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Communication in Swiss Farming Cooperatives

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Abstract

The present study investigates how Swiss farmers organized into farming collectives (FCs) rate communication with their cooperation partners. The research uses the KomminO questionnaire focusing on intra-organizational communication (Sperka, 2000; Sperka and Rozsa, 2007). The validity of the questionnaire in an agricultural context is analyzed, resulting in confirmation of four of the seven scales assessed by the KomminO, namely, communication quality, usability of information, channel openness, and importance of communication. The FC farmers' scores in these four scales were all fairly high. The comparison of the farmers' scores with the data of a large norm sample suggests that the rating of communication quality, usability of information, and channel openness by FC farmers is significantly above average. Accordingly, the results indicate that Swiss farmers organized into FCs possess strong communication skills. Given that for 75% of the farmers completing the questionnaire the FCs have been in place for at least five years, we can conclude that communication skills are an important factor for the continued existence of an FC.

Keywords: farming collective, production cooperative, communication in organizations, KomminO questionnaire

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Introduction

Since the average farm in Switzerland is only around 20 hectares in size (Roesch and Hausheer Schnider, 2009), increasing the size of Swiss farms would result in economies of scale and lower production costs. However, given the limited availability of agricultural land in Switzerland, this is more easily said than done (Gazzarin et al., 2008). An alternative to the extension strategy lies in cooperation between farms. The most intensive form of cooperation is the farming collective (FC), a type of production cooperative in which two or more farms are integrated into a single organizational unit under joint management. Farms involved in an FC must fulfill several conditions, such as having been previously independent for at least three years and having a driving distance between farms of 15 km at most. The farms must also have a written contract and keep common account books. In addition, ownership of livestock and moveable assets is ceded to the FC, as is the use of land and agricultural buildings necessary for the running of the farm (Agridea, 2009).

Although cooperation between farms appears to be promising, the prevalence of FCs in Switzerland is limited, with just 1.4% of farms being organized as collectives. In addition, around 40% of Swiss FCs were disbanded between 1990 and 2005 (Möhring, 2007). Within the framework of a qualitative analysis, Walter (2007) studied farmers who disbanded their FCs. She found that farmers mentioned communication problems and a poor ability to deal with conflicts among the reasons for disbandment. Investigating Swiss farmers' perception of FCs, Pulfer (2007) found that over 90% considered interpersonal conflicts to be a weakness of FCs. As a further result, around 85% of the farmers attributed strong communication skills to FC leaders.

Keeping an FC running and managing any conflicts that arise is a challenging task which highlights the importance of communication. We therefore hypothesize that communication within an FC must be on a high-quality level, and accordingly expect partners within an FC to have well-developed communication skills. To test our hypothesis, we aimed to examine how farmers in Swiss FCs rate communication with their cooperation partners. This was achieved by analyzing data on the intra-organizational communication of Swiss farmers in FCs gathered in a survey by Pulfer et al. (2006). In this survey, communication between farmers was assessed by means of a standardized psychometric instrument, the *Questionnaire for the Assessment of Communication in Organizations* (KomminO), developed by Sperka (2000). Pulfer et al. (2006) and Pulfer and Lips (2010) subsequently derived success factors for farming collectives and analyzed the responses to the KomminO questionnaire along the lines suggested by Sperka (2000). It must be borne in mind, however, that the KomminO questionnaire was

developed on the basis of the responses of non-farmers. To date, neither the reliability nor the validity of the KomminO scales has been investigated in an agricultural context, an action which would require a structural analysis.

A structural analysis has been performed in our study based on the results of Pulfer et al. (2006). We start with descriptions of the survey and the KomminO questionnaire, followed by the results of the structural analysis validating the KomminO approach in an agricultural setting. The survey results and a comparison with normative data are then presented. We end with a discussion.

Methods and data

Survey

This study is based on data gathered in by Pulfer et al. (2006), who had sent out a survey questionnaire to a randomly selected sample of cooperation partners in all FCs that existed in Switzerland at the time. A total of 462 farmers returned the filled questionnaire (response rate of 53%), which included questions on the history and the present situation of the FC, as well as questions for the assessment of conflict intensity and a section with the KomminO questionnaire (Sperka, 2000). Preliminary inspection of the questionnaires revealed that a very high proportion of missing responses (up to 90%) occurred specifically in the KomminO section. To avoid distortion of the results, we accordingly decided to include only those subjects who had responded to all the KomminO questions. This reduced the sample for analysis to N = 383 respondents.

All subjects were male, between 23 and 89 years old. The largest group of respondents (35%) were aged between 41 and 50, while 10% were between 21 and 30, 24% between 31 and 40, 22% between 51 and 60, and 10% were 61 or older. For 34% of the respondents agricultural apprenticeship was reported as the educational background, whilst 51% mentioned a higher agricultural education, 7% a non-agricultural education, and 6% primary school as their highest educational attainment. Fully 91% of the respondents (N = 350) belonged to a collective comprising two farms, and only 9% belonged to a collective consisting of three or more farms. Among the collectives, 28% had been in existence for over 10 years, 47% for 5 to 10 years, 21% for 2 to 5 years, and 4% up to 2 years. The distribution of the farmland owned by the collectives was positively skewed (median = 41 hectares). Most collectives (63%) cultivated between 22 and 50 hectares of farmland, whilst 23% own between 51 and 82 ha, 10% own over 82 ha, and nearly 6% own less than 22 ha. Organic farming was reported by 8% of the collectives.

The KomminO questionnaire

The questionnaire for the assessment of communication in organizations – KomminO (Sperka, 2000; Sperka and Rozsa, 2007) is based on the organizational communication questionnaire originally developed by Roberts and O'Reilly (1974). According to the authors, intra-organizational communication can be comprehensively assessed with the KomminO, which involves evaluation of the following seven dimensions (Table 1): 1) quality of communication, 2) usability of exchanged information, 3) channel openness, 4) importance of communication, 5) feedback, 6) trust in the communication partner, and 7) information extent.

The KomminO communication-quality scale (dimension 1) is a measure of an individual's overall satisfaction with communication with one or more other individuals (e.g., a cooperation partner) in a work context. Communication quality includes aspects such as accuracy, accessibility of information and general satisfaction with communication. The usability scale (dimension 2) assesses whether an individual can deal with the information obtained through communication or feels flooded with more information than he can use. The channel openness scale (dimension 3) measures how well information can be exchanged. The importance of communication scale (dimension 4) assesses the importance attributed to communication with work colleagues, whilst the feedback scale (dimension 5) measures whether the individual receives sufficient feedback from others. The trust in the communication partner scale (dimension 6) serves to assess whether the information exchanged is treated confidentially or is not used against the individual concerned. Finally, the information extent scale (dimension 7) assesses the degree of detail of the information communicated by an individual to his communication partner.

The KomminO questionnaire consists of 25 self-report items which are formulated as statements, e.g., for dimension 5, "I receive sufficient feedback from my cooperation partners on the results of my work." Subjects are asked to indicate the correctness of the various statements. The response options correspond to a 5-point Likert scale (1 = not at all, 5 = very much). Each of the 25 items pertains to one of the seven KomminO dimensions, which were originally determined by exploratory factor analysis (Sperka, 1997, 2000). Seven items are assigned to the quality of communication scale (dimension 1), while all other dimensions contain three items each. The score of an individual in one of these dimensions is calculated as the mean of the responses to the items belonging to the same dimension. In addition, the KomminO questionnaire includes one further item asking participants to indicate as a percentage the proportion of their daily working hours devoted to communication.

Table 1: Dimensions of the KomminO questionnaire (Sperka and Rozsa, 2010)

KomminO dimension (scale)	Description
1) Quality of communication	How is the quality of communication with others (accuracy, accessibility of information, lack of information channeled through others, general satisfaction with communication) rated?
2) Usability	Can the participant deal with the amount of information received, or is he flooded with more information than he can use?
3) Channel openness	Can the participant's own information be passed on to others easily, or are obstacles experienced?
4) Importance of communication	How important is communication with others when it comes to dealing with one's own work?
5) Feedback	Does the survey participant receive sufficient feedback on his own conduct in the organization?
6) Trust in the communication partner	Is there any cause for concern that certain communication partners might not treat information confidentially, or might use it against their partner?
7) Information extent	Can the participant's own information be passed on to others comprehensively, or only briefly?

Structural analysis and reliability of the KomminO questionnaire

The calculation of the internal consistencies of the seven KomminO scales as defined by Sperka and Rozsa (2007) shows that four of the seven scales had an internal consistency (Cronbach's α) lower than $\alpha = 0.75$ (Table 2). Three of these four scales have a reliability lower than $\alpha = 0.7$. For this reason, we examine whether the KomminO scales can be found in our farmer sample and whether they can be structured so as to show a satisfactory reliability. The structure and reliability of the 25 items of the KomminO questionnaire are assessed in three steps.

First, the responses to each item are correlated with those of all other items by calculating Pearson's *r*. Based on this correlation matrix, clusters of items are determined by means of the ICLUST algorithm from R statistical software (Revelle, 1979). It is a procedure that joins any two items or clusters together into a single new cluster if the coefficients alpha (Cronbach, 1951) and beta (Revelle,

1979) for the new cluster exceed the average coefficients of the two separate items (or clusters) being considered for merging. Thus, the ICLUST procedure has the advantage that items are only added to clusters if they increase the cluster's internal consistency and factorial homogeneity. Moreover, since the sequential item-by-item growth of clusters mapped with an accompanying set of homogeneity statistics can be displayed in a hierarchical tree diagram, ICLUST provides useful diagnostic information not available in other scale construction methods, such as exploratory factor analysis (Cooksey and Soutar, 2006). ICLUST allows us to directly visualize the internal substructure of scales, and thus to decide whether to form scales on a macro level (higher-order scales) as well as at a more-finely-grained micro level (lower-order scales). Problematic items can be more easily identified and do not obscure the factorial structure as much as in an exploratory factor analysis, because they are usually merged in a late step of the ICLUST procedure (for more information, see Cooksey and Soutar, 2006).

Table 2: Internal consistency (reliability) of the seven KomminO scales in the total sample (N=383)

Scale	Items	Cronbach's α
1) Quality of communication	7	0.82
2) Usability	3	0.79
3) Channel openness	3	0.71
4) Importance of communication	3	0.79
5) Feedback	3	0.43
6) Trust in the communication partner	3	0.45
7) Information extent	3	0.35

Subsequently, we exclude those items in the ICLUST solution which are not at least part of a cluster that includes most of the items in the dimension to which they belong according to Sperka and Rozsa (2007), or which form a cluster with a low internal consistency ($\alpha < 0.7$). Accordingly, 10 of the 25 items are excluded, and a second-step cluster analysis is performed with the remaining items.

In a third step, in order to cross-validate the item clusters found by the second-step cluster analysis, the structure of the remaining items is analyzed by nonmetric multidimensional scaling (NMDS). This is accomplished by analyzing the correlation matrix of the KomminO items once based on Pearson's *r* and once based on Spearman's rho by means of the robust NMDS algorithm ROBUSCAL (Läge et al., 2005). This is a multidimensional scaling procedure which represents the items of the KomminO questionnaire as points in multidimensional space such that the distances between the points represent the intercorrelations of the items.

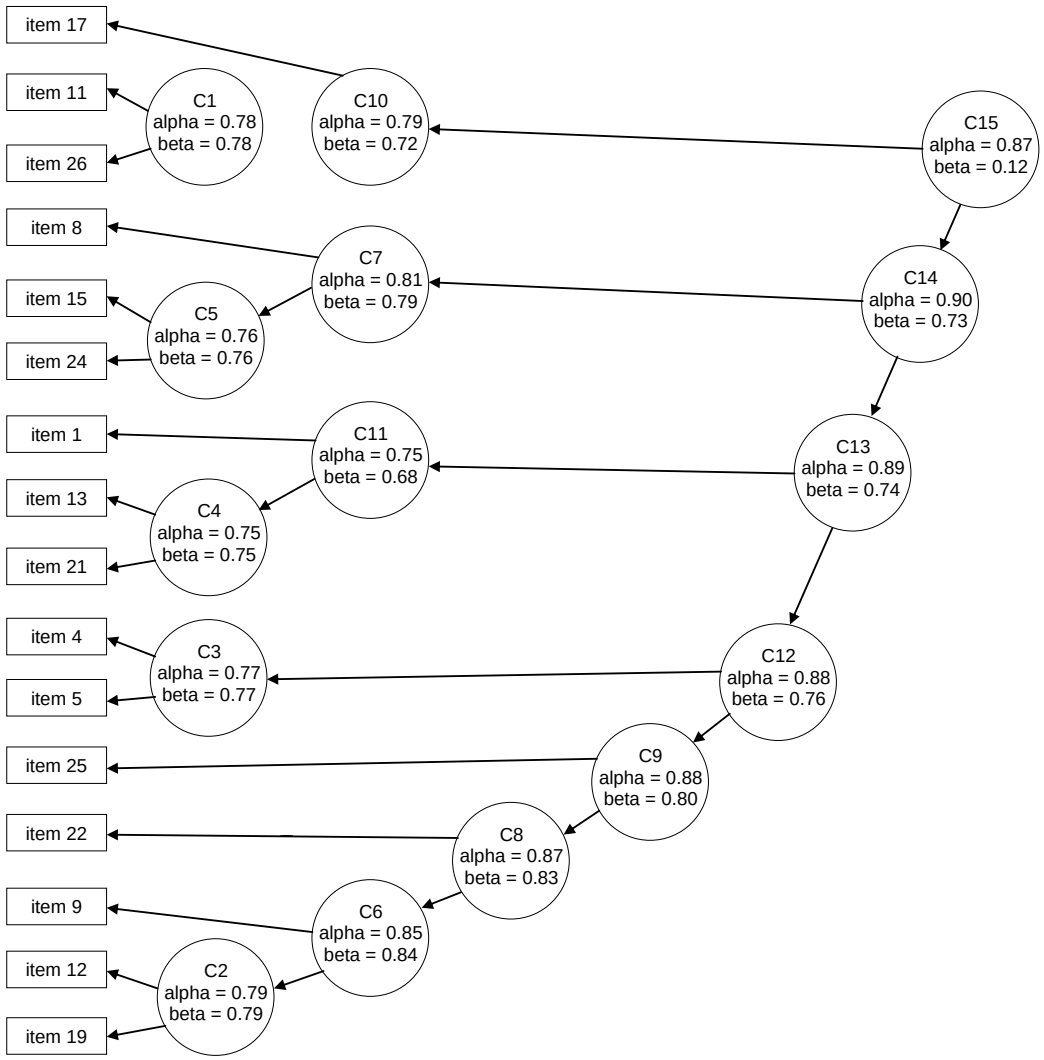
Within this Euclidian space, a small distance between two points corresponds to a small difference between the corresponding items or a high covariance, respectively. The two NMDS solutions are compared by means of the Procrustes transformation (Hurley and Cattell, 1962), which compares the structures of two NMDS solutions by extending, shifting, rotating, and mirroring the configurations in order to achieve a maximum congruence and then determines the remaining deviation as a numerical value between the compared NMDS solutions. This value, referred to as the average loss (AL), is the averaged and standardized value of all deviations of the various corresponding objects in the NMDS spaces. The statistics in this section are computed using R 2.1 for cluster analysis and ProDax 1 (Oberholzer et al., 2008) for NMDS.

The cluster analysis with ICLUST replicates the following three clusters as per Sperka and Rozsa (2007): usability (dimension 2; α = 0.81), channel openness (dimension 3; α = 0.75), and importance of communication (dimension 4; α = 0.79). All but one of the communication-quality items (dimension 1) are part of the same cluster. The usability items (dimension 2) as well as two of the three trust in the communication partner items (dimension 6) are also part of this cluster. Feedback (dimension 5), trust in the communication partner, and information extent (dimension 7) cannot be replicated in such a way that all the items of the respective scale are in the same cluster. Accordingly, these scales cannot be constructed with a satisfactory internal consistency. The items of these scales as well as the displaced information-quality item are therefore excluded in the second-step cluster analysis. The result of this analysis is shown in Figure 1. In this solution, communication quality (dimension 1; α = 0.88), usability (dimension 2; α = 0.81), channel openness (dimension 3; α = 0.75), and importance of communication (dimension 4; α = 0.79) formed four distinct clusters with a high internal consistency, in accordance with Sperka and Rozsa (2007).

As can be seen in Figure 1, the ICLUST solution suggests that the four KomminO scales represent subscales. The four clusters described above can be merged into one single higher-order cluster. Thus, the communication of a farmer in an FC can also be described by calculating the score of a general scale based on the response to all questionnaire items.

The NMDS of the reduced item set based on Pearson correlations and the NMDS based on Spearman rank correlations produce almost identical solutions. The comparison of these two maps by means of the Procrustes transformation yields a very low average loss (AL = 0.06). Figure 2 shows the NMDS map based on Spearman rank correlations. The clusters on this map fully converge with those of the cluster analysis.

Figure 1: Result of cluster analysis performed with ICLUST: C12 = Quality of communication, C7 = Usability, C11 = Channel openness, C10 = Importance of communication, N=383, cluster fit = 0.76.



Results

For each subject, the scores are calculated in the KomminO dimensions that can be replicated as scales with satisfactory reliability. This is done by calculating the mean of the responses to the items that formed the same cluster in the NMDS solution and the cluster-analysis solution and at the same time represented the corresponding KomminO scale in accordance with Sperka and Rozsa (2007). Based on these individual scores, the descriptive statistics of the whole sample are calculated. Table 3 shows the descriptive statistics of the whole sample in the four scales. Bearing in mind that the response options range from 1 to 5, all mean scores – except the importance score – are fairly high. As regards median values, results of at least 4.0 can be observed for all four dimensions.

Figure 2: Relational structure of the reduced set of items in 3-dimensional space as determined by NMDS based on Spearman's rank correlations (N=383, stress=0.042). Quality of communication: items 4, 5, 9, 12, 19, 22, 25; Usability: items 8, 15, 24; Channel openness: items 1, 13, 21; Importance of communication: items 11, 17, 26.

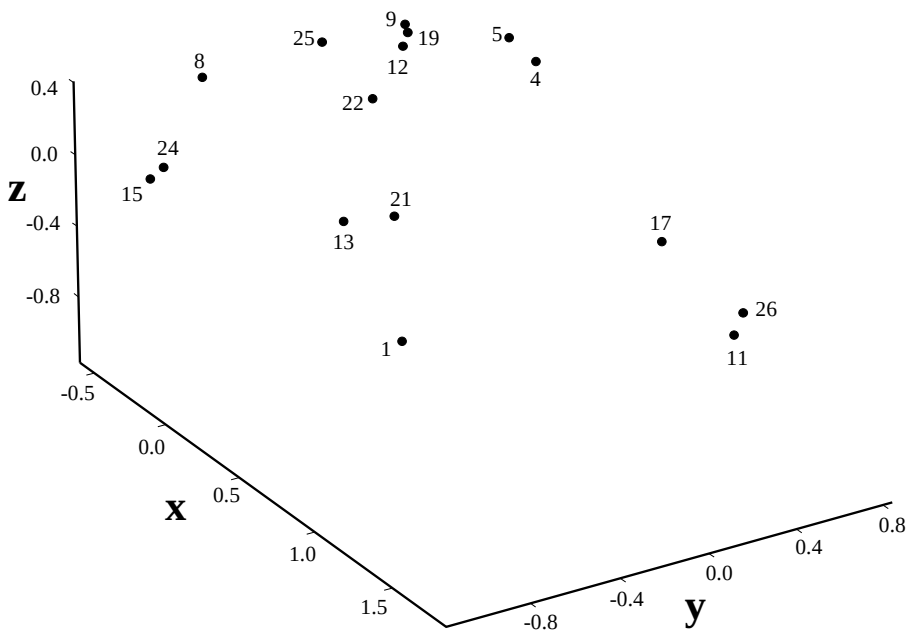


Table 3: Descriptive statistics of the four KomminO scales for the total sample (N=383)

Scale	Median	Mean	SD	Skewness	Kurtosis
1 Communication quality	4.3	4.2	0.6	-0.3	-1.1
2 Usability	4.7	4.5	0.6	-1.1	0.1
3 Channel openness	4.0	4.2	0.6	-0.2	-0.9
4 Importance of communication	4.0	3.8	1.0	-0.6	-0.4

To evaluate the relative magnitude of the farmers' KomminO scores, we determine the percentile rank (Lienert and Raatz, 1998) to which the farmers' median scores correspond within the data of a norm sample (N = 2245) provided by Sperka and Rozsa (2010). This sample consists of individuals working in a wide variety of organizations. Figure 3 shows the percentile ranks in the norm sample to which the median scores of the farmers correspond. According to these results, the farmers' profile is indeed characterized by above-average scores for three out of the four scales. The only below-average score is the farmers' rating of the importance of communication.

In addition to the items of the KomminO questionnaire, Pulfer et al. (2006) also asked about the frequency of information exchange. In their responses, 22% of the farmers indicated that they exchanged information monthly or weekly, whilst 45% claimed to do so daily, and 27%, several times a day. A Kruskal–Wallis test with these three groups was used to determine whether the frequency of information exchange has an effect on the communication dimensions. We discovered a significant effect in the importance of communication scale (chi-square(2,361) = 22.9; $p < 0.001$), the channel openness scale (chi-square(2,361) = 6.7; $p < 0.05$), and the communication quality scale (chi-square(2,361) = 6.8; $p < 0.05$).

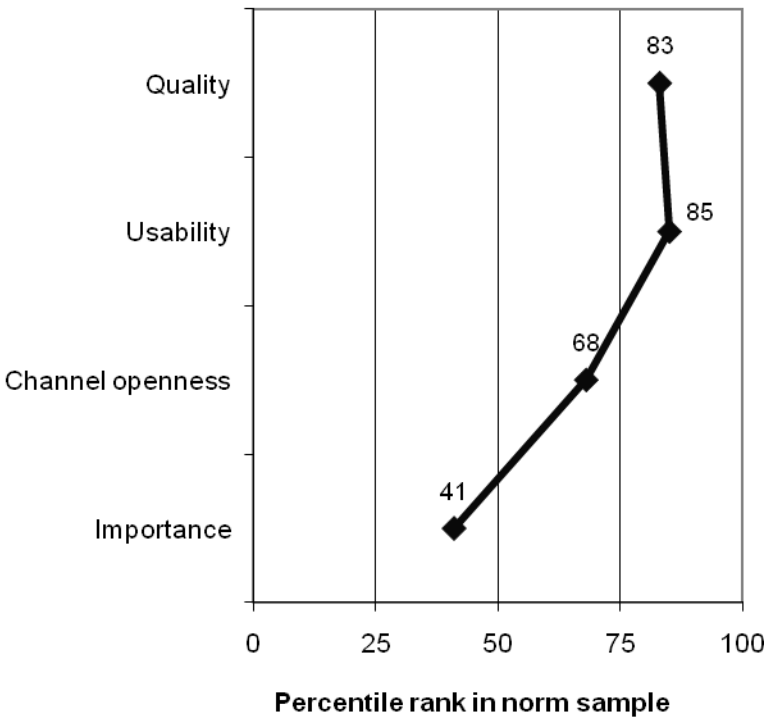
Discussion and conclusions

The present analysis investigates how Swiss farmers organized into farming collectives (FCs) rate the communication with their cooperation partners. Using the KomminO questionnaire (Sperka, 2000; Sperka and Rozsa, 2007), we test its validity and reliability in a sample of farmers. We confirm the following four out of seven aspects of communication included in the KomminO questionnaire: communication quality (dimension 1), usability of information (dimension 2), channel openness (dimension 3), and importance of communication (dimension 4).

However, one of the communication quality items has to be excluded due to displacement. Thus, regarding the future calculation of KomminO scale scores, it appears to be worthwhile to consider the exclusion of this particular item.

Feedback (dimension 5), trust in the communication partner (dimension 6), and extent of information transmission (dimension 7) cannot be identified as distinct clusters. It should be borne in mind, however, that all of these dimensions are defined by just three items. Furthermore, it is only in the case of information extent (dimension 7) that none of the items form part of the same cluster. Moreover, the other two scales cannot be replicated, as a minimum of three items is needed to calculate the internal consistency of a scale. Accordingly, we cannot conclude that they do not exist as aspects of the communication of the farmers studied. In terms of the current version of the KomminO, however, the findings of our investigation suggest that we refrain from calculating the scores on these scales, at least for Swiss farmers organized into FCs. Future studies should re-evaluate the existence of these scales.

Figure 3: Percentile ranks in the norm sample (N=2245; from Sperka and Rozsa, 2010) to which the farmers' median scores (N=383) correspond.



Nevertheless, the results of the present investigation indicate that four out of the seven KomminO scales could be confirmed in our sample, and also show high reliability. In summary, the KomminO questionnaire may be regarded as a promising tool for investigating communication between farmers.

A comparison of the Swiss farmers' results with those of a norm population suggests that the farmers rate communication quality, channel openness, and the usability of exchanged information above average. Based on the results for communication quality (dimension 1), which serves as an indicator for overall satisfaction with intra-organizational communication, we confirmed our hypothesis that communication within an FC is on a high-quality level. As regards usability (dimension 2) and channel openness (dimension 3), results indicate that farmers in Swiss FCs are very satisfied with communication with their cooperation partners.

Usability of information obtained from the cooperation partner (dimension 2) is the aspect of communication within Swiss FCs that farmers rated most positively. Thus, we may assume that farmers in Swiss FCs do not suffer from being flooded with information by their cooperation partners. On the other hand, we may also assume that farmers in an FC have well developed skills in communicating only as much information to their partner as he is able to use. Identical educational backgrounds, specialization within agriculture, and being of local origin might well facilitate communication among FC partners.

The channel openness score (dimension 3) represents the farmers' rating of how well information can be exchanged, i.e., whether information is exchanged easily or there are obstacles to its exchange. This aspect may be regarded as a prerequisite for all other aspects of communication, because information – whether accurate or not – can only be communicated if the intended recipient is "open" to receiving it, i.e., ready or able to do so. On the basis of the results of the present investigation, therefore, we may assume that one of the main characteristics of farmers in Swiss FCs is an unusually well-developed ability to assimilate information from their cooperation partners.

By contrast, the importance of communication (dimension 4) is the only aspect of communication to receive a below-average rating, possibly reflecting the farmers' attitude that communication is not important within an FC. Nevertheless, their ratings for the other three aspects indicate that their communication within the FC is finely honed rather than neglected. It may therefore be assumed that whilst farmers have above-average communication skills, they are simply not aware of the importance of this fact or the importance of communication in general. The reason for this might be that the subject of communication is not a traditional focus of farmers' perception or reflection.

The results confirm that farmers organized into an FC have strong communication skills. In addition, we must bear in mind that 75% of the FCs

analyzed have been in existence for at least five years. Assuming that communication within the analyzed FCs has been fairly stable over a period of years, we conclude that communication skills are an important factor in the continued existence of an FC. Furthermore, strong communication skills are a powerful preventive for interpersonal conflicts usually associated with FCs (Pulfer, 2007).

Analyzing interpersonal, economic, and overall success factors for FCs, Pulfer and Lips (2010) found that several communication issues had a significant influence on success. In particular, the working time spent on communication, communication quality (dimension 1), and trust in the communication partner (dimension 6) were of importance. As shown by structural analysis, the consistency of dimension 6 cannot be confirmed in the present study, making this particular result questionable.

Communication is also of importance during the setup process of an FC. Pöchtrager and Wagner (2002) mention willingness to engage in dialogue as a personal precondition for initiating cooperation. Thus, it is essential for farmers and farm consultants to focus on the farmers' communication skills when setting up or maintaining an FC. Finally, we expect that improving communication skills through communication courses for farmers who are involved in an FC or intend to set one up would reduce the risk of subsequent disbandment.

The results of the present analysis are primarily descriptive. Moreover, it should be noted that the calculation of percentile ranks within a norm population is an exploratory method aimed at obtaining a rough idea of the relative magnitude of the farmers' KomminO scores. Future studies should compare farmers in FCs with other similar, specific groups, e.g., with farmers who are not members of an FC. In addition, communication within less intensive forms of cooperation, such as farm-machinery cooperatives, could be of interest. Finally, it would be interesting to investigate communication patterns within FCs by collecting data from all the partners involved.

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