drive innovation, competitiveness, and strategic growth within their organizations.

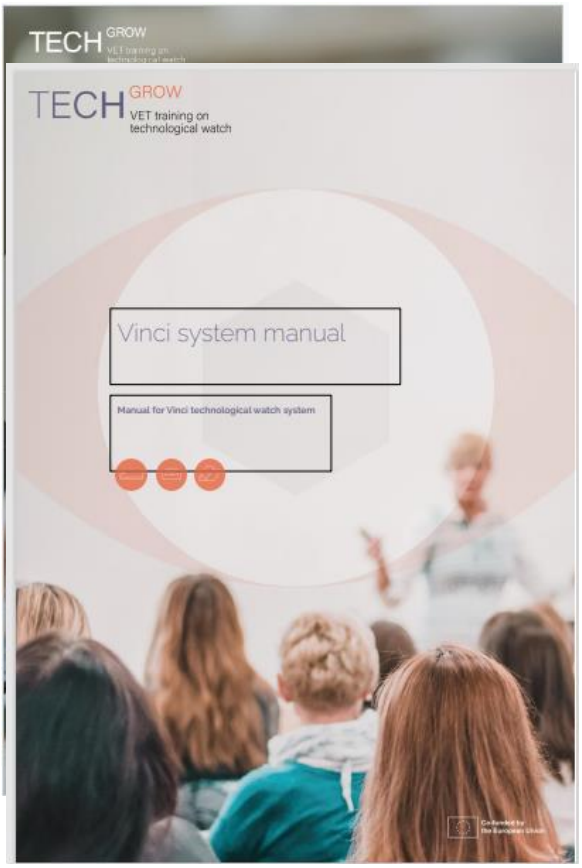


The program comprises **three distinct modules** designed to equip learners with comprehensive knowledge, essential skills, and valuable competences essential for navigating today's rapidly evolving business landscape.

- Module 1, "**Guide for the Implementation of a Technological Watch System**," learners will gain foundational knowledge on establishing and maintaining an effective technological watch system. This module will cover critical aspects such as the importance of technological watch, processes involved, and the roles and responsibilities within the system.



- Module 2, "**Main Tools for Technological Watch and Competitive Intelligence**," focuses on exploring the essential tools and resources available for gathering, analysing, and interpreting valuable information. Learners will learn to leverage a variety of tools, including alert systems, databases, and specialized software, to enhance their organization's decision-making processes.



- Module 3, "Best Practices in Three Manufacturing Sectors: Footwear, Textile, Furniture," will delve into industry-specific best practices aligned with critical technological watch factors. Learners will gain insights into implementing these best practices tailored to the footwear, textile, and furniture manufacturing sectors, fostering competitiveness and innovation.

In addition, a virtual TW information platform, has been customized for these 3 clusters. Vinci Technology Watch Platform is a software tool for the comprehensive and systematic management of technology watch practices. VINCI can help you make strategic decisions and generate innovative ideas.

VINCI software is comprised by two key elements that should be correctly differentiated:

- BACK - Tool for internal use. This tool will show the retrieval information, according to our defined Critical Watch Factors, key words and sources of information. It is used to classify the retrieval information, as valid or not, for your organisation or for companies.
- FRONT - Platform for external use. In this platform any user, after being registered, will be able to visualize that valid information selected by us, and filter it according to the different critical watch factors.

These critical watch factors - external elements critically influencing an organization's competitiveness, acting as focal points in a technology watch

system - definitely are the central variables that can be set up to succeed in the platform customization regarding the different sectors.

The main objective of CWF is to guide and document R&D activities of an organization by identifying and collecting any related information. Thus, they serve as the primary guide, enabling the identification of relevant information by providing appropriate keywords, search formulas, and sources of information. They are also variable and evolve over time, adapting to new tendencies and challenges in the business environment. Without defining them, generating reports that support the organization's decision-making will be impossible. More information in the Methodological guide to define a Technology Watch System based in a personalised information audit, developed in the project Activity 1 - Technology watch system definition for manufacturing industry sectors, and available in the project website.

Training workshops' experience

Methodology

Three training workshops, one per sector and country involved, were promoted aiming at disseminating put in practice the developed materials and digital tools along the project. The workshops were then hold by

- CETEM (furniture companies, Spain),
- CTCP (footwear, Portugal)
- CLUTEX (textile, Czech Republic),

These workshops were also moments of teaching/learning on how to use the developed materials and take the most advantages of them, test the digital tools, and gather the feedback of learners and trainers.

In Czechia two separate workshops were promoted by CLUTEX, organized as a one-day event in Prag and Brno with defined agenda, structured in 3 parts – theory, practical demonstration, final discussion. One of the workshops aimed at using the VINCI platform from the point of view of cluster (but with experience from company) and the second group were people who probably could use the program for their work directly.

In Spain, CETEM organised the workshop to show project results and get target groups feedback, articulating two different components: one as a current training course on industrial design for furniture that was ongoing in its facilities targeted to a variety of different profiles of attendants, among designers, workers, and managers; and another one as company visits aiming at promoting the new

service of Technology Watch through TECHGROW platform, In this part several companies were visited and personally presented the advantages of using the platform for their daily activity, mainly to launch and develop new projects.

In Portugal, the workshop took place in a presential format in CTCP facilities integrating presentations on the project objectives and outcomes and technology watch processes and methodologies in general, a presentations and discussion on the application of the technology watch practices in different contexts and a presentation of the TECHGROW platform and a practical component where the audience had the opportunity to have a first experience on the platform functionalities.

At the end of the events, a questionnaire was distributed to collect feedback from all participants. The conclusions drawn from these questionnaires were compiled and analyse, to identify additional improvements in the TECHGROW project results and draft VET recommendations.

Feedback

To organise and classify the rich feed-back collected from the workshops on the training material and the TECHGROW platform, a SWOT analysis was used as below.

Conducting a SWOT analysis helps to comprehensively evaluate the strengths, weaknesses, opportunities, and threats associated with implementing training materials and TECHGROW platform on technology watch and competitive intelligence in the 3 traditional sectors in analysis. These tools provide a framework for understanding the potential benefits and challenges of leveraging innovation in industries deeply rooted in heritage and artisanal practices, far beyond the 3 clusters in analysis: Furniture, Footwear and Textile.

The TECHGROW platform and training materials aim to equip traditional sectors with the knowledge and tools necessary to effectively implement technology watch and competitive intelligence. These resources are critical in bridging the gap between traditional practices and modern innovation, ensuring that industries with historical and cultural significance remain competitive in a dynamic global market. Below is a SWOT analysis that evaluates the usage and utility of the TECHGROW training materials.

The feed-back collected from the workshops in the 3 countries was organize into the 4 quadrants of the SWOT matrix:

<table>
<tr><th colspan="2">Czechia</th></tr>
<tr><th>Strengths</th><th>Weaknesses</th></tr>
<tr><td>▪ High overall satisfaction with the meeting's organization, speaker, and agenda.
▪ Project results are perceived as a good service for cluster members.
▪ Positive feedback indicates alignment with participant expectations.</td><td>▪ Limited applicability of project outputs to all participants due to diverse roles.
▪ Lack of hands-on practice with the program hinders immediate usability.</td></tr>
<tr><th>Opportunities</th><th>Threats</th></tr>
<tr><td>▪ Potential to enhance training and increase awareness of the Vinci program and related results.
▪ Opportunity to integrate new positions in clusters to effectively utilize project outputs.
▪ Further suggestions from participants (e.g., additional sources for searching) can guide improvement and expansion.</td><td>▪ Some participants' roles do not currently align with using the program's tools, which may impact overall adoption.</td></tr>
</table>

Spain	
Strengths	**Weaknesses**
▪ Clarity on Technology Watch Concepts: Clear explanation of technology watch processes benefits participants, improving company competitiveness. ▪ Usefulness of TECHGROW Platforms: Real-time sector-specific information (e.g., furniture, footwear, textiles) is practical for businesses. ▪ Personalised Interaction During Company Visits: Hands-on demonstrations and direct interaction during visits help companies see how tools integrate into operations. ▪ Support for Ongoing Training: Content ties into career development for students and workers, adding value to professional growth.	▪ Need for Greater Adaptation to Specific Business Needs: Tools may not fully address the unique challenges of all businesses. ▪ Limited Time for Full Platform Integration: Companies require more time or support to integrate platforms into their workflows. ▪ Need for Extended Workshop Duration: One-hour workshops may not provide sufficient time to cover all details effectively.
Opportunities	**Threats**
▪ Desire for Additional Resources: Providing detailed case studies or examples of successful technology watch applications can enhance understanding and adoption. ▪ Potential for Tailored Customisation: Customising platforms to specific business challenges could broaden appeal and effectiveness. ▪ Expanding Training and Support: Offering extended workshops or follow-up sessions can address time constraints and deepen knowledge.	▪ Challenge Reaching All Companies: Traditional or resource-limited companies may struggle to adopt practices without additional support. ▪ Complex Integration Process: Systematic implementation may be too complex or resource-intensive for some businesses.

Portugal	
Strengths	**Weaknesses**
▪ Engaging Speakers and Useful Subject Matter: Participants found the speakers excellent and the subject highly useful. ▪ Opened Perspectives for New Projects: The workshop sparked ideas for future initiatives and collaborations. ▪ Positive Audience Feedback: Overall feedback was highly encouraging, supporting continued dissemination and tool support. ▪ Integration into CTCP Services: Project resources will become part of CTCP's ongoing support for the Portuguese Footwear Cluster, ensuring long-term impact.	▪ Insufficient Workshop Duration: The time allocated was inadequate to cover all the intended content effectively. ▪ Limited Practical Application During Workshop: Participants expressed a need for more opportunities to practice using the tools to improve their understanding and confidence.
Opportunities	**Threats**
▪ Ongoing Dissemination and Support: Continued promotion and support for project outcomes can extend the project's benefits beyond its official timeline. ▪ Potential for Improved Training: Future workshops could include extended durations and hands-on sessions to enhance practical learning. ▪ Building Reliability and Trust in Tools: Encouraging participants to practice using the tools can increase their confidence in the platform's reliability.	▪ Reliance on Post-Workshop Practice: The need for participants to practice independently may delay tool adoption or reduce immediate impact. ▪ Potential Gaps in Implementation: Without sufficient workshop time or follow-up sessions, some participants may struggle to effectively apply the tools.

In general, and with a focus on the recommendations for the VET operators, the global SWOT matrix will become like the following:

Strengths:

The TECHGROW training materials and platform provide a structured and accessible approach to understanding and implementing technology watch and competitive intelligence. Designed with the specific needs of traditional sectors in mind, these resources cater to SMEs that may lack prior expertise in these areas. The platform likely includes user-friendly interfaces, real-world case studies, and sector-specific examples, making the content relatable and practical. TECHGROW fosters skill development in areas that enable businesses to adapt and innovate effectively. The training materials also support collaboration and networking by introducing shared tools and practices that encourage cross-industry learning and partnerships, creating a broader ecosystem of innovation.

Weaknesses:

TECHGROW training materials may face challenges in adoption and implementation. Resistance to change is a common issue in traditional sectors, where producers may view technology watch and competitive intelligence as overly complex or misaligned with artisanal values. Limited digital literacy and lack of prior exposure to structured training programs could hinder the effective use of the platform, particularly in smaller businesses. Additionally, the materials might require ongoing updates to remain relevant in the face of rapidly evolving technologies and market dynamics. Finally, resource constraints, such as time and financial investment required for training, could limit engagement from stakeholders in these sectors.

Opportunities:

The TECHGROW platform and materials are positioned to capitalize on several significant opportunities. As traditional sectors increasingly recognize the need for modernization, there is growing demand for targeted training solutions that respect their heritage while promoting innovation. The platform can expand its reach by offering localized content, translations, and sector-specific customizations, ensuring relevance across diverse regions and industries. Furthermore, the platform could explore additional offerings, such as certification programs, advanced modules, and consultancy services, to deepen engagement and add value for users. that encourage cross-industry learning and partnerships, creating a broader ecosystem of innovation.

Threats:

The TECHGROW platform faces external threats that could undermine its utility and adoption. Competing training providers or platforms may emerge, offering similar resources with enhanced features or lower costs. The rapid pace of technological change also poses a challenge, as businesses may struggle to implement insights from the training materials before they become outdated. Additionally, economic uncertainties or external shocks, such as global recessions or supply chain disruptions, may divert attention and resources away from training initiatives, making it harder for TECHGROW to sustain engagement. Finally, skepticism about the relevance or applicability of technology watch and competitive intelligence in preserving the authenticity of traditional sectors could limit its acceptance among potential users of innovation.

Conclusion on the SWOT analysis

The SWOT analysis highlights the significant potential of the TECHGROW platform and training materials to empower traditional sectors through technology watch and competitive intelligence. By addressing weaknesses such as resistance to change and digital literacy gaps, and actively mitigating threats like competition and rapid technological shifts, TECHGROW can establish itself as a valuable resource for these industries. Leveraging its strengths in accessibility, practicality, and customization, and capitalizing on opportunities for partnerships, localization, and expanded offerings, the platform has the capacity to drive meaningful transformation in traditional sectors. This ensures that these industries remain culturally vibrant, economically viable, and globally competitive in the long term.

Recommendations for VET providers

The VET approach to the TECHGROW training materials

In this section an analysis to the overall training program and material is presented considering the transferable potential of the materials and platform. The analysis is presented into the below 6 topics:

1. Structure and Delivery of Training:
2. Practical Engagement and Examples:
3. Supporting Materials and Resources:
4. Assessment and Follow-Up
5. Collaboration and Networking Opportunities:
6. Encourage Continuous Learning:

and for each module 1, 2 and 3 and the Vinci Technology Watch Platform.

Module 1 - "Guide for the Implementation of a Technological Watch System"	
Topics for recommendations	Recommendations for the implementation of the training near the project target-groups
Structure and Delivery of Training:	Tailor Training Sessions to Audience: adjust the depth and focus of the module based on the background and experience of learners. For example, providing more foundational context for beginners and/or diving deeper into practical applications for experienced professionals. Incorporate Interactive Learning: use case studies, simulations, or role-playing exercises to illustrate technological watch system implementation. Facilitate group discussions on the relevance of technological watch in different industries. Flexible Learning Options: offer both in-person and online training formats to cater to diverse learner needs and schedules.

Practical Engagement and Examples	Highlight Real-World Applications: share examples of successful technological watch systems in various sectors (e.g., manufacturing, IT, or healthcare) to demonstrate practical relevance. Hands-On Activities: conduct workshops were learners design mock technological watch systems for specific industries. Use tools or platforms that mimic real-world technological watch processes.
Supporting Materials and Resources	Create Supplementary Guides: develop concise resources such as checklists, flowcharts, or templates to aid in the implementation of technological watch systems. Access to Tools and Software: provide learners with trial access to technological watch tools or platforms during the training to enhance their understanding.
Assessment and Follow-Up	Assess Knowledge Retention: use quizzes or assignments focused on key aspects of the module, such as identifying roles within the system or outlining the watch process. Encourage Post-Training Practice: assign projects where learners apply what they've learned to analyse and monitor technology trends in their fields.
Collaboration and Networking Opportunities	Foster Peer Learning: create opportunities for learners to share insights and experiences with one another, promoting cross-industry learning. Engage Industry Experts: invite guest speakers who have successfully implemented technological watch systems to share their experiences and provide inspiration.
Encourage Continuous Learning	Integrate Module 1 with Other Modules: highlight how Module 1 provides the foundation for subsequent TECHGROW modules, encouraging learners to pursue the full training. Promote Lifelong Learning: emphasize the evolving nature of technology and the importance of regularly updating knowledge to maintain competitive advantage.

Module 2 - "Main Tools for Technological Watch and Competitive Intelligence"	
Topics for recommendations	Recommendations for the implementation of the training near the project target-groups
Structure and Delivery of Training:	Break Down the Content into Tool Categories: organize training into focused sections on alert systems, databases, and specialized software. Start with foundational concepts before progressing to complex tools. Use a Progressive Approach: begin with simpler tools (e.g., free or open-source tools) and gradually introduce advanced, specialized software. Flexible Learning Formats: offer both in-person and online training to accommodate diverse learners. Use live sessions for demonstrations and asynchronous materials for review.
Practical Engagement and Examples	Live Demonstrations: show real-time examples of setting up alerts, conducting database searches, and using specialized software to gather and analyse data. Simulated Scenarios: create hands-on exercises where learners apply the tools to hypothetical business cases, such as monitoring a competitor's product launch. Industry-Specific Examples: tailor demonstrations and activities to the sectors most relevant to participants (e.g., retail, technology, manufacturing).
Supporting Materials and Resources	Tool-Specific Manuals: provide step-by-step guides for each tool introduced, including screenshots and troubleshooting advice. Comparison Matrices: offer charts that compare the features, strengths, and limitations of tools to help learners select the best options for their needs. Access to Tools: provide learners with trial accounts, free tools, or sandbox environments to practice during and after the training.
Assessment and Follow-Up	Skill-Based Assessments: assign practical tasks, such as creating an alert system, gathering data from a database, or analysing information using a specific tool.

	Feedback and Reflection: conduct review sessions where learners present their work, discuss challenges, and receive constructive feedback. Post-Training Assignments: encourage learners to apply what they've learned by monitoring a topic relevant to their industry and presenting their findings.
Collaboration and Networking Opportunities	Group Activities: facilitate team-based exercises where learners collaborate on a competitive intelligence project, simulating real-world scenarios. Peer Presentations: have participants research and present on different tools, sharing their findings and insights with the group. Engage Industry Professionals: invite guest speakers or practitioners to share their experiences with technological watch tools and provide mentorship.
Encourage Continuous Learning	Recommend Additional Resources: share links to webinars, online courses, and articles for learners to deepen their understanding of technological watch tools. Create a Learning Community: establish forums or groups where learners can share insights, ask questions, and stay updated on new tools or practices. Link to Broader TECHGROW Modules: emphasize how Module 2 integrates with the other TECHGROW modules, encouraging learners to progress through the entire program.

Module 3 - " Best Practices in Three Manufacturing Sectors: Footwear, Textile, Furniture"	
Topics for recommendations	Recommendations for the implementation of the training near the project target-groups
Structure and Delivery of Training:	Industry-Specific Segmentation: divide the training into three focused sections: Footwear, Textile, and Furniture, ensuring sector-specific depth. Integrate Foundational Concepts with Sector Practices: begin with an overview of technological watch principles, then connect them to the unique challenges and opportunities in each sector. Flexible Training Formats: provide live sessions for direct interaction and Q&A. Offer recorded lectures or self-paced materials for learners to review as needed. Localized Examples: include regional case studies and examples where relevant to increase relevance and applicability.
Practical Engagement and Examples	Case Study Analysis: present real-world examples of successful technological watch implementation in each sector, highlighting challenges and solutions. Simulation Activities: create sector-specific scenarios where learners apply best practices to design or improve technological watch systems. Factory or Production Line Examples: use videos or virtual tours to demonstrate how best practices are applied in real manufacturing settings. Industry Tools in Action: provide hands-on exercises with tools commonly used in footwear, textile, or furniture manufacturing for technological watch.
Supporting Materials and Resources	Sector-Specific Guides: develop tailored manuals or guides that detail best practices and how they relate to technological watch factors in each sector. Resource Libraries: share curated lists of industry reports, toolkits, and technology trends specific to footwear, textile, and furniture.

	Templates and Frameworks: provide templates for implementing technological watch systems, such as monitoring frameworks or data collection checklists.
Assessment and Follow-Up	Sector-Based Assignments: assign projects requiring learners to identify and analyse key trends in one of the three sectors using best practices. Practical Performance Evaluations: evaluate learners' ability to create a sector-specific technological watch strategy based on module teachings. Personalized Feedback: provide targeted feedback on assignments to help learners refine their approach and understanding. Follow-Up Sessions: offer optional follow-up workshops or webinars for learners to revisit challenging concepts or explore new developments.
Collaboration and Networking Opportunities	Sector-Focused Peer Groups: group learners by sector to foster collaboration and encourage sharing of insights specific to their industries. Expert Panels: invite professionals from the footwear, textile, and furniture sectors to discuss their experiences with technological watch and best practices. Cross-Sector Exchange: facilitate discussions where learners from different sectors can exchange ideas and identify cross-sector innovation opportunities.
Encourage Continuous Learning	Recommend Advanced Learning Resources: provide links to additional materials, webinars, and workshops for deeper dives into sector-specific innovations. Establish a Learning Community: create an ongoing forum or platform for learners to discuss technological watch trends and share insights within their sectors. Highlight Future Modules and Programs: encourage learners to explore other TECHGROW modules or advanced training opportunities to build on their knowledge.

Vinci Technology Watch Platform	
Topics for recommendations	Recommendations for the implementation of the training near the project target-groups
Structure and Delivery of Training:	Introduce the Platform Gradually: begin with an overview of technology watch principles, then demonstrate how VINCI applies these concepts practically. Role-Specific Training: design training modules tailored to the roles of technicians, professionals, researchers, and managers, focusing on how VINCI addresses their specific needs. Blended Learning Approach: combine live demonstrations, hands-on practice, and self-paced tutorials to cater to different learning preferences.
Practical Engagement and Examples	Hands-On Experience: provide learners with access to the VINCI platform through trial accounts or sandbox environments to practice its features. Simulated Scenarios: create real-world scenarios where learners use VINCI to monitor trends, analyse data, and generate actionable insights. Demonstrate Strategic Applications: show how VINCI supports decision-making by helping users identify opportunities for innovation and respond to industry changes.
Supporting Materials and Resources	User Manuals and Quick Start Guides: provide comprehensive guides with screenshots and step-by-step instructions on using VINCI's key features. Video Tutorials: develop short instructional videos highlighting specific tools and functionalities, such as setting up alerts or generating reports. Cheat Sheets and Templates: share reference sheets or templates for common tasks like data organization and analysis workflows.
Assessment and Follow-Up	Performance-Based Assignments: assign projects requiring learners to use VINCI to analyse a specific trend or issue and provide strategic recommendations. Progress Monitoring: use quizzes and practical evaluations to measure learners' proficiency in using the platform effectively.

	Provide Individual Feedback: offer constructive feedback on how learners use VINCI to refine their approach and better align with industry best practices.
Collaboration and Networking Opportunities	Group Projects: facilitate collaborative exercises where learners use VINCI to tackle shared challenges, simulating team environments. Expert Sessions: invite industry professionals who use VINCI to discuss their experiences, share insights, and answer learner questions. Discussion Forums: establish online communities where learners can share tips, discuss challenges, and showcase their projects using VINCI.
Encourage Continuous Learning	Encourage Exploration of Advanced Features: motivate learners to explore VINCI's advanced functionalities, such as predictive analysis and trend forecasting. Provide Access to Updates: keep learners informed about new features or improvements in the VINCI platform through regular updates or refresher sessions. Connect to Broader Learning Goals: highlight how VINCI complements other tools and methodologies taught in the curriculum, encouraging learners to integrate it into their long-term professional practices.

Transferable materials and modifications

In this section and taking into account the structure of different modules, an exercise will be set out for the adjustment of the training modules to the different clusters.

Firstly, it is necessary to identify which modules and topics can be implemented as they are, and which ones need modification. Then, to understand how to do such modifications.

The next table consists in the first exercise which should be undertaken upon the curriculum developed within the Project Activity 2 and presented in the project outcome "TRAINING ITINERARY - Development of a Comprehensive Training Program for Strategic Advantage in Technological Watch and Competitive Intelligence". For each module a comprehensive training program is defined from

the identification of the project target-group training needs, definition of the learning outcomes into knowledge, skills and competences and detail of the curricula into submodules. / topics.

In the next table it is possible to understand which modules and submodules ca be taken as they are within different clusters and which one need modification.

In a second phase, a 6 steps methodology will be suggested to support the modifications.

Module 1 - Guide for the implementation of a technological watch system		
Curricula's topics	**Need modification?**	**Remarks & suggestions**
Introduction	N	All the topics are general and transversal to the majority of the traditional clusters, thus in the exercise of implementation the training to the new clusters, the need of modification will be very marginal.
Technological Watch Process	N	
Roles and responsibilities in a technological watch and competitive intelligence system	N	
Technological Watch Product	N	
Update of the Technological Watch System	N	
Punctual Technological Watch Methodology	N	
International Standards for Innovation Management	Y	Verification and possible adaptation on different international standards on strategic intelligence, depending on different clusters
Estimated % of modification	**< 10%**	

Module 2 - Main tools for Technological Watch and Competitive Intelligence		
Curricula's topics	**Need modification?**	**Remarks & suggestions**
Introduction	N	The topic is transversal to the new clusters in cause

Alert Tools	Y	alert tools for proactive monitoring of the new industries changes and developments
Metasearch engines	N	The topic is focused on the development of literacy in using metasearch engines in general.
Specialized Databases	Y	To find, allocate and use specialized databases for the new clusters
Sectorial Magazines	Y	To find, allocate and use sectorial information
Sectorial Associations and Research Organizations	Y	To find, allocate and use sectorial information
Technological Watch Software	Y	The topic is focused on the development of literacy in using technological watch software in general
Estimated % of modification	>70%	

Module 3 - Best practices		
Curricula's topics	Need modification?	Remarks & suggestions
Footwear best practices	Y	Inclusion of best practices related to the new clusters, however keeping the same organisation and the same template. Within a co-innovation spirit, the dissemination of the best practices on the original clusters Footwear, Furniture and Textile will be useful – to get contact with other sectors practices and find and share ideas for the new sectors.
Textile best practices	Y	
Furniture best practices	Y	
Estimated % of modification	< 90%	

How to customize TECHGROW training materials

The normal flow-chart for curricula design

The normal flow-chart for curricula design in a given sector, to a given target-group and within a given topic, according to EQF (European Qualification Framework) and the presuppositions of Learning Outcomes (LO), bridging to ECVET (European Credit Transfer for Vocational Education Training) and to EQAVET (European Quality Assurance for Vocational Education Training) is composed by 8 to 10 steps, depending on the details of the methodology. This was applied to TECHGROW partners to design Curriculum on TECHNOLOGY WATCH.

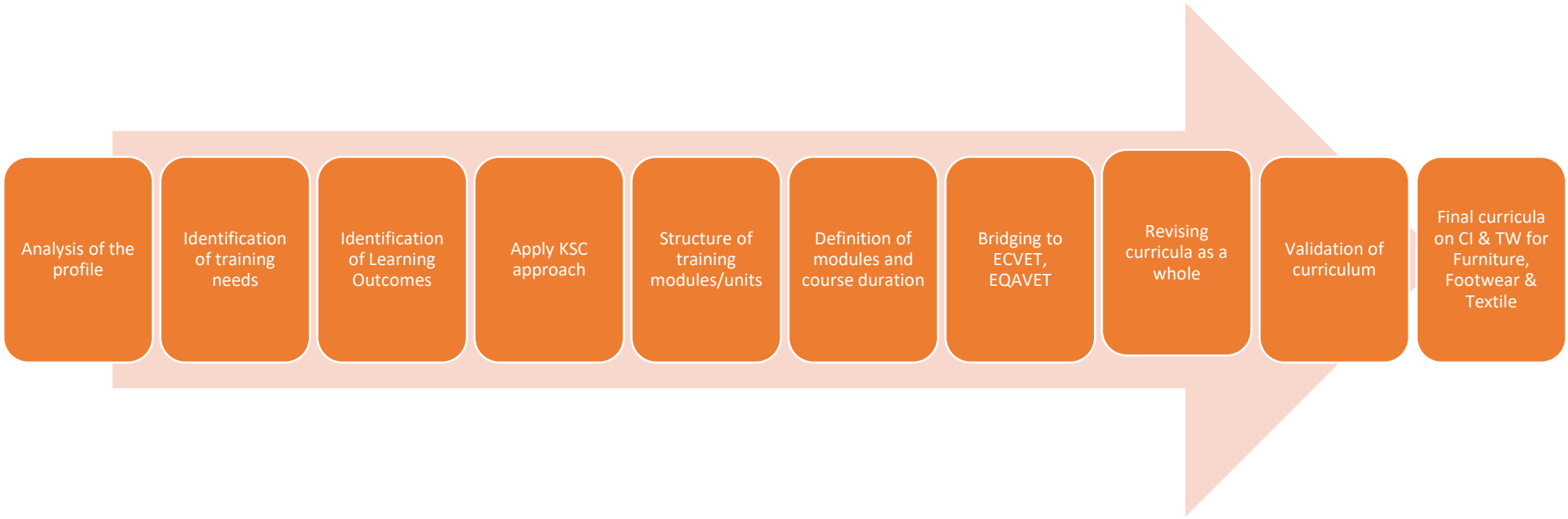
The normal flow-chart for curricula design is composed of the following steps:

1. Analysis of the professional profile – a set of activities that the new professional should do in the frame of the new activity.
2. Identification of training needs on a certain topic and to which the curriculum is addressed to. This can be done through consultation with the target group and desk research on forecasting data. In TECHGROW, these training needs were validated within workshops targeted at stakeholders' panels in each country involved.
3. Identification of Learning Outcomes (LO) - for each activity area, this step involves the identification the Learning Outcomes - what a learner is expected to know, to be able to do and to understand at the end of a learning process or sequence. The way such outcomes are defined and written orients teaching and learning influences the quality and relevance of education and training. The way learning outcomes are defined and written, matters to individual learners, the labour market and society in general produced a wide range of materials to support the draft of curricula focused on CI and TW topic that can be used for other sectors.
4. Apply KSC approach – Identification, for each Learning Outcome of Knowledge areas, Skills to achieve at the end of the training and Competences, through KSC method:

a. Knowledge - means the body of facts, principles, theories and practices that is related to a field of work or study. It is described as theoretical and/or factual knowledge.
b. Skill - means the ability to apply knowledge and to use know-how to complete tasks and solve problems. They are described as cognitive (logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments)
c. Competence - refers to the capacity to integrate and apply contextually appropriate knowledge to consistently perform successfully within a specified domain.

5. Structure of training modules/topics/units – Identification, for each set of KSC, of the correspondent training module/unit and submodules/subunits that will lead the trainee/student to achieve the Learning Outcome, correspondent learning strategies and assessment means. Normally this is supported by filling in the content development tools with all information regarding identification of the units of learning outcomes, designing the content of each unit, attribution of a time load to each content depending on the training methodology (lectures/lessons, demonstrations, case studies, work-based projects, etc.), defining assessments and certification requirements.
6. Definition of course duration - For each Learning Outcome, define the number of hours for the learning process, divided namely into training, self-study, practical activities.
7. Bridging the training itinerary to ECVET, EQF, and EQAVET, applying EQF rules and analysis of the specification at national level if any, besides the EQF (European Qualification Framework)
8. Revising the training programme according to the development of the occupational profile regarding validation of the professional competencies by national regulatory bodies.
9. Validation of the training programme near stakeholders' panel. In TECHGROW this was done in ACT 2 in each country through a dedicated survey.

Below the flow-chat illustrate the methodology for curriculum design in TECHGROW project:



Flow-chart of curriculum design traditional process

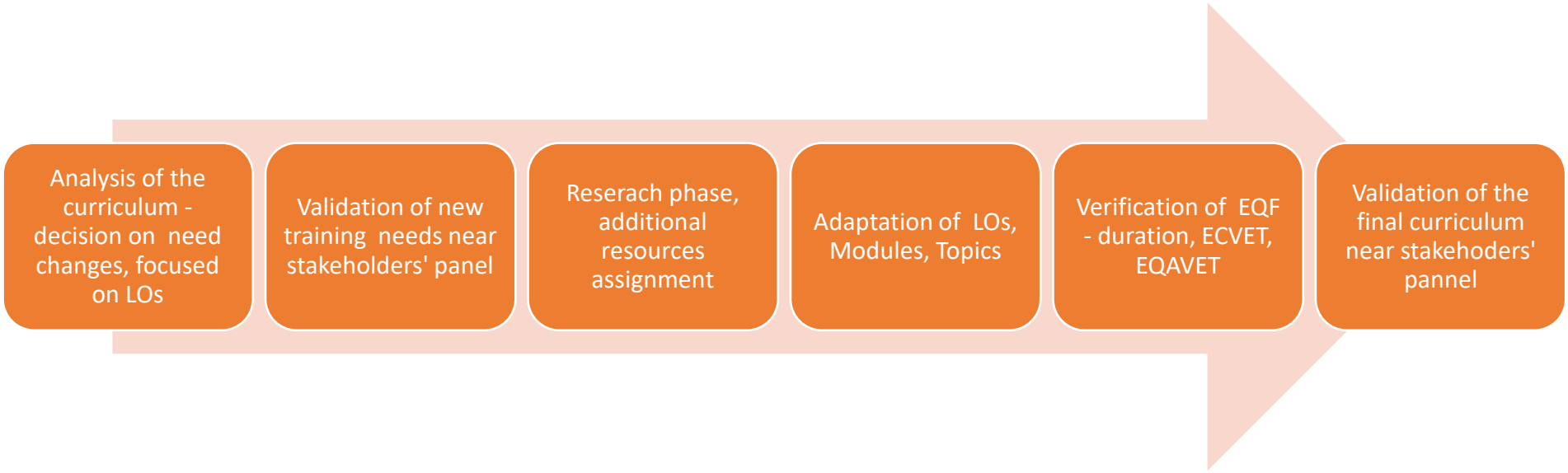
The proposal of TECHGROW is to draft a curriculum on technology watch the way around, through reverse engineering approach, starting from the Curriculum or training itinerary on TECHNOLOGY WATCH, changing the normal order of the methodology of designing curricula, adapting step by step the small conquests of the normal steps into a new scheme that should respect in the same way the training needs of the new sector.

The 6 steps methodology on curricula modifications

Here we propose a simplified method taking as common ground the already drafted curriculum on TECHNOLOGY WATCH.

Globally the methodology suggests to start by A2 – curriculum defined, structured, oriented to different target groups, to analyse it in all each knowledge, skills, competences thinking about the news sector to which the curriculum will be adapted, to decide for each module/unit on the need of implement changes, to validate the new training needs (for the news sector), search for additional data/knowledge to improve the modules, to draft the new curriculum and finally to validate it near the sector representatives.

This 6 steps methodology is illustrated in the following scheme:



Flow-chart of 6 steps methodology curriculum design

Step 1- Analysis of the TECHGROW curriculum (or training itinerary)

This is the first step of the 6 steps methodology that proposes to start with the analysis of the already drafted curriculum, focused on the learning outcomes, detailed into knowledge, skills, autonomy, and responsibility and to decide on the need of change and /or adapt its elements in order to better fit the perceived training needs of the new target-group, new sector. This analysis, which, again, should focus on the Learning Outcomes (LO), meaning the set of what a learner is expected to know, to be able to do and to understand at the end of a learning process or sequence, being able to act with the autonomy and responsibility needed. This analysis is the key to the success of this methodology, the capability to project the already existing curriculum into a new sector. The objective here is also to detect new training needs the new target groups in the new sector have and how far the curriculum is able to overcome. The finalization of step 1 involves the answer to the question if it's mandatory to implement changes and in which modules and topics.

Step 2- Validation of the projected training news

The adaptation of a curriculum to a new sector of activity, maintaining the scope and topics, obliges a validation of the training needs. In this methodology, step 1 identifies new training needs that need to be validated by the new sector representative stakeholders in step 2. The validation can be implemented through focus groups within dedicated workshops as it was done in TECHGROW project, in the several countries involved. VET providers Universities and other entities in the field of VET can find inspiration in TECHGROW practices.

Step 3- Research phase, additional resources assignment

In this step the proposal is to analyse the need of additional resources, to decide the need to tackle research to gather information to improve the existing curriculum in the direction of the new sector needs. This is the phase to research,

to learn, to gather theoretical and practical knowledge, to apply to the new curriculum.

Step 4- Adapt Learning Outcomes, Modules, Topics

This is the step where the curriculum is modified to match the new needs, the demands of the new sector of activity. This is more the operational phase of the curriculum design, where the adaptation is materialized into tangible changes in the LOs, Modules and Topics. A new curriculum is being drafted here according to sectorial data gathered in step 3, matching training needs validated in step 2. The result is a new curriculum, conceptually like the TECHGROW curriculum, on CI and TW modified to be more in line with the specificities of the new sector in consideration. The new curriculum will have finetuned LOs, Modules and Topics.

Step 5- Verification of EQF presuppositions, ECVET and EQAVET

In this step, the new curriculum will be compared to the TECHGROW already existing one, in terms of duration (learning and self-study hours of duration), EQF level, ECVET points and EQAVET indicators fulfilment, that should be similar to the already existing one.

Step 6- Validation of the final curriculum

In this final step, the new curriculum will be validated near the stakeholders' panel. For the validation we suggest applying a Quantitative method through a survey among SMEs, business associations, that can represent the new sector into which the new curriculum has been adapted, envisaging at collecting general opinions. In addition, we suggest applying a Quality method through interviews with key experts within the new sector envisaging to get in-deep considerations regarding the new adapted curriculum. We suggest getting inspiration in the IO2-A4 activity of TECHGROW and eventually using available templates.

Transferability to different sectors - examples

Below is an adapted version of the curriculum for each of the five specified clusters: ceramic, glass, cork, leather goods, and wine. The modifications align the general structure with the unique characteristics, needs, and industry practices of each sector.

Each curriculum is tailored to emphasize sector-specific processes, materials, and industry challenges while retaining the structure's core objectives.

Ceramic Cluster
Module 1 - Guide for the implementation of a technological watch system
1. Introduction Overview of the ceramic industry: trends, challenges, and innovations. Key players and applications of ceramics in modern industries. 2. Technological Watch Process 2.1. Identification of information needs, sources of information, and means of access. Materials research: clay, glazes, additives. Trends in energy efficiency and sustainable practices in kilns. 2.2. Planning the execution of Technology Watch Monitoring ceramic design innovations and production techniques. 2.3. Search and Information processing Analysing patents and case studies on ceramic composites and advanced ceramics. 2.4. Valorisation of the information Translating findings into design, production, and marketing strategies. 2.5. Distribution and storage Best practices in sharing and archiving material innovations. 2.6. Results and decision making Application of results in cost reduction, product enhancement, and green certification. 3. Roles and responsibilities in a technological watch and competitive intelligence system Team roles for monitoring ceramic supply chains, sustainability, and market opportunities. 4. Technological Watch Product Reports on advanced ceramics for electronics, construction, and art. 5. Update of the Technological Watch System

Periodic reviews based on evolving sustainability goals and material availability. 6. Punctual Technological Watch Methodology Case study: Rapid adoption of 3D printing technologies in ceramics. 7. International Standards for Innovation Management 7.1. The role of strategic intelligence in innovation management Focusing on ceramic applications in high-tech industries. 7.2. Different international standards on strategic intelligence ISO standards for ceramics, including quality control and material testing.
Module 2 - Main tools for Technological Watch and Competitive Intelligence
1. Introduction Overview of the ceramic industry: markets, applications, and innovation areas. Key challenges: sustainability, advanced materials, and energy efficiency. 2. Alert Tools Tools for monitoring advancements in ceramic materials, firing technologies, and glaze formulations. Notifications for innovations in additive manufacturing and ceramic composites. 3. Metasearch Engines Utilizing engines like Google Scholar or Scopus for academic research on ceramic engineering. Focus on patent databases for materials and design innovations. 4. Specialized Databases Accessing databases like MatWeb for material properties of ceramics. Using industry-specific repositories for kiln efficiency studies and ceramic process innovations. 5. Sectorial Magazines Journals such as Ceramic Industry Magazine or Ceramics International. Regular updates on trends in tableware, tiles, and industrial ceramics. 6. Sectorial Associations and Research Organizations Collaborations with groups like the American Ceramic Society (ACerS) and European Ceramic Society (ECerS). Partnerships with R&D centers focused on advanced ceramic applications. 7. Technological Watch Software Implementation of software like PatentSight or Innography to monitor ceramic patents and market data.

Tools for tracking life-cycle analysis and environmental impact of ceramic production.
Module 3 - Best practices
▪ Best Practices in the Ceramic ▪ Exploration of ceramics in footwear innovation: thermal insoles, anti-slip ceramic coatings, and wear-resistant components. ▪ Best practices for integrating ceramics into design for durability and comfort. ▪ Case studies: ceramic-infused soles for enhanced performance in sports and outdoor footwear. ▪ Applications of ceramics in textiles: ceramic-coated fabrics for heat resistance and UV protection. ▪ Best practices for embedding ceramic nanoparticles into fibers for enhanced strength and insulation. ▪ Sustainability considerations in combining ceramics with textiles for wearable technology. ▪ Use of ceramics in furniture: tabletops, decorative inlays, and ergonomic designs. ▪ Best practices for ceramic surface treatments (glazing and polishing) to ensure durability and aesthetic appeal. ▪ Integration of ceramics in sustainable furniture design using recycled materials.

Glass Cluster
Module 1 - Guide for the implementation of a technological watch system
1. Introduction Overview of the glass sector: from traditional glassware to high-tech applications. 2. Technological Watch Process 2.1. Identification of information needs, sources of information, and means of access. Innovations in glass processing: smart glass, recycling methods. 2.2. Planning the execution of Technology Watch Monitoring automation in glass manufacturing. 2.3. Search and Information processing Researching innovations in glass coating and energy-efficient windows. 2.4. Valorisation of the information

Incorporating data into sustainable production processes.

2.5. Distribution and storage

Using digital libraries to catalog innovations in glass chemistry.

2.6. Results and decision making

Decision-making frameworks for product and process optimization.

3. Roles and responsibilities in a technological watch and competitive intelligence system

Teams to monitor advancements in optical and structural glass.

4. Technological Watch Product

Reports on trends in architectural, automotive, and electronic glass.

5. Update of the Technological Watch System

Bi-annual updates focused on emerging technologies like smart mirrors.

6. Punctual Technological Watch Methodology

Analysing breakthroughs in energy-efficient glass production.

7. International Standards for Innovation Management

7.1. The role of strategic intelligence in innovation management

Applications of strategic intelligence for glass sustainability.

7.2. Different international standards on strategic intelligence

ISO standards for glazing, safety, and optical performance.

Module 2 - Main tools for Technological Watch and Competitive Intelligence

1. Introduction

Overview of the glass industry: from traditional glassmaking to smart and technical glass.

Challenges: energy-efficient production, recycling, and durability.

2. Alert Tools

Alerts for innovations in optical glass, energy-efficient glazing, and recycling technologies.

Monitoring breakthroughs in glass tempering and coating techniques.

3. Metasearch Engines

Scanning for new developments using platforms like ScienceDirect and Espacenet.

Tracking competitive innovations in specialty glass markets.

4. Specialized Databases

Resources like GlassOnline for insights into manufacturing trends.

Accessing material property databases specific to optical and structural glass.

5. Sectorial Magazines

Key publications: Glass International, Glass Worldwide, and Glass on Web.

Articles on automation in glass production and smart glass applications. 6. Sectorial Associations and Research Organizations Engaging with entities like the Glass Association of North America (GANA) and International Commission on Glass (ICG). R&D partnerships for advancing glass recycling and sustainability. 7. Technological Watch Software Employing tools like Questel Orbit for patent analysis in smart glass and manufacturing techniques. Software to analyse the adoption of digital innovations in the glass industry.
Best practices
▪ Best Practices in the glass sector ▪ Applications of glass in footwear: tempered glass embedded in high-fashion footwear or smart shoes. ▪ Best practices for using laminated glass for durable and aesthetic shoe designs. ▪ Safety and innovation in wearable glass-based sensors for footwear. ▪ Advancements in glass fibers for textiles: heat-resistant fabrics, insulating layers, and fireproof materials. ▪ Best practices for integrating glass fibers in construction, medical, and performance apparel. ▪ Recycling and sustainable practices in producing glass-based textiles. ▪ Use of glass in furniture: safety glass tabletops, shelves, and decorative elements. ▪ Best practices for combining tempered and laminated glass in ergonomic and durable furniture designs. ▪ Innovations in smart glass for adaptive furniture designs (e.g., privacy screens or colour-changing panels).

Cork Cluster
Module 1 - Guide for the implementation of a technological watch system
1. Introduction Importance of cork in sustainable industries: from wine stoppers to construction. 2. Technological Watch Process 2.1. Identification of information needs, sources of information, and means of access.

Monitoring cork harvesting practices, processing, and substitutes. 2.2. Planning the execution of Technology Watch Tracking innovations in cork composites and applications. 2.3. Search and Information processing Studies on cork insulation, flooring, and design. 2.4. Valorisation of the information Enhancing product quality and expanding market applications. 2.5. Distribution and storage Centralized knowledge repositories for cork industry stakeholders. 2.6. Results and decision making Decisions on material use, pricing, and lifecycle analysis. 3. Roles and responsibilities in a technological watch and competitive intelligence system Coordinating efforts among producers, designers, and researchers. 4. Technological Watch Product Reports on advancements in cork's role in green architecture. 5. Update of the Technological Watch System Integrating data on cork substitutes and ecological impacts. 6. Punctual Technological Watch Methodology Study: Adoption of hybrid cork-rubber materials for durability. 7. International Standards for Innovation Management 7.1. The role of strategic intelligence in innovation management Strategic approaches to cork as a renewable material. 7.2. Different international standards on strategic intelligence Quality standards for cork products and processing methods.1. Introduction
Module 2 - Main tools for Technological Watch and Competitive Intelligence
1. Introduction Overview of the cork industry: its role in sustainability and its wide range of applications. Challenges: optimizing harvesting practices and combating substitutes. 2. Alert Tools Notifications on developments in cork-based composites and eco-friendly processing methods. Alerts for innovations in alternative uses of cork (e.g., construction, fashion). 3. Metasearch Engines Platforms like PubMed and Google Scholar for bio-based material research. Patent search engines for developments in cork insulation and flooring.

4. Specialized Databases

Access to cork-focused sustainability and lifecycle analysis reports.

Repositories like SpringerMaterials for research on cork properties.

5. Sectorial Magazines

Publications such as Amorim Cork Magazine and Sustainable Packaging News.

Articles on cork's evolving role in the green building and packaging industries.

6. Sectorial Associations and Research Organizations

Partnerships with associations like APCOR (Portuguese Cork Association).

Collaboration with institutes focusing on agro-forestry and renewable materials.

7. Technological Watch Software

Tools like Techmonitor or Horizon Scanning systems to track cork market innovations.

Software for monitoring cork's market share in various industrial applications.

Best practices

- Best practices on Cork sector
- Applications of cork in footwear: eco-friendly insoles, shock absorption, and lightweight materials.
- Best practices for designing ergonomic and sustainable cork-based shoes.
- Case studies on incorporating cork for orthopaedic and comfort footwear.
- Cork-infused textiles: creating flexible, water-resistant, and biodegradable materials.
- Best practices for blending cork with natural fibers for eco-friendly fashion.
- Innovations in cork fabric for high-performance apparel.
- Use of cork in furniture: seating, flooring, and soundproof panels.
- Best practices for leveraging cork's natural properties (elasticity, insulation) in furniture design.
- Sustainable practices in producing modular cork furniture.

Leather Goods Cluster
Module 1 - Guide for the implementation of a technological watch system
1. Introduction The evolving leather goods market: luxury, sustainability, and innovation. 2. Technological Watch Process

2.1. Identification of information needs, sources of information, and means of access.

Trends in sustainable leather and alternatives (vegan leather).

2.2. Planning the execution of Technology Watch

Tracking tannery innovations and waste reduction methods.

2.3. Search and Information processing

Researching dyeing methods, durability, and design enhancements.

2.4. Valorisation of the information

Incorporating sustainable practices in production and branding.

2.5. Distribution and storage

Building databases of eco-friendly suppliers and processes.

2.6. Results and decision making

Evaluating new techniques for scalability and compliance.

3. Roles and responsibilities in a technological watch and competitive intelligence system

Responsibilities for monitoring eco-leather developments and market demand.

4. Technological Watch Product

Reports on emerging trends like leather recycling and plant-based alternatives.

5. Update of the Technological Watch System

Yearly updates based on environmental regulations and material innovation.

6. Punctual Technological Watch Methodology

Study: Transitioning from traditional to synthetic tanning processes.

7. International Standards for Innovation Management

7.1. The role of strategic intelligence in innovation management

Leveraging innovation for sustainable leather product differentiation.

7.2. Different international standards on strategic intelligence

Standards for ethical sourcing and leather processing.

Module 2 - Main tools for Technological Watch and Competitive Intelligence

1. Introduction

Overview of the leather goods industry: luxury, sustainability, and global trade.

Challenges: eco-friendly tanning, durability, and new materials (e.g., vegan leather).

2. Alert Tools

Alerts for innovations in tanning processes, leather substitutes, and waste management.

Notifications for advancements in leather preservation and dyeing techniques.

3. Metasearch Engines

Platforms like Semantic Scholar or Lens.org for tracking sustainability-focused research.

Searching patents on advanced materials in leather goods.

4. Specialized Databases

Databases like Leather International and Textile Exchange for industry reports.

Material property repositories focused on leather and its alternatives.

5. Sectorial Magazines

Publications such as International Leather Maker and Leather International.

Regular updates on industry events, design trends, and sustainability initiatives.

6. Sectorial Associations and Research Organizations

Collaborations with the International Leather Federation (ILF) and regional tanneries.

Engagement with research centers developing eco-friendly leather treatments.

7. Technological Watch Software

Systems like Clarivate Analytics for tracking competitive patents and innovations in leather alternatives.

Software for analysing market shifts toward sustainable leather solutions.

Best practices

- Best practices in the Leather Goods sector
- Best practices in leather footwear: optimizing tanning processes for durability and aesthetics.
- Sustainable sourcing and processing of leather for eco-friendly shoe production.
- Case studies on luxury and performance leather footwear.
- Applications of leather in textiles: blending leather with fabrics for hybrid materials.
- Best practices for enhancing leather textiles with treatments for water resistance and breathability.
- Innovations in combining leather with natural and synthetic fibers for unique textile applications.
- Leather in furniture: upholstery techniques, durability, and maintenance.
- Best practices for using leather sustainably in furniture design.
- Innovations in combining leather with other materials (e.g., wood, metal) for modern furniture.

Wine Goods Cluster
Module 1 - Guide for the implementation of a technological watch system
1. Introduction Overview of the wine industry: traditional practices and technological advancements. 2. Technological Watch Process 2.1. Identification of information needs, sources of information, and means of access. Monitoring trends in viticulture, fermentation, and packaging. 2.2. Planning the execution of Technology Watch Tracking advancements in vineyard management and wine analytics. 2.3. Search and Information processing Researching yeast strains, biodynamics, and flavor profiling. 2.4. Valorisation of the information Applying findings to enhance quality, branding, and marketing. 2.5. Distribution and storage Maintaining databases on climate-resistant grape varieties. 2.6. Results and decision making Innovations in production methods and sustainable practices. 3. Roles and responsibilities in a technological watch and competitive intelligence system Monitoring roles in vineyard health, market trends, and regulations. 4. Technological Watch Product Reports on precision viticulture and market positioning strategies. 5. Update of the Technological Watch System Continuous improvement through sensory analysis and customer feedback. 6. Punctual Technological Watch Methodology Study: Adoption of blockchain for traceability in the wine industry. 7. International Standards for Innovation Management 7.1. The role of strategic intelligence in innovation management Strategic insights into global wine trends and sustainability standards. 7.2. Different international standards on strategic intelligence Compliance with wine certification and export requirements.
Module 2 - Main tools for Technological Watch and Competitive Intelligence
1. Introduction Overview of the wine industry: traditional methods and modern technology. Challenges: climate change, traceability, and changing consumer preferences. 2. Alert Tools

Alerts for innovations in vineyard management, fermentation, and packaging.

Notifications for breakthroughs in sustainable practices and digital labeling.

3. Metasearch Engines

Tools like AGRICOLA and CAB Abstracts for viticulture and enology research.

Searching patents for fermentation technologies and wine additives.

4. Specialized Databases

Resources like WineSpectator and OIV databases for wine production trends.

Repositories for grape varietal and climate adaptation studies.

5. Sectorial Magazines

Key publications: Wine Business Monthly, Decanter, and The Drinks Business.

Updates on vineyard technology, market trends, and new wine releases.

6. Sectorial Associations and Research Organizations

Partnerships with OIV (International Organization of Vine and Wine) and local wine guilds.

Collaborating with research institutes for sustainable viticulture practices.

7. Technological Watch Software

Employing tools like AgriTech monitoring platforms for vineyard health and yield optimization.

Software for traceability and blockchain integration in wine production.

Best practices

- Best practices on Wine sector
- Application of wine by-products (e.g., grape leather) in eco-friendly footwear production.
- Best practices for sustainable design using vineyard-derived materials.
- Case studies: collaboration between wineries and fashion brands for unique footwear lines.
- Use of wine waste to create textiles: grape leather and dyes derived from grape skins.
- Best practices for transforming wine residues into biodegradable textiles.
- Innovations in eco-textile manufacturing are inspired by circular economy practices in the wine industry.
- Wine-related furniture: barrels repurposed into furniture, wine racks, and vineyard-inspired designs.
- Best practices for incorporating wine-themed aesthetics into functional furniture.
- Sustainability in using reclaimed materials (e.g., cork, wood from barrels) for furniture production.

Conclusions

The TECHGROW project demonstrates the critical role of well-designed training materials in fostering innovation and competitiveness across diverse industries. By emphasizing key methodologies such as technological watch, best practices, and strategic intelligence, the project equips learners with the tools to adapt to rapid technological advancements and market dynamics.

The recommendations for Vocational Education and Training (VET) underscore the importance of tailoring content to the specific needs of each cluster while maintaining flexibility for broader application. This adaptability ensures that the methodologies and tools developed can successfully transfer to other clusters, promoting cross-sector collaboration and knowledge sharing.

The integration of TECHGROW's training framework into VET curricula supports workforce upskilling, enhances technological literacy, and fosters a culture of continuous learning. By doing so, it contributes to the sustainability and resilience of industries in the face of global challenges, ensuring their readiness for future opportunities.

TECHGROW's success lies in its ability to bridge the gap between industry-specific training and transferable innovation strategies. This approach not only enriches VET programs but also strengthens the capacity of industries to thrive in an ever-evolving global economy.

As we understand from the exercise on adaptation of the TECHGROW curriculum into the different sectors the original curriculum is transferable in more than 80%.

The provided exercises prove the effectiveness of the 6 steps methodology to design curricula on eco-design and circularity based on the TECHGROW curriculum on Competitive Intelligence and Technology Watch proves its transferable character and foresees it's suitability to many other sectors of activity

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- Clarivate Analytics: Innovation and intellectual property data analysis.
- Techmonitor: Strategic insights into technological developments across industries.

TECH GROW

VET training on technological watch

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