NETWORK ATTRIBUTES' EVALUATION BY STAKEHOLDER GROUPS CONCERNED TO THE AGRI-FOOD SECTOR IN HUNGARY

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Abstract: As a consortium partner, University of Debrecen, Hungary, has been conducting a European four-year project with the acronym NetGrow financed within the Framework Program 7 under the auspices of the EU focusing on network behaviour of food SMEs and the performance of networks. The overall objective is to reveal more evidences and facts on innovation, learning, and networking in the food sector of the EU. Whithin the scope of the project, special attention was paid to reveal how network attributes were evaluated by the main four stakeholder groups of the food sector such as food SMEs, public bodies, research institutions, and network management organisations. The respondents differ in ranking the attributes, while but we got a clear order of attributes, of which the top five can be explicitly selected. Taking the next three ranks into consideration, the attributes behind them have clear meanings and they seem to be complementary for the top five. The stakeholder groups were significantly differ in scoring open-mindedness and external relations, the importance of network rendered services, and the goals relevance of the network to the firms.

Keywords: agri-food sector, innovation and learning, network, attributes, evaluation

Introduction

As a consortium partner of universities and research institutions throughout Europe, University of Debrecen, Hungary, has been conducting a European four-year project with the acronym NetGrow financed within the Framework Program 7 under the auspices of the EU, which seeks to enhance the network behaviour of food SMEs and the performance of networks. Within the NETGROW project, which has the objective to contribute to the innovativeness of food SMEs through revealing the strategic network behaviour and network learning performance, one of the tasks is to identify the network attributes which are relevant in prompting network learning and innovation among agri-food SMEs, and to identify of their associated levels.

Experienced network management can be more confident respondents of the field of networking than those of concerned by a specific field or aspect of it. For the business partners such as food SMEs, this level of examination seems to be too abstract, thus they might be rather aware of network operation than comprehensive evaluation. The less abstract issues can go to business partners, but only if they are touched upon. Felföldi et al. (2013) focused on the personal consistency in scoring network attributes from the angle of learning and innovation that resulted in a more confident organisational 'expert' group such as the network managers. Of the stakeholder groups, the food SME firms were less consistent in their scores for the most important characterisitcs of networks that contribute most to learning and innovation in networks. This draws the attention to the importance of network management in order to evaluate performance or factors influencing networking.

The overall objective is to reveal more evidences and facts on innovation, learning, and networking in the food sector of the EU. Within the scope of the project, special attention was paid to reveal how network attributes were evaluated by the main four stakeholder groups of the food sector such as food SMEs, public bodies, research institutions, and network management organisations. We presume that they differ in evaluating the importance of those attributes. Doing so, they provide us with different ranks and we can identify some of those attributes preferred by a speicifc stakeholder group.

Material and methods

The identification of relevant network attributes was done by a selection process by Bologna University (UNIBO), Italy and LaSalle Beauvais Polytechnic Institute (LAS), France through the review of the relevant literature, and through the data collected during the plenary brainstorming session held in Bonn in June, 2011. Stakeholders from the triple helix coming from the partners' countries and some international experts were involved in the brainstorming session to classify those many attributes arisen. The basic methodology was developed by UNIBO together with Ghent University (UGENT), Belgium. A professional facilitator was in charge

of the direction of the plenary brainstorming session, and the results were mapped out graphically by a visual facilitator. A provisional list of attributes emerged, and the results were analysed by project partners UNIBO and LAS, and compared with the attributes emerged from the literature review.The major objective of this task was to focus on the identification of the twenty most important attributes for network innovation for the SMEs at international level.

Not to neglect the national experience within the consortium, there was a brainstorming session held by the NETGROW partners, running with the participation of a group of external national experts, where the business component was represented by food SMEs managers. It is aimed at identifying the list of attributes and related levels, according to a national perspective. A common procedure was used in each participating country, and it was intended to encourage the elicitation of an independent list of attributes from the experience of the participants, rather than asking general statements or commenting pre-defined list of attributes (e.g. the general list of attributes developed in Bonn).

Most of the attributes were alike than those selected in the sessions held by cosortium partner countries (Belgium, France, Hungary, Ireland, Italy, Sweden), at least in the possibility to group them according to macro-areas. Moreover, the emerged attributes are also consistency with those obtained from the plenary brainstorming session in Bonn.

The identification of the attributes levels was satisfactory, but their listing and definition at the national level resulted less consistency and with different levels of detail and operationality for the different attributes. In particular, while some attributes' levels may be quantified through measurements, others are mainly qualitative ones.

In conclusion, the application of the brainstorming methodology in the six Netgrow partners involved helped to reach our objective, the identification of the list of attributes, their levels and their definition. These results provided useful insights for the following step taken in Netgrow project, the organization of the Delphi rounds, which would lead to a ranking of the current list of attributes and to the final identification of the most relevant ones, while revealing the relationship among them by respondent groups.

We set two hypothesis, namely:

H1: An order of attributes can be set and the most important five-plus can be identified by using the ranks

H2: Group preference of some attributes does exist that can be identified to a specific respondent (stakeholder) group

Description of the data

During the NETGROW brainstorming session, the experts identified a list of 37 attributes relevant for SMEs networking and innovation, later we reduced this attributes to 12. Then, these attributes were grouped and then ranked (through dots) by the participants, which were asked later to define the characteristics of the most voted ones. In the following table *(Table 1.)* presents the 12 selected variables for the analysis.

In the second column of the table we can read the definitions of the selected variables (or attributes).

Table 1: Selected variables to evaluate and its definitions

1.	Degree of internal information openness	Degree to which information is shared openly with members within the network
2.	Clearness of goals	Degree to which the goals of the network are clearly defined
3.	Main services provided by the network	Type of preferred services provided by the network
4.	Type of members	Composition of the network in terms of the type of members (e.g. other firms, advisors, etc.)
5.	Relevance of network's goal for the firm	Degree to which the network's goal is relevant for the firm
6.	Presence of common values and willingness to collaborate	Degree to which the members of the network share common values and a willingness to collaborate
7.	Variety of industry sectors	Specificity of network's focus with respect to the food sector
8.	Degree of commitment by members	Degree of commitment by members of the network towards the network and other members
9.	Linkages to other networks or institutions	Linkages of the network/its members to other networks or institutions
10.	Diversity and open-mindedness	Degree to which the members of the network show/value diversity and open mindedness
11.	Representativeness of the network with respect to the sector	Degree to which the network covers the full sector
12.	Type of food sector of the members	Desired composition of the network in terms of the homogeneity/heterogeneity of the sectors the members represent

Source: Netgrow, 2011

After having the 12 important attributes to evaluate, 34 experts of Hungary, only those of concerned by their institutional basis, were involved in the evaluation, representing four stakeholder groups such as food SMEs as business partners, public bodies, research institutions, and network management organisations *(Table 2.)*.

Table 2: Respondent category

Groups of respondents (stakeholders)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	network management	7	20,6	20,6	20,6
	food SME (business partner)	10	29,4	29,4	50,0
	research institution	10	29,4	29,4	79,4
	public body	7	20,6	20,6	100,0
	Total	34	100,0	100,0	

Source: own

Method of analysis

The method of paired comparisons has a long history, originating in the field of psychophysics. Within psychology it is most closely associated with the name of Louis Thurstone (1959), an American psychologist working in the 1920s–1950s who showed how the method could be used to scale non-physical, subjective' attributes such as 'perceived seriousness of crime', or 'perceived quality of handwriting' (Bramley-Oates 2010).

In practice, the paired comparison method typically is very demanding – it can be extremely resource- and time-intensive. The issue for its deployment depends not least on reaching a judgment regarding its benefit-effort ratio in a specific context (Novakovic and Suto, 2010). In an effort to increase the efficiency of the process, Bramley (2005) showed how the same principles could be used to create a scale if the experts were asked to put several objects into a rank order rather than comparing just two. Using rankings of several objects allows many more comparisons to take place in the same time, with the advantage of allowing whole mark scales to be linked, rather than just grade boundary points (Bramley-Oates 2010).

To get a clear view for each of the attribute combination scores, we used a preference matrix for each respondent. This matrix includes each decision on paired attributes that the individual experts made. In the rows and columns of the matrix we can see that different attributes (a1-a12) to be compared. During the comparison procedure the experts has to compare for instance the a1 with the a2, but later they have the opposite comparison, like a2 with 11. It is the same decision but in another way, to test the experts confidences. The diagonal of the matrix does not mean anything (with same attribute comparison) so the value of the diagonal matrix will be neutral. Finally we calculate the sum of the individual rows and columns that go to a cumulative score matrix. Having that we used the cumulative attribute score matrix to get the rankings by each stakeholder group.

To meet this paper objectives, we run a test (Kruskall-Wallis H) for several independent samples to reveal relations between stakeholder groups and the attributes assessed. Following this, we made paired comparisons by stakeholder groups based on the significance values for each attribute. Obviously, we made the comparisons in the case of those network attributes of that significance values were less than 0,1. In general this level value is maximum 0,05, but we paid attention to those all not higher than 0,1 in order not to neglect some information.

Results

Because the 34 experts represented from different fields like SMEs, public body, research institutions and network management organisations, their different orientations show different preference systems with different point of views. But we got an overall picture showing that there is some common orientation representing a pattern of attributes' importance.

From the cumulative attribute score matrix we can compute the aggregate order of the different attributes, which is applied together with the mean ranks. Thus, we could create the verified order of the important attributes.

After having gained the attributes' order of importance for a network to innovate for the agri-food sector, we could select the most important five ones and separate another three, which were judged by their mean ranks, were considered belonging to the first five rather than the last one-third of the attributes in rank.

In *table 3* we can read the attributes orders of importance by expert groups and totalled up. We have to highlight the "relevance of network goals for the firm", "clearness of goals", "degree of internal openness", "presence of common values and willingness to collaborate", and "main services provided by the network" as they are the top five. The next three are complementary for those of five, thus they together make up the relevants representing the 2/3 of the total dozen.

Based upon the values of Kruskal Wallis H *(table 4.)*, we must analyse relations between stakeholder groups and attributes named "Diversity and open-mindedness", "Linkages to other networks or institutions" as it is justified by significance. Paralell with that we found that it makes sense to reveal relations between stakeholder groups and attributes named "Main services provided by the network", "Relevance of network's goal for the firm", since significances suggest that these are not so low values to reject the null-hypothesis, although the pure values mean that we should do so.

Conclusions

A preliminary list of 37 attributes stemmed from NETGROW were applied and reduced to 12, so 12 attributes were assessed. Experts (only those of concerned by their institutional basis) were involved (34 of Hungary), representing four stakeholder groups such as food SMEs, public bodies, research institutions, and network management organisations. They were selected respecting the rules that a respondent had to be a stakeholder concerned in innovation related organizations and actions by agri-food sector players.

As a result of the survey we got a clear order of attributes, of which the top five can be explicitly selected such as "relevance of network goals for the firm", "clearness of goals", "degree of internal openness", "presence of common values and willingness to collaborate", and "main services provided by the network". Taking the next three such as "linkages to other networks or institutions", "degree of commitment by members", and "diversity and open-mindedness" into consideration, these attributes also have clear meanings and they seem to be complementary for the top five.

The most important attribute for a network to innovate is the degree to which the network's goal is relevant for the firm that is or would be a member of the network. The second one suggests more accuracy, referring the specificity and the clear definition of the goals set. The third one is the degree to which information is shared openly with members within the

Table 3. Attributes by order by expert groups

Order	Network management	Research institution	Public body	Business partner	Aggregate
1	Degree of internal information openness	Relevance of network's goal for the firm	Relevance of network's goal for the firm	Relevance of network's goal for the firm	Relevance of network's goal for the firm
2	Clearness of goals	Presence of common values and willingness to collaborate	Presence of common values and willingness to collaborate	Degree of internal information openness	Clearness of goals
3	Presence of common values and willingness to collaborate	Diversity and open-mindedness	Main services provided by the network	Clearness of goals	Degree of internal information openness
4	Linkages to other networks or institutions	Clearness of goals	Clearness of goals	Main services provided by the network	Presence of common values and willingness to collaborate
5	Relevance of network's goal for the firm	Degree of internal information openness	Degree of internal information openness	Presence of common values and willingness to collaborate	Main services provided by the network
6	Main services provided by the network	Degree of commitment by members	Degree of commitment by members	Degree of commitment by members	Linkages to other networks or institutions
7	Type of members	Linkages to other networks or institutions	Type of members	Linkages to other networks or institutions	Degree of commitment by members
8	Type of food sector of the members	Variety of industry sectors	Representativeness of the network with respect to the sector	Diversity and open-mindedness	Diversity and open-mindedness

Source: own

Table 4: Test statistics

	Degree of internal information openness	Clearness of goals	Main services provided by the network	Relevance of network's goal for the firm	Presence of common values and willingness to collaborate	Degree of commitment by members	Linkages to other networks or institutions	Diversity and open-mindedness
Chi-Square	1,065	4,270	7,425	6,987	3,848	2,712	8,357	12,594
df	3	3	3	3	3	3	3	3
Asymp. sig.	0,786	0,234	0,060	0,072	0,278	0,438	0,039	0,006

a. Kruskal Wallis Test , b. Grouping Variable: Respondent category. Source: own

network, whatever is that information. So, the focus might be on the "sharing" among the members. Presence of common values and willingness to collaborate is the next as an attribute of importance that is in line with the former one as common values and willingness to collaborate help with sharing. As members of a network organisation all stakeholder expect services "rendered" by the network as an organisation. They have their own expectations, which are rather general than specific, although, the services must have the potential to meet their needs. Those following the top five are the completing three that stress upon the degree of commitment by members of the network towards the network itself and other members, while the micro-environment is considered necessary as other networks or institutions and the degree to which the members of the network show/value diversity and open mindedness.

The stakeholder groups were significantly differ in scoring open-mindedness and external relations, the importance of network rendered services, and the goals' relevance of the network to the firms.

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