CORPORATE SCHEMES FOR THE INTEGRATION OF PF NETWORKS OF EXCELLENCE IN CE CROSS VALUE CHAIN

D.T3.3.3 – Tactics for the creation of a transnational network of PF performers

Version 1

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1. Introduction

Precision farming concerns digitalised farming technologies and processes allowing to provide near-real time observations, measurements and interventions. Its application results in improved cost efficiency and product quality, more precise as well as diminished use of fertilisers (in case of crops), medicine (in case of animals), additives and other inputs (resource efficiency). It helps the farming sector to address challenges such as: lack of employees, soil degeneration, food supply chain logistics, impact of climate change. Precision farming has been applied by larger farms, but more and more smaller farms are considering available solutions. Main barriers for adopting such solutions by smaller farmers are: lack of capital to invest, lack of competencies to handle sophisticated software and technologies, and solutions not necessarily adapted to the scale of the farming business and to the specific local situation in terms of crop systems, livestock systems, geographical and climate conditions.

The Transfarm 4.0 project (start: 01.04.2019; end: 30.06.2022) aimed at increasing the direct participation of farmers in the precision farming sector and boosting the competitiveness of the European precision farming advanced manufacturing supply chains. Through scouting new demand-driven precision farming solutions and identifying needs of farmers, the project consortium managed to bring together companies, clusters, research institutions and farmers in testing new technological solutions. During the project a precision-farming one-stop-shop was created (http://precision-farm40.com/) and pilot projects (Proof of Concept) were provided.

In the framework of the thematic work package T3: “Addressing R&D regional agenda (RIS3) to increase investments & specialisation in precision farming”, the Transfarm 4.0 consortium has been working on the stimulation of a favourable background for the large uptake of precision farming competencies in the Central European pilot areas and beyond. Main actions concentrated on technology insights and trends, networking (networks developed within a co-creation approach) and the setting up of a training, coaching and financing mechanism to support new precision farming technology assessment and commercialisation.

At the background of climate change, geopolitical instabilities, logistical deficiencies of resources, strategic technology positioning by China, accelerated change has become the new real. Problem solving is getting more and more complex. The process from problem identification, through solution definition, research and development, technology testing, up to technology commercialisation and scaling of business models often cannot take place without the involvement of several stakeholders. Technology commercialisation and marketing is about “push” rather than “pull”, a process in which time-to-market is crucial. As technologies are often part of a wider system or representing a new system, their commercialisation requires a well-developed eco-system of players, ready to test, invest, defend and apply the new solution.

Still too often technology commercialisation probes fail because inventors/inventor-teams try to provide the process on their own without making active use of organisations that could deliver the necessary means, not only money but also access to resources and markets. Weak business models, inaccurate financial calculations, as well as the absence of specialists in the inventor-team often lead to frustrations among inventors, while investment proposals are negatively assessed by the next group of potential investors. The Transfarm 4.0 consortium has brought together teams of universities and research organisations that have already a good track record in technology

commercialisation. Also, business support organisations have been involved in assessing technologies and bringing them to the market. The experiences and lessons learned from the project form the basis for the development of a network of excellence, that should ensure the continuity of the activities of the project consortium in promoting precision farming technologies in Central Europe and beyond.

This document includes a business model for the construction of a consortium (collaboration network, network of excellence), initially consisting of organisations involved in the Transfarm 4.0 project, but over time enlarged with other stakeholders. It covers issues like: the vision and goals, the management structure, the stakeholder (client) groups, the service package, the marketing approach and the financial sustainability.

Disclaimer

2. The vision and goals

Vision

The Transfarm 4.0 Network of Excellence supports market introduction and adoption of precision farming technologies in traditional farming with the aim to increase farming efficiency and predictability of farming processes, as such diminishing costs, increasing resource efficiency and improving competitiveness of small farmers in Central Europe.

Goals

The Transfarm 4.0 Network of Excellence shall:

- Identify new precision farming technologies developed at universities, research organisations and start-ups in Central Europe and beyond;
- Identify suppliers of precision farming technologies interested in positioning their technologies on the Central European market and/or willing to invest in new precision farming technologies from universities, research organisation and start-ups;
- Identify famers' needs and potential to test and adopt new precision farming technologies, as well as identify regional, national and international funding opportunities to support proof-of-concept and investment projects;
- Promote new precision farming technologies through the one-stop-shop, the transfarm 4.0 network of excellence website and events, as such bringing precision farming technologies closer to the market;
- Bring together the Central European supply side and demand side of precision farming technological solutions in online events in order to support networking and projects;
- Ensure information support for farmers through the Transfarm 4.0 one-stop-shop and regional/national contact points.

The above goals shall be monitored by the following key-performance indicators:

- At least 5 new precision farming technologies identified and promoted yearly;
- At least 10 farmers supported in testing and adopting precision farming technologies;
- At least 50 universities, research organisations, start-ups and suppliers of precision farming technologies identified and included in the network of excellence;
- At least 250 farmers identified and reached with information about precision farming technologies through the network of excellence information and promotion campaigns.

3. The management structure

The project consortium consisted of 10 partners from 5 central European countries:

- HBLFA Francisco Josephinum (AT), Rottenhauser Straße 1, 3250 Wieselburg | www.josephinum.at
- Linz Center of Mechatronics GmbH (AT), Altenberger Strasse 69, 4020 Linz | www.lcm.at
- Szent István University (HU), Villányi street 29-43, H-1119 Budapest | www.szie.hu
- Agro ICT Cluster (HU), Kinizsi u. 21-25, H-1092 Budapest | www.agroit.hu
- Regional Development Agency of Bielsko Biala (PL), ul. Cieszyńska 365, 43-382 Bielsko-Biała | www.arrsa.pl
- University of Maribor (SL), Slomškov trg 15, 2000 Maribor | www.fkbv.um.si
- AE-ROBO-NET, Agricultural and Environment Robotic Networking (SL), Liminjanska cesta 96, 6320 Portorož-Portorose | www.ae-robo.net
- CREA - Council for Agricultural Research and Economics (IT), Viale XXVIII Aprile 26 - 31015 Conegliano (TV) | www.crea.gov.it
- t²i – trasferimento tecnologico e innovazione s.c.a r.l. (IT), Piazza delle Istituzioni, 34/a, 31100 - Treviso | www.t2i.it
- FEDERUNACOMA – Italian Agicultural Machinery Manufacturers Federation (IT), Viale Aldo Moro 64, 40127 Bologna | www.federunacoma.it

The above organisations are the first group of entities incorporated in the network of excellence. Each of them shall have a specific function as: technology supplier (universities, research organisations, start-ups, enterprises and their network organisations) and business support organisation (intermediaries between precision farming technologies' supply and demand side, funding organisations).

A stable management structure shall be the fundament to ensure continuity of the network of excellence over time. The approach should include the voice of its members in strategic decisions as well as operational efficiency and flexibility in a transparent decision-making process. As such, the management structure shall consist of:

- The General Assembly of the Transfarm 4.0 Network of Excellence that includes one representative of each of the members. It will meet at least once a year to discuss main challenges and opportunities, to agree on the Transfarm 4.0 Network of Excellence budget and work programme and to vote the discharge of the management board;
- The Management Board of the Transfarm 4.0 Network of Excellence that includes three representatives of which:
    - One representative of a business support organisation;
    - One representative of a university or research organisation;
    - One representative of a supplier network/association/cluster.

  The representative of the business support organisation shall take up the role of the president of the Management Board. This business support organisation shall also appoint an assistant of the president of the Management Board responsible for the coordination of the operational activities of the Network of Excellence. There shall be a yearly or two-year rotation of the management board functions among the members.

4. The stakeholder (client) groups

The main stakeholders for the Transfarm 4.0 Network of Excellence are:

- Suppliers of precision farming technologies, including:
  - Universities;
  - Research organisations;
  - Start-ups;
  - Enterprises;
- Farmers in Central Europe;
- Clusters, associations and other network structures of suppliers;
- Clusters, associations and other network structures of farmers;
- Governmental and regional organisations responsible for preparing and implementing public funding support programmes;
- Private and public risk capital organisations and financing institutions.

A first list of stakeholders was developed in the document: "Point-zero report of CE emerging clusters & specialisations in PF" (D.T.1.2.3, 2020), further elaborated on the one-stop-shop platform, and in the document: "Screening survey of further CE innovation players & clusters operating in ADV-manufacturing (D.T.3.4.1, 2021).

5. The service package

The Transfarm 4.0 Network of Excellence shall provide the following services:

- Promotion of new precision farming technologies on its website and positioning of precision farming technologies on the one-stop-shop platform;
- Organisation of online events during which precision farming technologies are presented and promoted and supply side meets with demand side in order to foster networking;
- Support of consortium and project development to test and adopt precision farming technologies by way of bringing supply and demand side together and identifying financial instruments;
- Support of innovators (individuals and teams) from universities and research organisations as well as start-ups in technology commercialisation processes by way of introducing their new precision farming technological solutions to risk capital organisations and enterprises.

The network members shall closely cooperate with regional and national advisors and their branch organisations involved in analysing the local situation, providing cost-benefit analyses for precision farming solutions, recommending suitable solutions and guiding farmers through the investment and implementation process.

The services shall partly be delivered in the framework of the yearly membership fee paid by the members and partly offered according to market prices or financed under projects. In some cases, such as for instance advisory services in technology commercialisation, a success fee can be applied based on the transaction value (technology sold, value of the licence agreement, investment value in a new start-up, …) as a result of the support service.

6. The marketing approach

Global agriculture is facing a number of challenges: rapid world-wide population growth, climate change, an increasing demand for energy, resource shortages because of geopolitical instability, geographically concentrated food logistics due to accelerated urbanisation, life-style changes, ageing populations in rural areas, lack of access to credit and exponential degeneration of soil because of incompetent land management.

The major factors driving growth of the precision farming technologies' market include: increasing farm mechanisation in developing countries, rising labour costs as a result of shortage of skilled labour, pressure on global food supply chains, substantial cost savings associated with smart farming techniques, government initiatives to adopt modern agricultural techniques, as well as increasing need for optimum crop production with limited available resources.

Precision farming hardware and software technologies, including: artificial intelligence, robotics, the Internet of Things, Edge Computing, 5G, blockchain and supercomputing, have the potential to make agriculture more efficient, sustainable, and competitive. Main focus points are: precision irrigation, field monitoring, precision spraying, precision fertilizers, precision planting and data management. In the hardware segment a major role is played by: sensors, cameras, drones and unmanned aerial vehicles.

The Transfarm 4.0 Network of Excellence has the aim to become the main pivoting platform between the supply side and the demand side for precision farming technologies in Central Europe. As such the marketing approach should take into consideration the constrains faced by farmers, including: connectivity issues, lack of awareness about the benefits of precision farming technologies, lack of compatibility of machines and systems, lack of digital skills, high investment costs, lack of data-minded approach in decision-making processes.

Target group	Main concerns	Marketing aim	Approach
Universities Research organisations Start-ups	Technology readiness level 6-8, prototype (gap between technological features and market needs) Lack of Proof-of-Concept testing in practical conditions Lack of financing to support commercialisation of developed technology	To promote new precision farming technologies among farmers ready to enter in proof-of-concept projects To promote new precision farming technologies among risk capital organisations in order to secure financing for commercialisation	Support in preparing teaser and informational materials about the specific technology Positioning of the team/technology on the Transfarm 4.0 website and one-stop-shop Presentation of the technology during online events Presentation of the technology during

Target group	Main concerns	Marketing aim	Approach
			investment pitching events
Enterprises	Mostly focused on larger farming corporations Mostly focused on own developed technologies	To support enterprises in accessing smaller farmers To convince enterprises of the value of new technologies developed by universities and research organisations that could be incorporated in their product portfolio	Organisation of online networking events during which enterprises present their solutions to smaller farmers Facilitation of bilateral online meetings between enterprises and farmers as a result of identified needs and opportunities at farmers Organisation of online events during which teams of universities and research organisations present their solutions to enterprises
Farmers in Central Europe	Lack of access (time to identify) to information about precision farming technologies Lack of information about the costs and benefits of new precision farming technologies Fear of investing in technologies that exceed employees' competencies or are not compatible with existing applications Technologies estimated as too costly, too complicated and not reliable over time without support of the technology suppliers Concerns over data-security	To identify needs and constrains related to precision farming To present features and benefits of precision farming technologies To network farmers with potential suppliers of precision farming technologies To support farmers in proof-of-concept projects to experience the benefits of new precision farming technologies in a practical context	Organisation of need-analysis surveys among farmers in cooperation with national/regional branch associations Organisation of online events to present precision farming technologies, including information about costs-benefits Support in networking farmers with teams of universities, research organisations and start-ups to provide proof-of-concept projects

Target group	Main concerns	Marketing aim	Approach
Clusters, associations and other network structures of suppliers Clusters, associations and other network structures of farmers	Make the European agricultural market more resilient against climate change, more environmentally friendly in terms of resource efficiency and more cost efficient through data management	To build and strengthen interactions between the supply side and demand side for precision farming technologies in Central Europe	Further developing of the one-stop-shop Organisation of online events during which demand side representatives can articulate their needs and concerns and supply side representatives can present solutions
Governmental and regional organisations responsible for preparing and implementing public funding support programmes	Compatibility between the planned instruments and the needs and capacities of farmers Public sector readiness to support innovations in the agricultural sector Smart specialisation processes delivered through entrepreneurial discovery processes	To support regional entrepreneurial discovery processes by bringing together the demand side, the supply side and regional government organisations in addressing challenges and opportunities for precision farming in the region	Organisation of entrepreneurial discovery workshops in cooperation with regional government Information about regional/national financing instruments and calls for proposals on the Transfarm 4.0 website
Private and public risk capital organisations and financing institutions	Lack of investment-ready project proposals from teams from universities and research organisations	To inform potential investors about new precision farming technologies and commercialisation opportunities To increase the investment-readiness level of project proposals	Organisation of information meetings for teams from universities and research organisations about ways to improve investment readiness level of projects Involvement of identified risk capital organisations in pitching events

Based on the above, the following marketing tools and activities shall be applied:

- The Transfarm 4.0 website;
- The one-stop-shop (http://precision-farm40.com/);
- The updated catalogue of precision farming technology suppliers;
- One online event yearly to present new precision farming technologies, costs and benefits of precision farming technologies through business cases and good practices and support networking;
- One online workshop yearly to inform teams of universities and research organisations about improving the investment readiness level of precision farming technology projects (this could be followed in a later stage by training and advisory services);
- One online pitching event yearly to promote new precision farming technologies among risk capital organisations;
- Three online workshops dedicated for specific precision farming to improve networking between universities, research organisations, start-ups and farmers to engage them in proof-of-concept projects and other projects financed by region, national or international funding programmes.

7. The financial sustainability

In order to provide the Transfarm 4.0 Network of Excellence one should consider at least the following cost categories:

Cost category	Source of cost	Cost covered by
Yearly licencing fees related to social media, website, online communication platform	CREA	All members based on cost calculation and fee per member invoiced by CREA
Costs related to maintenance and updating of the Transfarm 4.0 website and the one-stop-shop platform	CREA	All members based on cost calculation and fee per member invoiced by CREA
Costs related to maintenance, updating and video covering of precision farming good practices and technologies on YouTube	CREA	All members based on cost calculation and fee per member invoiced by CREA
Employee costs of multimedia/marketing specialist responsible for organising and coordinating the multimedia and marketing activities	CREA	All members based on cost calculation and fee per member invoiced by CREA

Cost category	Source of cost	Cost covered by
Employee costs of the assistant to the President of the Board responsible for the daily secretariat of the Transfarm 4.0 Network of Excellence	Business Support Organisation taking up the leading role in the Management Board	All members based on cost calculation and fee per member invoiced by business support organisation
General administration costs related to the daily secretariat of the Transfarm 4.0 Network of Excellence	Business Support Organisation taking up the leading role in the Management Board	All members based on cost calculation and fee per member invoiced by business support organisation
Employee costs of the representatives appointed by each of the members as the main contact person ensuring good communication between the members and within the organisational structures of each member	All members	Each member covers internally the cost of its employee selected as contact person for the Network of Excellence
Fees for experts involved advisory services	Members involved in delivering services	Each member covers the cost of the expert involved and finances this cost through own projects or commercial service income
Costs related to analyses and assessments regarding identification of new precision farming technologies at universities and research organisations	Members involved in delivering services	Each member covers the costs and finances this cost through own projects or commercial service income
Costs related to audits and support of farmers in order to identify needs and constrains as well as opportunities for adopting precision farming technologies	Members involved in delivering services	Each member covers the costs and finances this cost through own projects or commercial service income

The Transfarm 4.0 Network of Excellence members shall proceed together in order to identify international calls for proposals to finance joint activities. Additionally, the members shall look for regional and national funding programmes to finance locally actions and support services based on the joint roadmap to enhance local and transnational innovation management services (D.T.3.2.1)

8. Summary of the business model for the Transfarm 4.0 Network of Excellence

<table>
<tr>
<td rowspan="2">Key partners
Technology experts
Clusters, associations and other network structures of suppliers
Clusters, associations and other network structures of farmers
Governmental and regional organisations responsible for preparing and implementing public funding support programmes
Private and public risk capital organisations and financing institutions</td>
<td>Key activities
Identification of new precision farming technologies
Identification of suppliers of precision farming technologies
Identification of famers’ needs and potential to test and adopt precision farming technologies
Promotion of precision farming technologies during online events
Support in project development and implementation
Information support for farmers through the Transfarm 4.0 one-stop-shop and member representatives</td>
<td rowspan="2">Value propositions
Dedicated networking between the demand side and the supply side for precision farming technologies in Central Europe
Neutral support in needs assessment and guidance towards financing of proof-of-concept testing and/or investment projects
Support in improving the investment readiness level of precision farming technologies at universities, research centres and start-ups

Main values:
• Expert network
• Supplier network
• Dedicated intermediary between demand side and supply side
• Support in identifying financing opportunities for projects</td>
<td>Customer relationships
Personal contact through secretariat
Personal contact through members’ representatives responsible for information exchange, advisory services
Automated contact through online assessment survey and one-stop-shop platform
Direct contact during online events
Expert community coordinated on social media</td>
<td rowspan="2">Target group segments
Suppliers of precision farming technologies, including: universities, research organisations, start-ups, enterprises
Farmers in Central Europe
Clusters, associations and other network structures of suppliers
Clusters, associations and other network structures of farmers
Governmental and regional organisations responsible for preparing and implementing public funding support programmes
Private and public risk capital organisations and financing institutions</td>
</tr>
<tr>
<td>Key resources
The Transfarm 4.0 website
The one-stop-shop platform
The online communication platform
The catalogue of technology suppliers
The You Tube channel
The contact persons and the specialists at the members’</td>
<td>Distribution channels
Events organised by clusters and branch associations
Own online events
The Transfarm 4.0 website
The one-stop-shop platform
S3 platforms
Social media channels</td>
</tr>
<tr>
<td colspan="3">Cost structure
Multimedia related costs, employee costs, operational costs of the secretariat, costs related to online events, costs related to assessment and advisory services</td>
<td colspan="3">Revenue streams
Internal invoicing between the members to finance the multimedia related costs of CREA
Internal invoicing between the members to finance the operational management costs
Yearly membership fee to finance joint initiatives
Project financing (regional, national, international)
Commercial service fees and success fees related to technology commercialisation</td>
</tr>
</table>