Marketing strategies of the German farm management information systems startups that reached critical mass

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Abstract: What kind of marketing strategies can lead to achievement of the critical mass on the agricultural market in Germany? To answer this question, all currently existing farm management startups in Germany were selected and the ones with critical mass were identified. Their marketing strategies were qualitatively analyzed and triangulated with the marketing strategies of online marketplaces.

Keywords: critical mass, farm management, startups, Germany, marketplaces

1 Objective and method

Farm management information systems (FMIS), according to the Gartner Hype Cycle, are the next technology that will conquer the agricultural market. The current challenge, though, is the adoption pace of FMIS, which is not as quick as it was expected. According to the EU expert group composed of 19 experts that range from farmers to scientists, the main obstacles to the adoption process of precision farming are a lack of economic benefits, high investment costs, complexity of new technologies, and a lack of open standards for the integration of different solutions [EA15]. So, how did some startups manage to achieve critical mass on such a complicated market? To answer this question, a qualitative investigation was conducted. For the purpose of this research, the FMIS will be defined as "a planned system of the collecting, processing, storing and disseminating of data in the form of information needed to carry out the operations functions of the farm." [SA10]. To collect data about the marketing strategies of the FMIS startups, a telephone interview was conducted; this was based on a structured questionnaire. The questionnaire was developed based on the 7 hypotheses that were developed from previous qualitative research, theories about innovation adoption, and the experts' opinions. To select the startups with promising marketing strategies, critical mass was defined in accordance with the theory about the diffusion of innovation as a share of the market that is between 10 % and 20 % [Ro83]. To calculate the share of the market, not only the number of the customers but also the customers' turnover share shall be considered. To verify the strategies of the startups that have achieved critical mass, a data triangulation method will be used. This method encourages a look "at the same phenomena, or research question, from more than one source of data" [De99]. For the triangulation, extant German online marketplaces for farmers that achieved critical mass were selected. The online agricultural marketplace was selected as a technology for comparison. This is because it

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has been around for almost as long as farm management. The first online farm management software appeared approximately 15 years ago [Ka12]. First online marketplaces for farmers appeared in the early 2000s [FDM18]. Several studies show that farmers faced similar challenges whilst using the FMIS and marketplace: lack of trust, lack of the education / training, lack of understanding of technological advantages [R06; FDM18]. The difference between online farm management and the marketplace is that farm management as a technology has a longer diffusion cycle. According to [FDM18], approximately 80 % of the farmers in Germany purchase online. As opposed to the FMIS, where, according to the [RK16] report, only 12 % out of 521 participating agricultural enterprises use modern farm management platforms. To find farm management startups with critical mass, firstly, all farm management startups in Germany were selected that 1) have an online presence (in form of a website with information about their solution), 2) and are not older than 5 years and 3) are not a corporate startup or startup with exit. To find farm management startups, several sources were used: f6s.com, start-green.net, dlg-Feldtage, FachGruppe AgTech; web searches that contained the keywords "farm management startups" and "German agricultural startups"; German online magazines like "deutschestartups" and "gründerszene" as well as previously obtained contacts during the Agritechnika fair and the GIL-conferences. The total number of the farm management startups found was ten; seven agreed to take part in the research. In the table presented below, key information about the startups can be found.

Founded	**Type of FMIS**	**Status of FMIS**	**Target group of FMIS**
2015	plant's disease analysis	on the market	hobby gardeners and small horticulture farmers
2014	smart cow feeding	on the market	cow and pig farms (all sizes)
2013	satellite data for soil analysis	on the market	developers of agricultural software
2015	field monitoring	on the market	crop farms (all sizes)
2016	soil analysis	test phase	crop farms (all sizes)
2016	online cooperation tool with vets	on the market	small and medium-sized animal farms
2016	cow monitoring	test phase	cow farms (all sizes)

Tab. 1: FMIS startups in Germany

To find companies that are suitable for data triangulation, a list of companies which was presented in the marketplace's study was used. [Cl05]. This list was enhanced by the inclusion of newer companies (after 2005) that were found during the web search with the following key words "Marktplatz", "Landwirte", "Online", "Kaufen", "Landmaschine", and "Pflanzenschutzmittel". In total, 18 online marketplaces in Germany were found. Some of the marketplaces were part of one big corporation, such as landimmo, tec24, landjobs; all of these are part of the Raiffeisen company. To obtain the necessary data regarding agricultural marketplaces, a telephone interview was used as a method. Nine online marketplaces represented by 6 companies participated in the interview.

2 Hypothesis

To investigate the types of strategies that startups with critical mass follow, a number of hypotheses were selected based on the theory of innovation diffusion/technology adoption, qualitative in-depth interview findings [GCT17] and the suggestions of the [EA15].

H1: Startups that have achieved critical mass provide feasible advantages for farmers.

Perceived usefulness was one of the main factors influencing precision farming acceptance [Pi13].

H2: Startups that have achieved critical mass offer access to a free trial version.

An opportunity to see how technology works without financial commitment reduces the uncertainty regarding benefits and risks [RS10].

H3: Startups that have achieved critical mass offer their technology to large farms.

According to several studies in Germany [Re09; PT17], the early adopters on the market tend to be larger farms with 250 ha and more.

H4: Startups that have achieved critical mass use cooperation for educational and distributional purposes, with agricultural stakeholders as scalable interpersonal communication.

The cooperation component was discovered during the in-depth interviews [GCT17]. Cooperation should help scale interpersonal communication, which is one of the most important informational sources about innovations for farmers.

H5: Startups that have achieved critical mass are integrated into either existing platforms or they expand their own solutions.

Compatibility with the existing work process and software, something already used by farmers, is an important factor that was suggested by the experts and that is also present in the theory [Ro83].

H6: Startups that have achieved critical mass actively spread information about their solutions through mass media.

According to [MMB90], the first adoption takes place due to the mass media and later mainly through word-of-mouth.

H7: Startups that have achieved critical mass developed their product along with farmers to make utilizing the solution easier.

The experts of the [EA15] group underlined that for spreading precision farming, solutions should be focused on real farmers' needs and should be understandable and easy to use.

3 Marketing strategies of the agricultural companies with critical mass

To calculate the market share of each interviewed startup, the statistical data regarding the number of agricultural enterprises and their standard output (SO) were analyzed. According to the new EU guidelines to small companies, all farms that have SO < 50,000 EUR/per year and less than one employee count. In other cases, the farming activities count as main source of income and as medium or large companies. Since there is no additional definition separating medium and large companies, for the purpose of this research, large companies will count as those with SO ≥ 1,000,000 EUR. The basis for the German market calculation was the statistical data from 2016, provided by the German statistical agency. According to this data, there are 275,392 companies that are involved in agriculture. 113,507 produce different types of crop, vegetables and horticulture. Among crop farms, there are 53,293 small and 3,108 large farms. 161,885 farms are involved in the dairy and meat production business. 145,892 are dairy and meat farms and 15,993 are pig and poultry farms. According to the data of the non-governmental organization "kleingarten-bund", there are 910,000 hobby gardeners.

According to the data provided by the startups, only two of them have achieved critical mass. However, it is important to mention that two of the interviewed startups are still in the test-phase and only planning a marketing strategy. One startup does not directly address farmers but sells their solution to the companies that develop agricultural software. In Germany, this startup works with one small software company. One startup with critical mass combined two strategies: the first one consisted of direct marketing to customers via mass media; the second one occurred through integration offered in form of cooperation to several big corporations in Germany, which produce plant protection products. Through mass media, the startup could win approximately 11 % of the German market. Additional growth comes through chemical companies that together own more than 30 % of the target market. Due to the privacy agreement with the co-founder, the names of the chemical companies could not be published. The other startup has a market penetration rate of

approximately 21 % due to the SO and 2 % due to the total number of crop farms. Thanks to the early adopters that were large farms, the startup could achieve critical mass.

In the telephone interview for the data triangulation, three startup marketplaces took part: one big corporation that owns several marketplaces and four medium-sized companies. All these companies wished to stay anonymous. Among the new marketplaces, there is no company that has achieved critical mass on the market. The marketplaces with critical mass followed mainly two strategies for market penetration: 1) through corporate partners; 2) cold acquisition. Two out of three marketplaces with critical mass were founded by corporations that, at the time, had already been on the agricultural market in Germany for a while. To gain their first customers, the corporations used their already existing channels. In the table below, a comparative analysis of the marketing strategies of farm management startups and marketplaces with critical mass is presented.

		Farm management startups with critical mass		**Marketplaces with critical mass**		
Hypothesis	Marketing strategy	Results of the interviews				
H1	Feasible advantages	x	x	x	x	x
H2	Trail version	x	x			
H3	Early adopters large farms		x	x		
H4a	Educational cooperation	x				
H4b	Distributional cooperation	x		x	x	x
H5	API	x	x	x	x	x
H6	Mass media	x	x	x	x	x
H7	Joint development	x	x	x	x	x

Tab. 2: Marketing strategies of the FMIS startups and marketplaces

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