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SWOT ANALYSIS TO HIGHLIGHT CRITICALITIES AND ASSET IN PRECISION FARMING UPTAKE

AUSTRIA

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1. SWOT analysis - Austria[1]

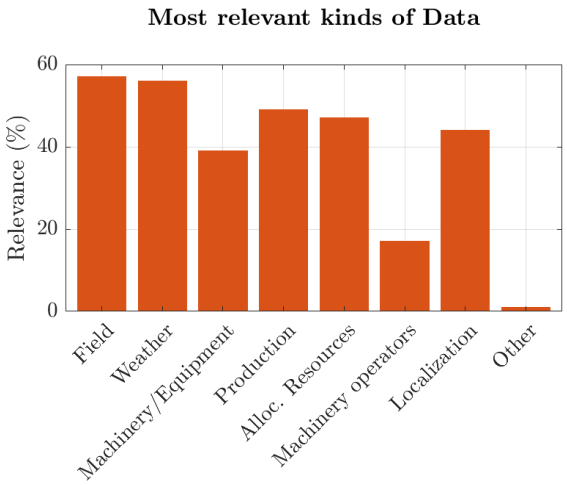
1.1. General Information

Of all the Austrian farmers who answered the questionaire, 49 % have already been using Precision Farming (PF) technology. Another 16 % considered themselves “advanced user”, and 9 % are professionally using PF for many years.

While for 39 % PF is important (incl. 12 % very important), 26 % are undecided, for 17% PF is less important and for 18 %, PF appears not important at all.

Farmers would use (reinforced) PF technologies on their farm, if the cost would be lower (84 %), if techology would be simper and/or more reliable (45 %), and if they would be better instructed how to use it (23 %). From these results, there is a clear demand for cheaper products and benefit-oriented marketing/product information. Moreover, the products should be obviously reliable and easy-to-use (high quality-of-user-experience).

The following figure provides an overview on which kinds of data are considered relevant (please see also figure 48 - question 4 from the survey). Aside from weather information, field condition monitoring appears to be most relevant to Austrian farmers, followed by production data, the allocation of resources and localization.



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Farmers assign a high amount of benefit to the use of tracking systems (GPS, 95 % of the farmers), Mobie-apps (92 %), records for supporting farm business decisions (88 %), satellite data (86 %) and soil samples services (84 %).

In addition, site-specific-focussed applications such as tillage and sowing (81 %), fertilization (79 %) and plant protection (79 %) are considered highly beneficial. The use of drones (70 %) and robots (60 %) have a tendency of being perceived as a benefit rather than a risk.

While, e.g., the initial investment, compatibility issues, data handling and system reliability tend to inhibit the use of Precision Farming, the traceability of the working processes, the facilitation of documents, reduced workload and an improvement of the quality of work are factors that appear to promote its use.

Essentially, the farmers try to keep themselves informed using five channels:

- The Internet,
- fairs,
- magazines,
- discussions with other farmers and
- agricultural associations.

In case of questions, they are consulting suppliers and vendors or the Internet.

In the following describes the analysis of the online questionaire with regard to the strengths, weaknesses, opportunities and threats of employing Precision Farming in Austria's farms.

1.2. Strengths

Summarizing the potential strengths of Precision Farming, Austrian farmers identify an increase of resource efficiency and quality of work (less work intensity and better working quality). The documentation of working processes would be easier and would be traceable. In addition, some working processes could be automated.

1.3. Weaknesses

The weaknesses related to PF are manifold, but there are some major core issues to be improved.

The first issue is about *costs*. The initial investments (incl. upgrades of existing machines) and maintenence costs appear to be too high. Up-to-date, high resolution satellite images that are easily available would be a nice-to-have but do not seem to be affordable.

Another core issue is related to the *compatibility* of the systems of different vendors which appears to be quite small regarding ISOBUS technology and the exchange of data. Easy-to-handle and cost-efficient upgrades for ISOBUS on existing machinery do not seem possible.

The *usability* of the systems appears to be weak and needs to be improved as to enable their use to untrained users. Systems also appear not to be sufficiently *reliable* to the users.

Regarding the topic „data“, security and sovereignity are not clearly defined. Algorithms for data analysis are missing, especially with regard to data from real-time applications.

Field robot technology appears to be still in its infancy and requires high initial investments. Root crops robots that exist on the market do not serve all cultures (missing for organic root crops such as pumpkin, corn and soy), and good and affordable robots that mow below vine stocks are missing as well as proper swarm technologies. Clear legal guidelines are missing for their operation. Drones seem difficult to use for cultivation, fertilization, and targeted plant protection.

Farm Management and Information Systems (FMIS) do not sufficiently provide short-range and remote sensing functionality. When changing the FMIS-provider, the systems lack possibilities for synchronization.

Regionwide soil water measurements and forecast models are missing for different cultures regarding location-specific climate and development. PF Technology is rather economically useful for larger farms than for smaller ones.

1.4. Opportunities

The following applications are perceived by farmers rather as a *benefit/opportunity* than a disadvantage/risk for running their farm:

- Tracking sytems (GPS),
- mobile Apps,
- satellite data,
- soil samples services,
- use of robots and drones,

- site-specific fertilization,
- site-specific tillage and sowing,
- site-specific plant protection,
- adequate irrigation,
- big & smart data management,
- records for the fulfilment of document obligations, and
- records for supporting farm business decisions.

One of the major opportunities --- and challenge for the manufacturers/vendors --- is the costs. Farmers would be willing to use PF technology if the costs would be reduced (84 %). This may especially be important for upgrades of existing gear/machinery.

The willingness to incorporate PF would also be increased, if the products would be more reliable and easier to use (45%). While, generally, more extensive product quality tests may address the first issue, Quality-of-User-Experience tests including naive test users may help increasing system usability and user satisfaction.

Another important opportunity results from the current weakness of products not being compatible with procucts from other manufacturers. If all vendors would cooporate in this respect, the use of PF could significantly be increased.

PF is especially interesting for cash crop and permanent crop plants. Field robots will be very useful for organic farming, as manual workforce will hardly be mobilisable. Moreover, additional functionalities, such as the easy Integration of AMA-GIS-Data or Integration of GPS-data, would provide increased attractivenes of PF to the farmers.

Farm operations theoretically will get economically and ecologically more efficient with increasing use of PF.

In order to establish a broad acceptance of PF, especially the following institutions need to act accordingly:

- 1. Research & Development,
- 2. Industry,
- 3. Political framework (funding, legal framework, etc.).

1.5. Threats

Precision Farming is associated with the following threats/risks.

- Data security and data sovereignty is not regulated.
- PF technology providers obviously do not take into account that their products need to be compatible with those of other vendors and need to be easily usable, especially taking the increasing age of the agricultural works managers into consideration.
- The prices and charges for equipment/gear and services appear not to be affordable for smaller farms/businesses.

This is in fact in line with the trend that the number of full-time farmers is decreasing. While part-time farming is currently increasing, the total amount of farmers will steadily decrease.