Milestone 3.1:
Stakeholder Decision Making Model
Report on the Fuzzy Cognitive Mapping Workshops and Data Analysis

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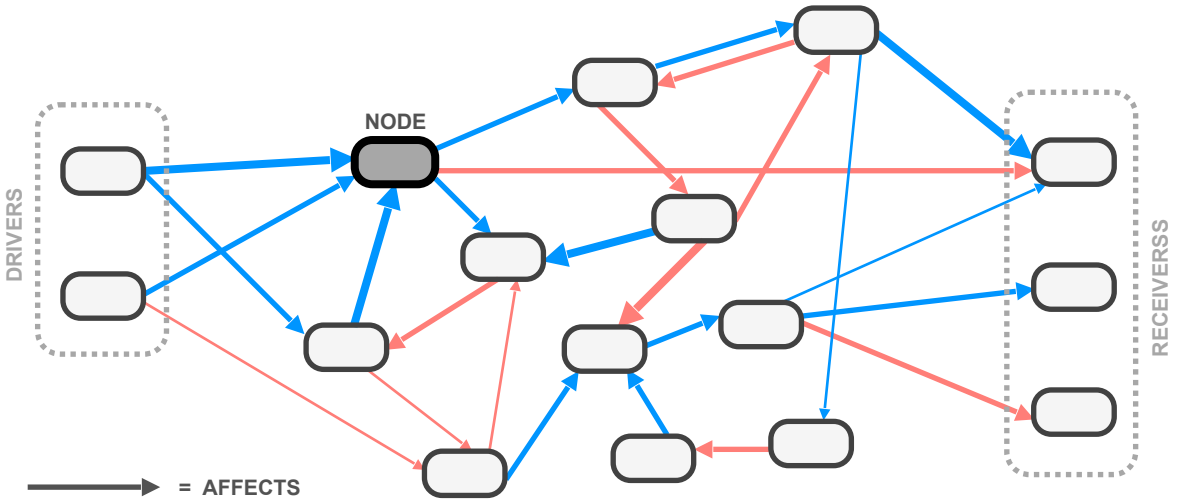
Table of contents

Fuzzy Cognitive Mapping General Principles

A Fuzzy Cognitive Maps is qualitative model of a system based on variables and on the causal relations between those variables, as it is perceived by a panel of subjects.

The qualitative model is translated into a semiquantitative model building a graph whose nodes are the variables and the arrows are the causal relations. Each arrow is assigned a weight in (0, +1] for direct relations and [-1, 0) for inverse ones.



Some variables are called drivers (outgoing arrows only) ad some are called receivers (incoming arrows only). The other nodes are called ordinaries. Drivers and receivers are perceived as causes and outcomes by the fuzzy map makers panel. The causal relations are often depicted with coloured arrows of different thickness, the color meaning a direct/inverse relation and the thickness varying proportionally to the weight.

The fuzzy graph is translated as a numerical matrix of weights interconnecting the nodes. On these weights some standard and fuzzy statistical calculations can be applied. In particular, it exists a set of indices related to the single variables as well as to the map as a whole; they are described in the FCM Weights Matrix Treatment section.

Algebraically speaking, the relations are modelled by assigning an actual or conventional value to each variable (being it quantitative or qualitative) and using saturated functions for the arrows (logistic, sigmoid, error function, etc). The weights/functions are then let go, until a steady state is reached. This is assured by the asymptotic behaviour of the functions. The result is a quantitative prediction, in the case of quantitative variable, or, more commonly, an increase/decrease estimate in for qualitative variables.

It is possible explore different scenarios, varying the input conditions (i.e. some driver or ordinary variables values) and letting the network reach a new steady state. Such calculations must be performed on a computer: various packages exist, e.g. the R fcm package (https://cran.r-project.org/web/packages/fcm/index.html).

Fuzzy Cognitive Mapping in FOODLEVERS

All the FOODLEVERS partners applied the FCM in their respective countries. This report is focused on the results from Belgium, Finland, Italy, Germany, Poland and Romania. The UK case study is the object of a separate report presented by the UK partner.

The FCM methodology has been applied by gathering a group (or groups) of stakeholders, who discussed about the leverage points in organic farming guided by a facilitator, who focused the debate on:

- defining the variables of the system, i.e. the components of the organic food network as they are perceived by the stakeholders group - these are the nodes of the fuzzy network;
- defining the links among the variables, i.e. the causal relations in terms of direct or inverse influence of one variable to the other. these links are represented as arrows carrying a so-called weight - the links are the arrows of the fuzzy network;
- discussing the role of the variables in the network, i.e. conceiving scenarios of change following external drivers such as global warming, pandemics, increased food demand, human migrations, etc;
- (optionally) merging the different stakeholders groups to produce a synthetic map.

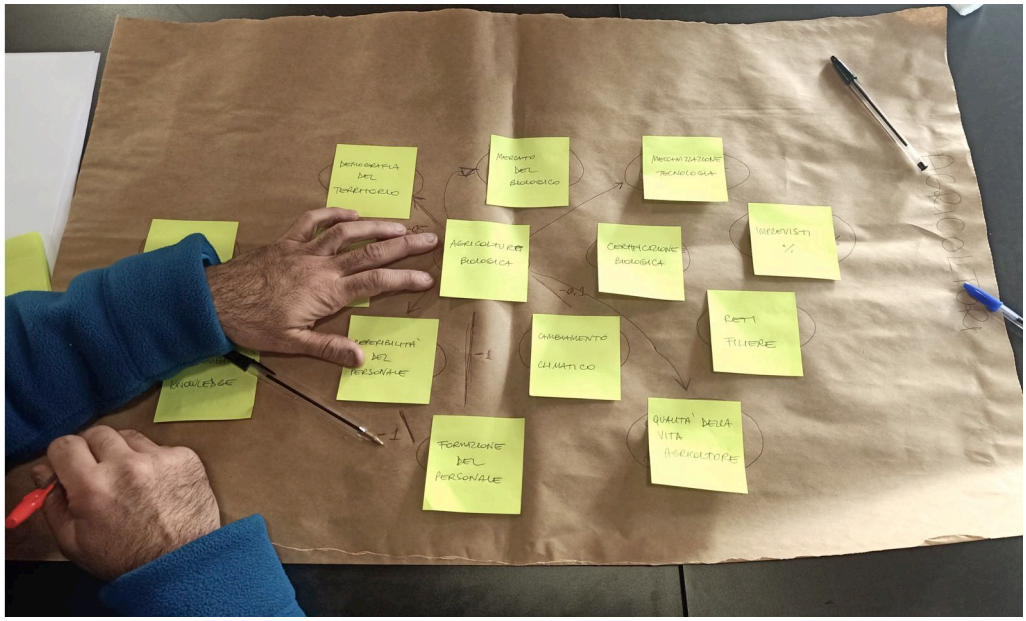
The first three points, although presented following a logic order, can actually be merged during the workshop: typically, while conceiving scenarios, new variables are introduced and their relations are modified.

Conventionally, the relations' weights are represented as real numbers ranging from -1 to +1, their absolute value meaning the intensity and their sign the kind of relation (+ direct, - inverse). The weights can be combined by averaging them.

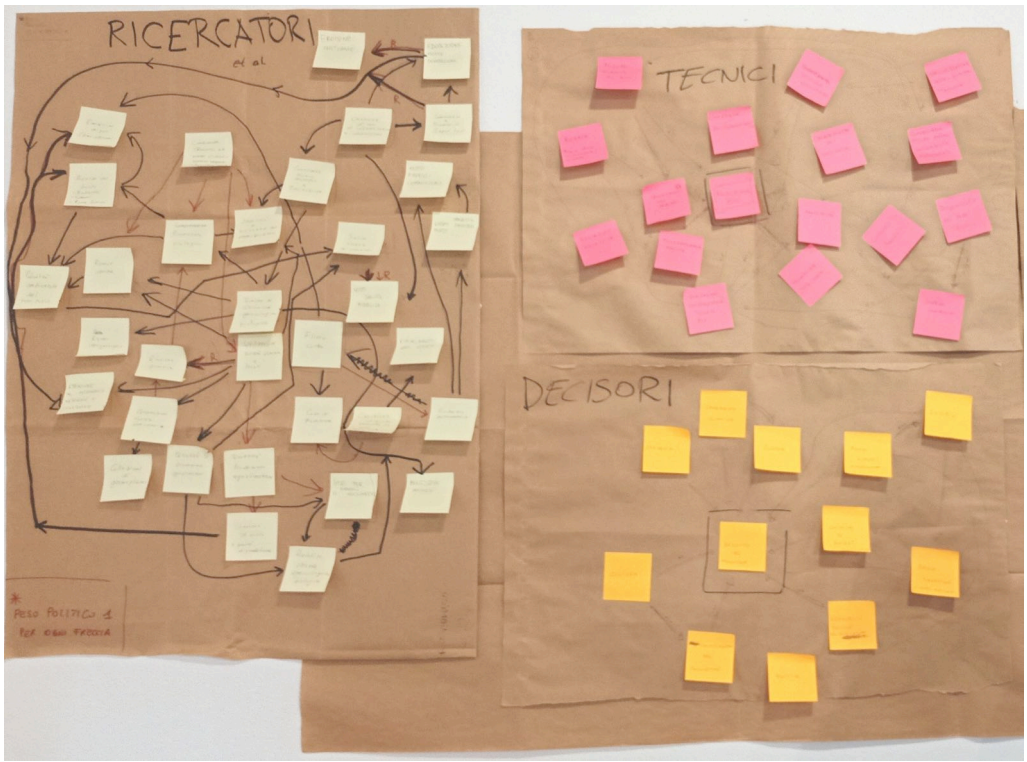
During the FCM workshops, the maps have been produced in a variety a ways, mostly by stickers on a board: it is an effective, quick and funny way to produce such maps while discussing in small, homogeneous groups. As an example, we present the case of Italy's FOODLEVERS FCM workshop: we had four stakeholders' panels:

- Researchers from various institutes of the National Research Council: biologists, modellers, forestry and nature-based solutions experts;
- Farmers, running established organic and transitioning to organic farms.
- Policy makers: mayors and public servants involved in agriculture;
- Technicians: agronomists and advisors involved with EU funds.

After a brief introduction of the FOODLEVERS aims, each panel produced a map without any contact with the other panels, assisted by a dedicated facilitator. Even the facilitators had no contact with one another.



After the maps production, which lasted around two hours, the maps were joined and discussed with the whole assembly. No editing was allowed during or after the discussion.



The maps where then translated into nodes and weights for the further analysis.

	VARIABLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Availability of workers							-1.0			1.0				0.9		
2	Network and production chain								0.8	0.8					0.5		
3	Farmer's competence								0.8			0.8					
4	Organic certification							-0.5								-0.4	
5	Requirements for premium measures								-0.8								
6	Climate change							-0.1							-0.3		
7	Organic Agricolture									0.5					0.7	0.5	-0.5
8	Farmer's income													-0.9			
9	Mechanical and technological innovation								0.5				0.5		0.7		
10	Staff's competences							-1.0							-0.8		
11	Quality of enviromment							0.8							1.0		
12	Accidents								-0.8						-0.7		
13	(low) Availability of land capital							-0.8									
14	Farmer's Life Quality																
15	Organic market																
16	Territorial demography																

The analysis included the computation of some relevant indices, the so-called density and complexity, for each map, the composition of maps through weight averaging and the extraction of a synthesis map. The detailed procedure is illustrated in the following.

We also conducted a resume workshop, where one representative from each panel gathered to discuss the FMC results and to build a synthesis map, obtained by the cumulative map by extracting the most significant variables. A synthetic map could also be obtained automatically, via algebraic manipulation of the weights matrix.

In two cases (Italy and Romania), we merged the panels' maps into a cumulative map, by averaging the appropriate weights of the common variables. Such operation was not performed on the two Finnish maps because there were too few common variables to be merged. Belgium and Germany maps were already finished.

A note of caution

During the workshops and in the subsequent computational stages, we noticed two point that are worth stressing in FCM workshops before the actual map-making:

- nodes semantics: pay the utmost attention to the actual meaning of the concepts to avoid possible ambiguities, e.g. *water*: does it imply availability or shortage?
- arrows geometry: an inverse relation from A to B is not the same as a direct relation from B to A, the sign of the weight is reversed, not the direction of the arrow. This is especially important during the map editing.

FOODLEVERS FCM Results

The FCM of each partner are shown, followed by a brief summary.
The nodes (concepts) can be classified as:

- drivers: only outgoing arrows, they act, roughly speaking, as causes;
- receivers: only incoming arrows, they are the result of a causal downstream;
- ordinaries: both incoming and outgoing arrows, the more the arrows, the greater the importance in the causal chain form drivers to receivers.

Each map is accompanied by two indices: the density *d* and the complexity *c*. The density is the ratio of the number of relations with respect to the maximum number of connections, i.e. N^2-N, where N is the number of variables. The higher density, the more a map is involved. The complexity is the ratio of the number of receivers over the drivers, it does not measure the complexity of the map, which is best represented by the density, but, in a broad sense, how simple or complex is the FCM with respect to the outcomes. Maps can have, or have not, any number of drivers, receivers and ordinaries.

In the following synthesis, for each country and for each map we show the complexity, the density and the most statistically significant variables. Significance is expressed with four valued scales for drivers and ordinaries and a different four value scale for receivers.[1] Drivers and ordinaries marked with **+++** and **++** have a very strong and strong increasing effect, while **- - -** and **- -** mark a very strong and strong depressing behaviour. Receivers marked with *** * *** and *** *** are very highly and highly sensitive to the variation of their connected variables. In a few cases we also show slightly less significant variables, marked with **+**, **-** and ***.** For each map we also show the number of connections *M* and the number of variables *N*.[2]

An actual map is also shown.
All the detailed maps can be found in the appendix.

[1] The definition of variables significance is detailed in the following *FCM weights matrix treatment* section.

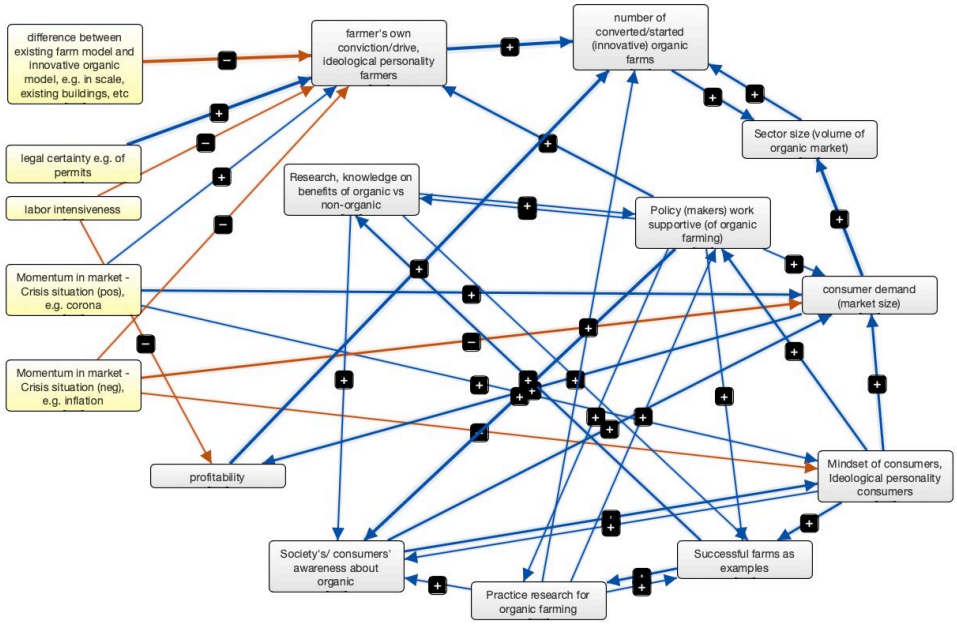
[2] *M* and *N* are referred to the original map(s), not to the synthetic one.

Belgium

***d* = 0.15 *c* = 0.0 *M* = 84 *N* = 16**

In the case of Belgium, we show a synthetic map sowing only the most significant variables, according to weights statistics, obtained from a single original map. The map is focused on market dynamics and consumers' behaviour.

Driver	+++	Momentum in market - Crisis situation (pos), e.g. corona
	- - -	Momentum in market - Crisis situation (neg), e.g. inflation
	- - -	difference between existing farm model and innovative organic model, e.g. in scale, existing buildings, etc
	+++	legal certainty e.g. of permits
	- -	labor intensiveness
Ordinary	+++	farmer's own conviction/drive, ideological personality farmers
	+++	consumer demand (market size)
	+++	Policy (makers) work supportive (of organic farming)
	+++	Society's/ consumers' awareness about organic
	+++	Mindset of consumers, Ideological personality consumers
	+++	Number of converted/started (innovative) organic farms
	++	Successful farms as examples
	++	Research, knowledge on benefits of organic vs non-organic
	++	Sector size (volume of organic market)
	++	Profitability
	++	Practice research for organic farming



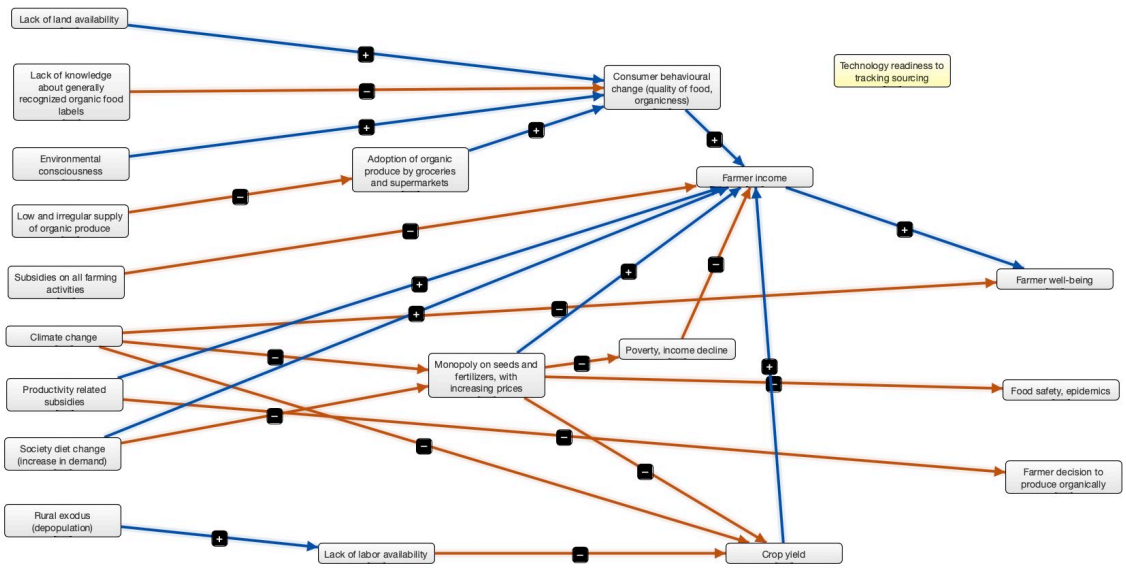
Finland

Researchers: ***d*** **= 0.06** ***c*** **= 0.3** ***M*** **= 23** ***N*** **= 20**
Farmers and advisors: ***d*** **= 0.09** ***c*** **= 0.3** ***M*** **= 79** ***N*** **= 30**

In the case of Finland we show the two maps collected for the researchers panel and the farmers and advisors panel. We did not attempt to merge the maps into a cumulative one because there were too few clearly mergeable ones. The maps are cover a wide range of subjects, including farmer's income and well-being.

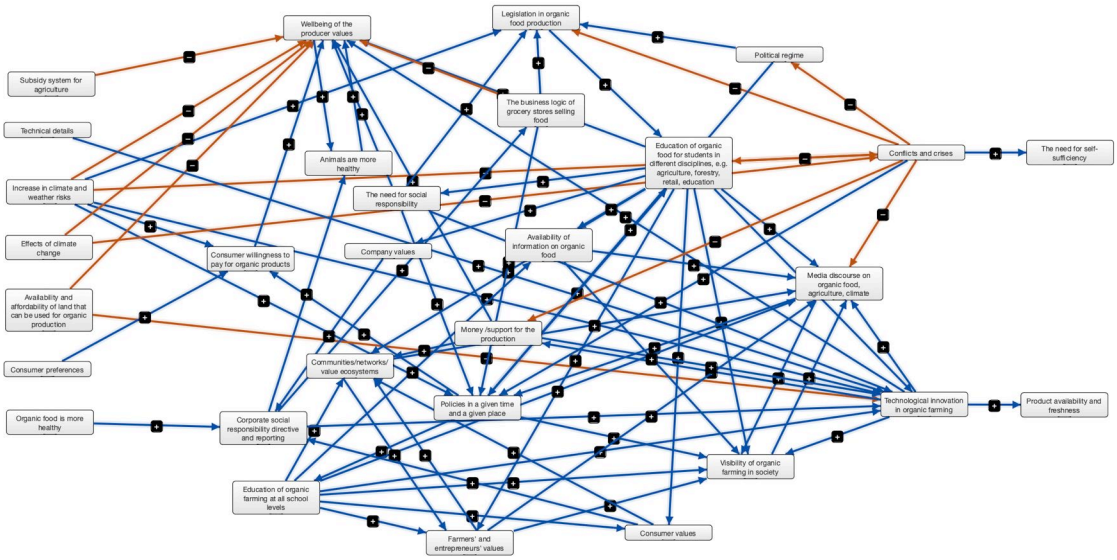
Researchers map:

Driver	- -	Climate change
	+	Productivity related subsidies
	+	Society diet change (increase in demand)
Ordinary	+++	Farmer income
	- - -	Monopoly on seeds and fertilizers, with increasing prices
	++	Consumer behavioural change (quality of food, organicness)
	+	Crop yield
Receiver	*	Farmer well-being



Farmers and advisors map:

Driver	+++	Increase in climate and weather risks
Ordinary	+++	Technological innovation in organic farming
	+++	Education of organic food for students in different disciplines, e.g. agriculture, forestry, retail, education
	+++	Wellbeing of the producer values
	+++	Media discourse on organic food, agriculture, climate
	+++	Policies in a given time and a given place
	- -	Conflicts and crises
	++	Visibility of organic farming in society
	++	Education of organic farming at all school levels
	++	Communities/networks/value ecosystems
Receiver	* * *	The need for self-sufficiency
	* * *	Product availability and freshness

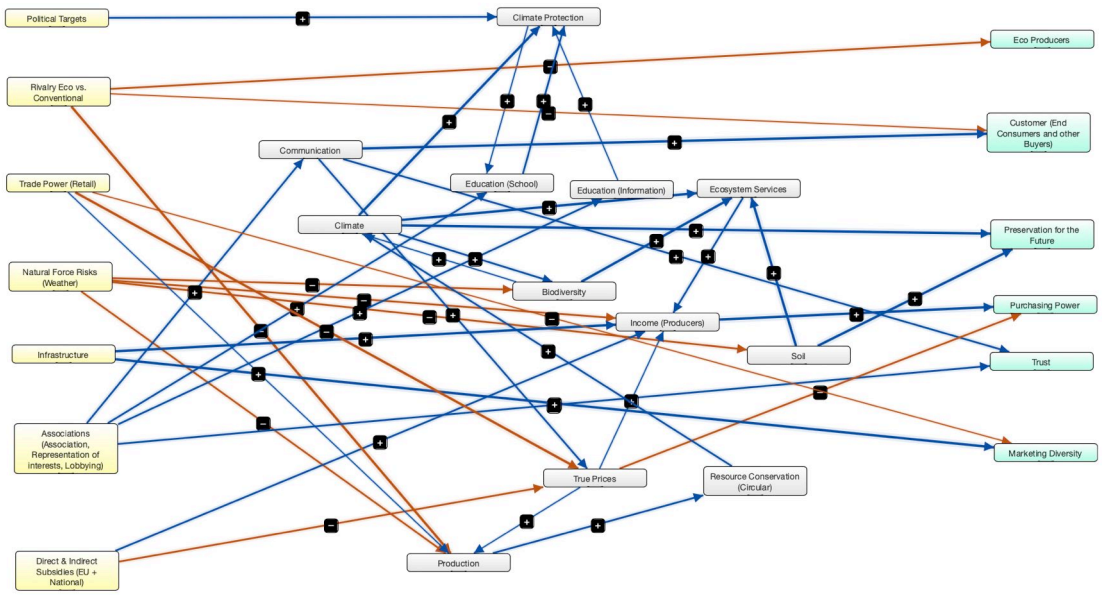


Germany

***d* = 0.07 *c* = 0.9 *M* = 40 *N* = 25**

The German synthetic map has been obtained by weight statistics from a single original one, as in the Belgian case. The map covers a wide range of topics, form social and market issues to ecosystem services.

Driver	+++	Associations (Association, Representation of interests, Lobbying)
	-	Natural Force Risks (Weather)
	+	Infrastructure
	-	Rivalry Eco vs. Conventional
	-	Trade Power (Retail)
	-	Direct & Indirect Subsidies (EU + National)
Ordinary	+++	Climate
	+++	Income (Producers)
	- - -	True Prices
	++	Ecosystem Services
	++	Communication
	++	Climate Protection
Receiver	* *	Preservation for the Future
	*	Purchasing Power

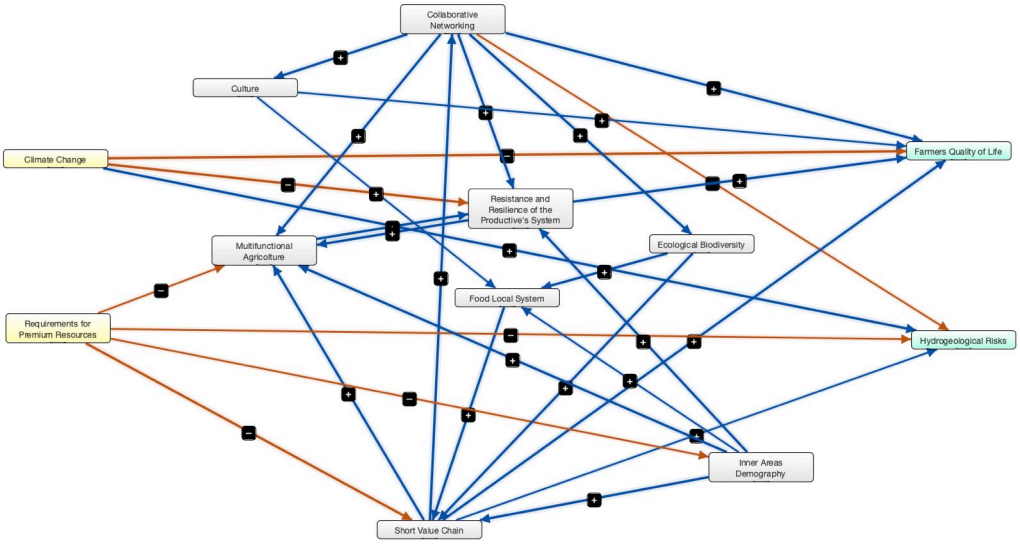


Italy

Synthetic map:	***d* = 0.22**	***c* = 1.0**	***M* = 29**	***N* = 12**
Researchers:	***d* = 0.05**	***c* = 0.3**	***M* = 53**	***N* = 34**
Farmers:	***d* = 0.12**	***c* = 0.5**	***M* = 28**	***N* = 16**
Advisors:	***d* = 0.09**	***c* = 0.5**	***M* = 23**	***N* = 17**
Policy makers:	***d* = 0.13**	***c* = 0.5**	***M* = 17**	***N* = 12**
Cumulative map:	***d* = 0.03**	***c* = 1.3**	***M* = 119**	***N* = 60**

The Italian synthetical map has been produced during a dedicated workshop held with one representative per panel. during the first workshop we obtained four different maps from researchers, farmers, advisors and policy makers. We prepared a cumulative map through weight merging, from which we selected the twelve most significant variables. The map covers a wide range of subjects, from environmental issues to collaborative networking to farmers' quality of life.

Driver	- - -	Climate Change
	++	Requirements for Premium Resources
Ordinary	+++	Short Value Chain
	+++	Collaborative Networking
	++	Resistance and Resilience of the Productive System
	++	Multifunctional Agricolture
	++	Inner Areas Demography
	+	Ecological Biodiversity
	+	Food Local System
	+	Culture, Education, Awareness
Receiver	* *	Farmers Quality of Life
	*	Hyrogeological Risks

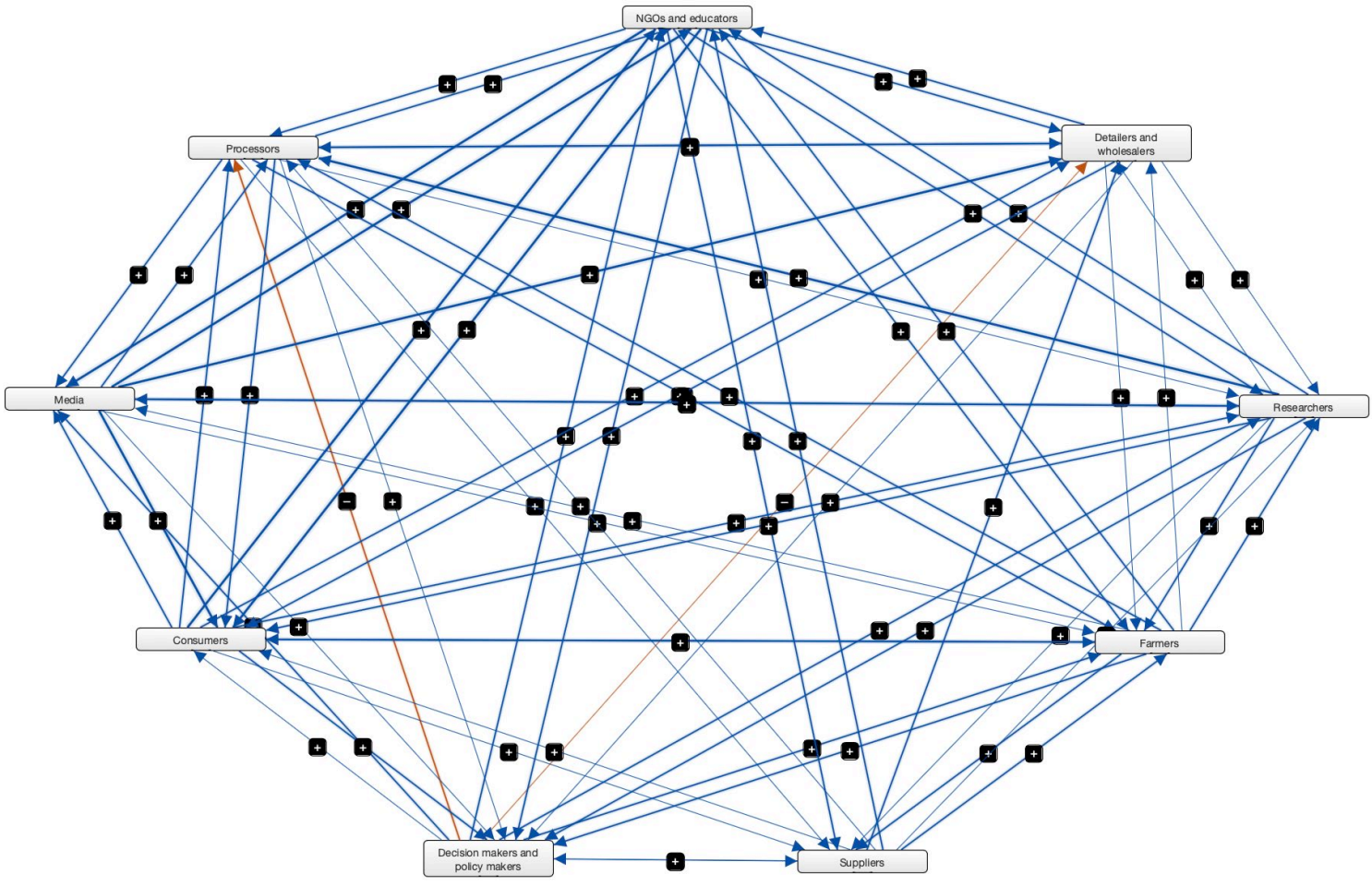


Poland

***d* = 0.94 *c* = — *M* = 68 *N* = 9**

The Polish map is unique in this FCM study. In this case the stakeholders panel did not explore the relations among concepts/variables but among the stakeholders themselves. The remarkable resulting map depicts an intricate pairwise network (with an astonishing *d* = 0.94). The complexity cannot be evaluated since there are no drivers nor receivers. The significativity depicts, in order of importance, each stakeholder's role.

Ordinary	+++	NGOs and educators
	+++	Consumers
	++	Processors
	++	Media
	+	Detailers and wholesalers
	+	Researchers
		Farmers
		Decision makers and policy makers
		Suppliers

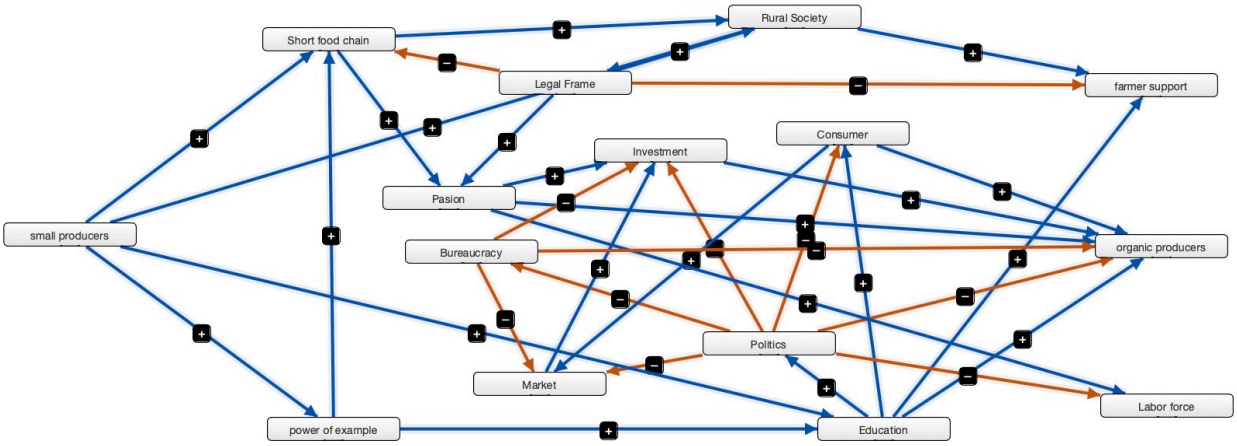


Romania

Synthetic map:	***d* = 0.16**	***c* = 3.0**	***M* = 33**	***N* = 15**
Researchers:	***d* = 0.11**	***c* = 1.0**	***M* = 23**	***N* = 15**
Farmers:	***d* = 0.13**	***c* = 1.5**	***M* = 28**	***N* = 15**
Advisors:	***d* = 0.14**	***c* = 2.0**	***M* = 30**	***N* = 15**
Cumulative map:	***d* = 0.06**	***c* = 1.3**	***M* = 77**	***N* = 37**

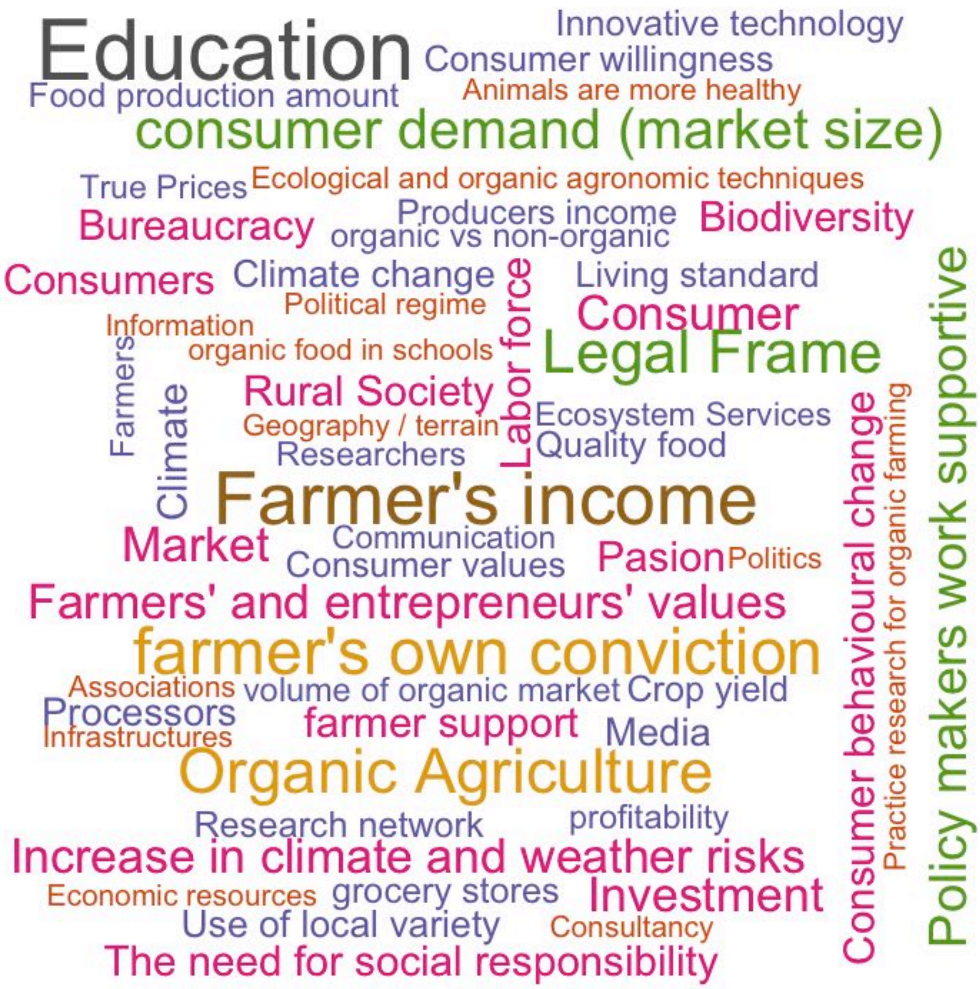
The Romanian synthetic map has been obtained from three original maps (researchers, farmers and advisors), merged into a cumulative map. The synthetic map covers a wide range of subjects, politics and bureaucracy emerging clearly as depressing factors.

Driver	++	small producers
Ordinary	- - -	Politics
	+++	Education
	+++	Investment
	++	Short food chain
	+++	Legal Frame
	+++	Market
	+++	Consumer
	++	Pasion
	- -	Bureaucracy
	++	Rural Society
	++	power of example
Receiver	+++	organic producers
	++	farmer support
	++	Labor force



Word clouds

A common representation of the concepts emerged during the FCM workshops and the resulting maps can be given in terms of the so called *word clouds,* which synthesise the word content of a text according to some statistical parameter. Generally speaking, this kind of representation has to be regarded as a catchy picture more than a statistically solid analysis, however, using the centrality parameter as a frequency index[3], we can produce such pictures.
The images were produced using the R packages worldcloud and worldcloud2. There is not a single cloud for Poland because it has too few variables.



All counties, including Poland.

[3] Word clouds are generally used counting the occurrences of a given word within a text.

Belgium

Finland

Germany

Italy

Romania

Words by frequency

The last word-cloud has been obtained by mixing all the words appearing in all the countries' variables, and counting their frequencies, regardless the centrality.

Comparative meta-analysis

In this section a simple statistical meta-analysis based on the following FCM indices:

- ***N*** — number of variables
- N_d — number of drivers
- N_r — number of receivers
- ***M*** — number of connections
- ***d*** — density: $d = M / (N^2-N)$
- ***c*** — complexity: $c = N_r / N_d$

For each country we analysed all the original maps, as submitted by the participants, a cumulative map for Italy and Romania, obtained by merging the original maps by weight averages, and a synthetic map. The maps are labelled according to the stakeholders panels composition:

- **A** — Advisors (Finland, Italy and Romania)
- **C** — Cumulative (Italy and Romania) or original (Belgium, Germany and Poland)
- **F** — Farmers (Finland, Italy and Romania)
- **P** — Policy makers (Italy)
- **R** — Researchers (Finland, Italy and Romania)
- **S** — Synthetic (Belgium, Germany, Italy, Romania)

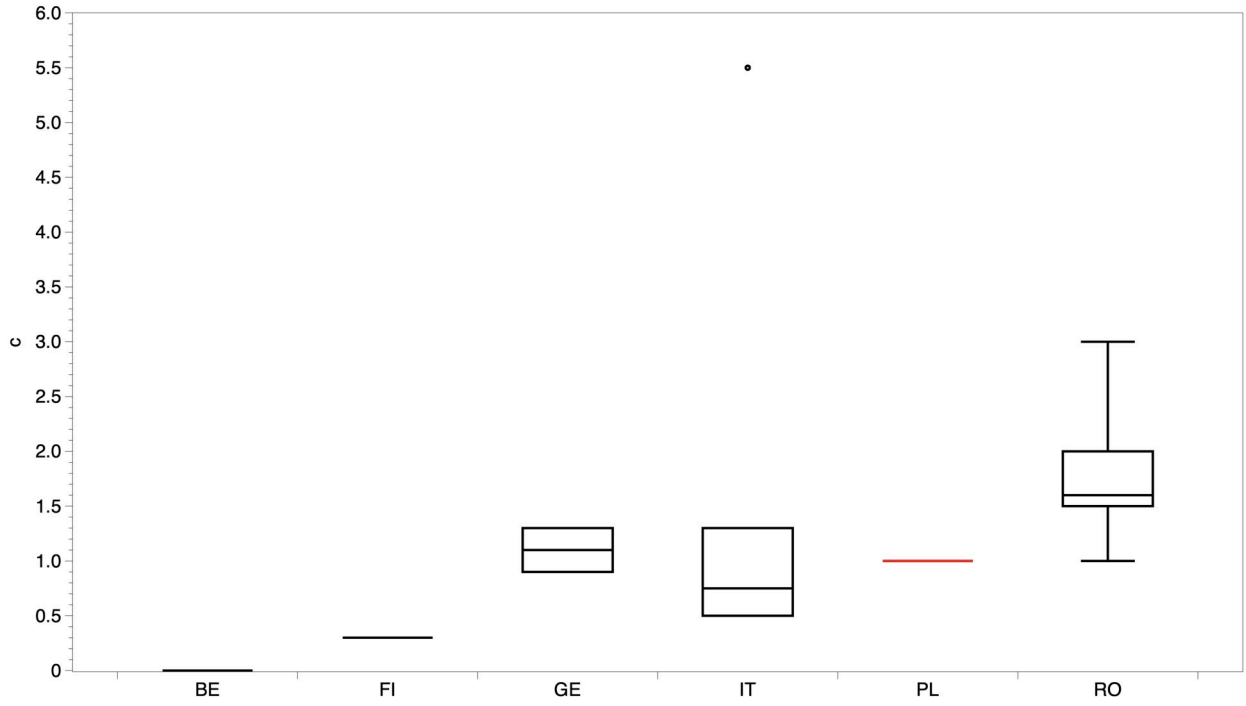
The value $c = 1$ has been conventionally attributed to Poland, since its actual $c = 0 / 0$ is undefined. Finland's farmers and advisors produced a joint map, labelled FA.

The graph show all the indices as pairwise scatterplots: *d* vs *c*, *M* vs *N*, with linear regressions, and N_r vs N_d. A couple of box plots for *d* and *c* are also shown - Poland's conventional $c = 1$ is shown in red in the box plot. For ease of reading, the *d* vs *c* plot is shown with and without the post pertaining to Poland, since its density value is much higher than the rest of the countries densities.

The number of connections and the number of nodes are significantly correlated with an $R^2 = 0.73$ (i.e. $r = +0.85$) including outliers, or $R^2 = 0.91$ (i.e. $r = +0.95$) removing outliers. The only outlier is Poland, with $d = 0.94$, due to an almost saturated graph.

All the relevant detail are collected in the appendix, ordered by country:

- **Belgium** — page 1 to 6
- **Finland** — page 7 to 12
- **Germany** — page 13 to 15
- **Italy** — page 16 to 33
- **Poland** — page 34 to 36
- **Romania** — page 37 to 51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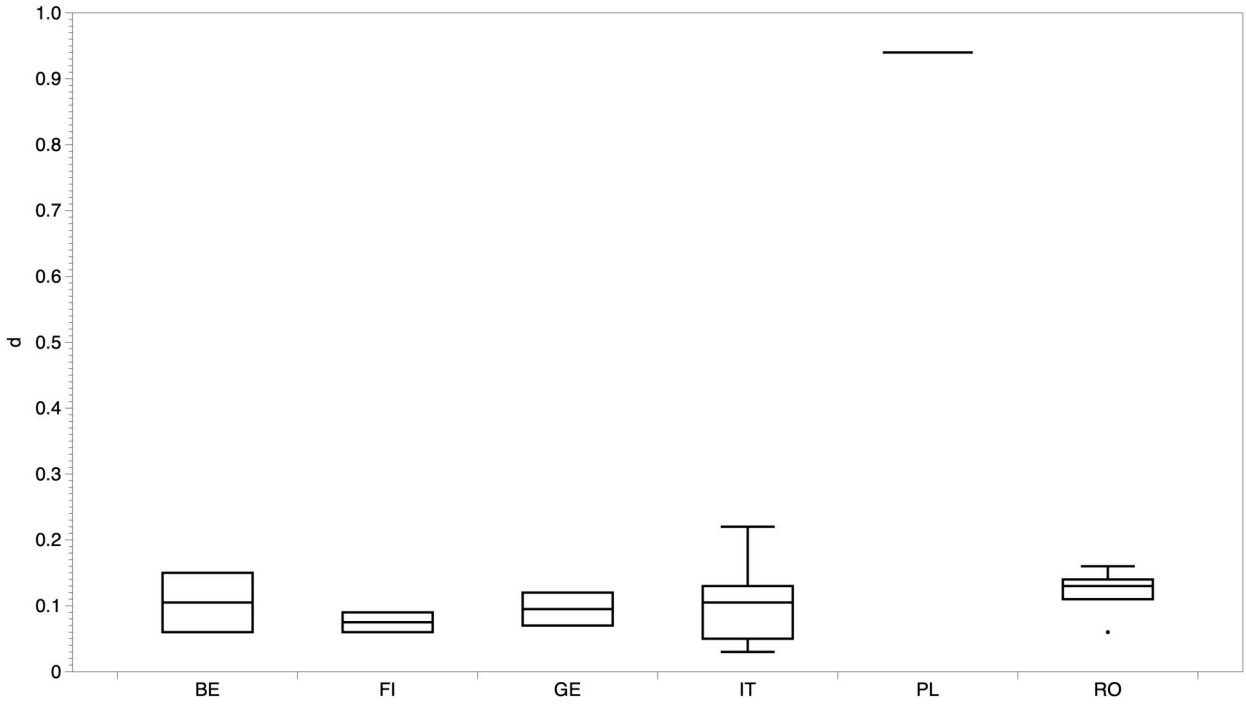
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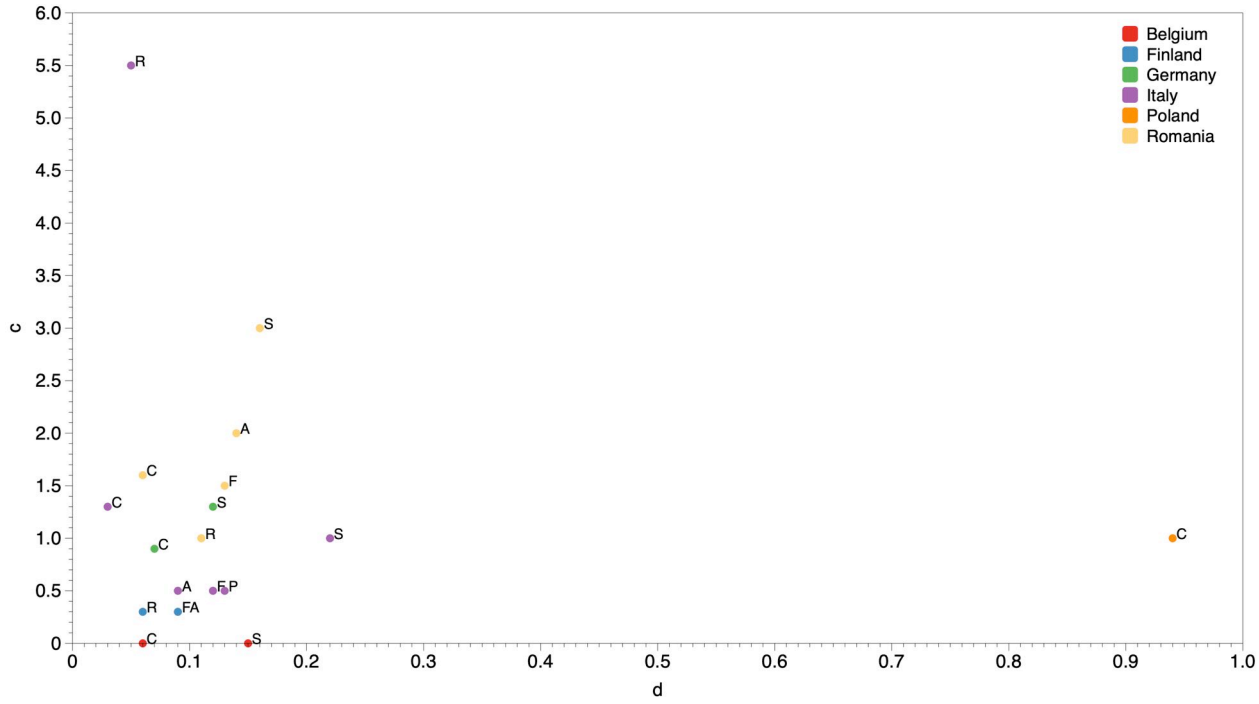
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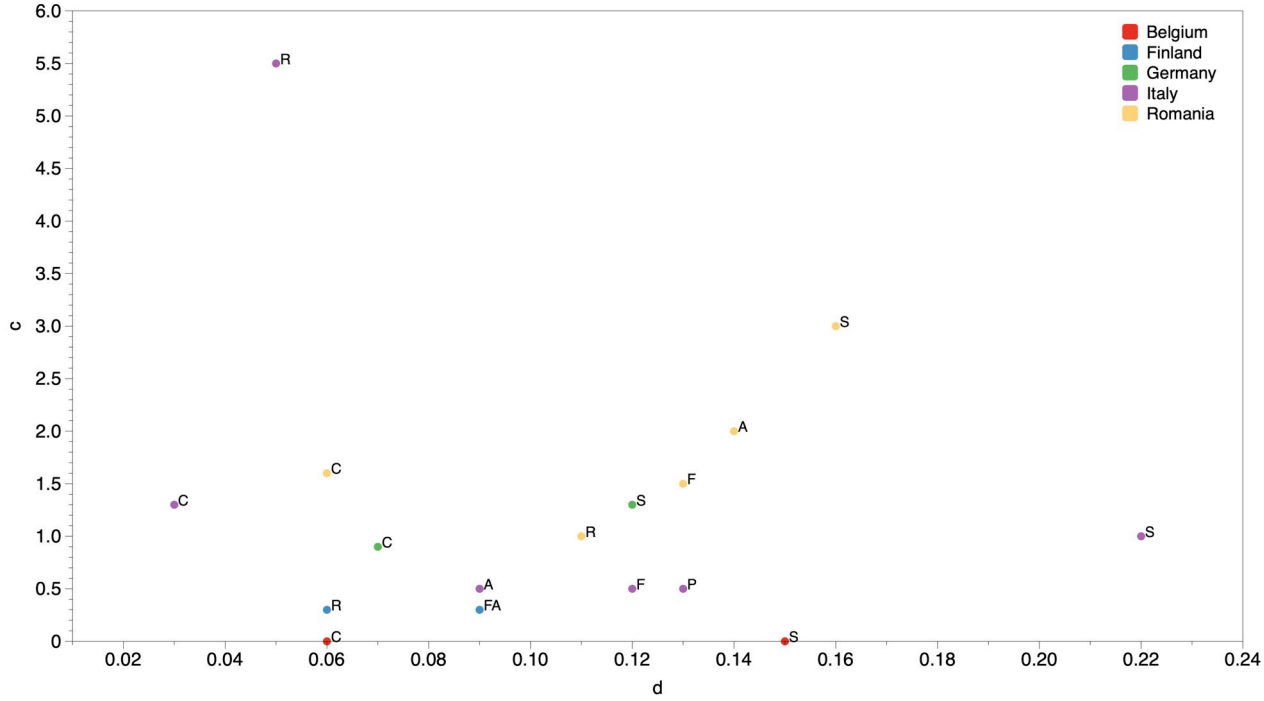
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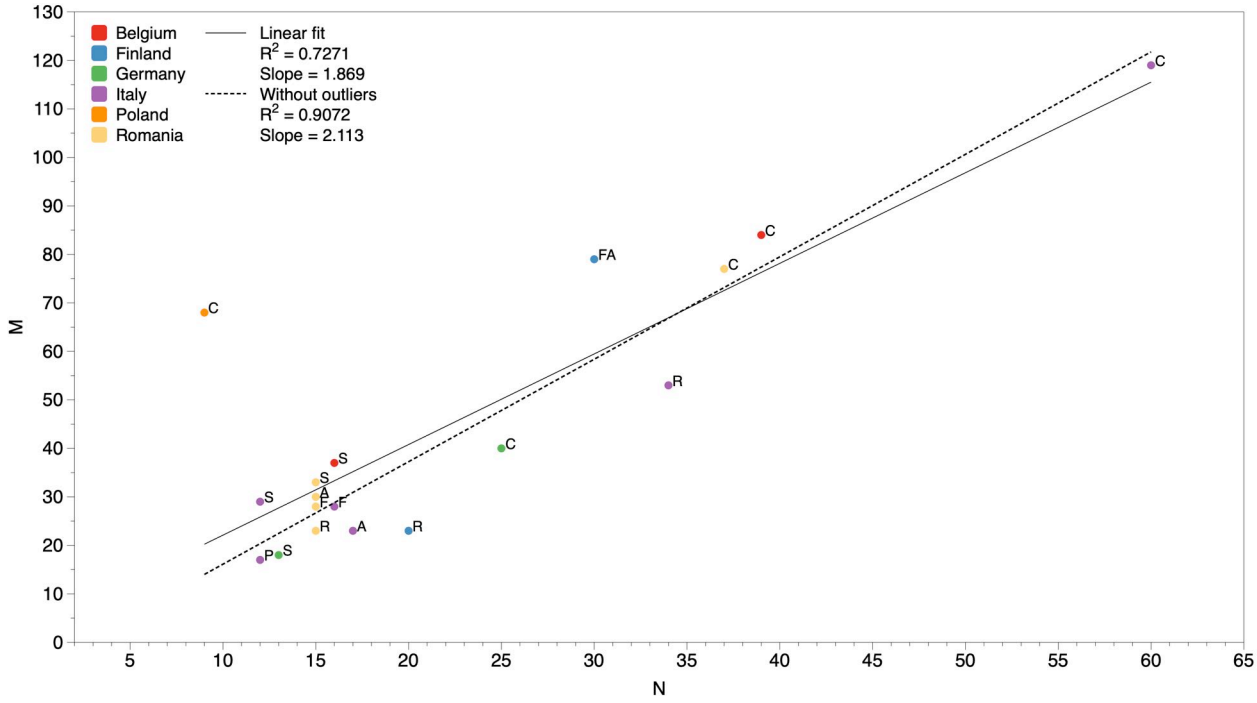
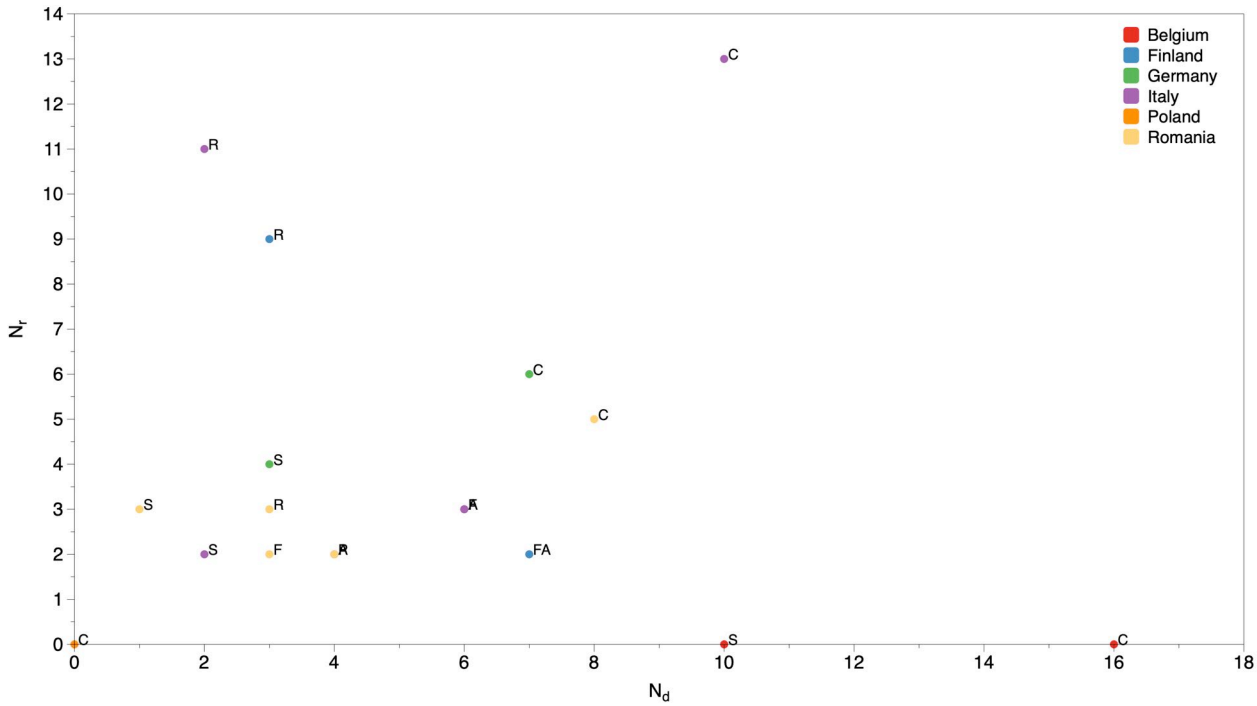

Belgium
Finland
Germany
Italy
Poland
Romania
Linear fit
R^2 = 0.7271
Slope = 1.869
Without outliers
R^2 = 0.9072
Slope = 2.113
M
N


Belgium
Finland
Germany
Italy
Poland
Romania
N_r
N_d

FCM Weights Matrix Treatment

General Remarks

A Fuzzy (Logic) Cognitive Map is a representation in terms of nodes and arrows of some concepts/variables and their causal relations, as these are perceived by a focus group of interviewees, sharing a common area of expertise. Algebraically a FCM is a graph: it inherits all the machinery of graph theory, given some constraints introduced in the following.
We exploited the free web application MentalModeler (https://www.mentalmodeler.com/scenario/) to obtain a graphical representation of the actual maps, all the calculations have been done using a spreadsheet software, as detailed below.
Let's start with a sample model (fig.0). It consist in a graph of nodes (*A, B, …., K*) and some connecting arrows, each arrow brings a weight in the range [-1 … +1]. The weight of the connection from the node *i* to the node *j* is called w_{ij}. e.g. the weight w_{HF} from node *H* to node *F* is positive (blue arrow), while w_{CG} from node *C* to node *G* is negative (red arrow)

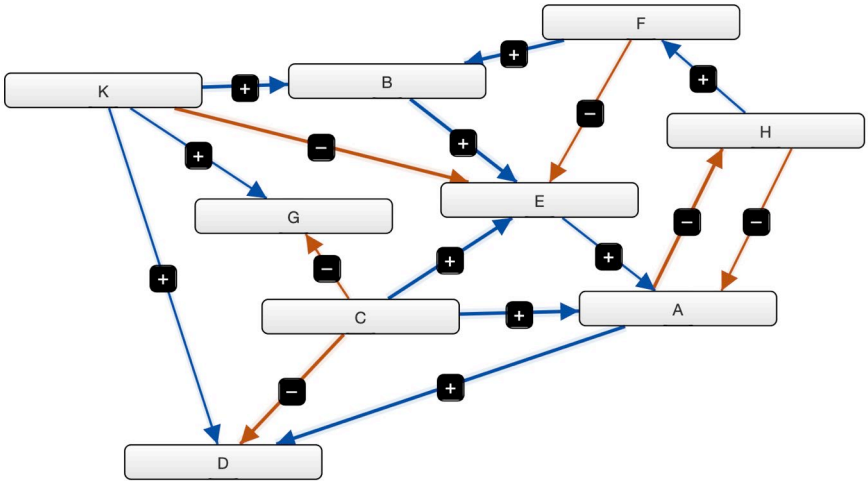


Figure 0 - A sample abstract model.

The rules of the game are the following:

- no self-interaction: i.e. $w_{il} = 0$ for each node *i,*
- a positive weight w_{ij} means that the relation from *i* to *j* is a direct (proportional) one,
- a negative weight w_{ij} means that the relation from *i* to *j* is an inverse (inversely proportional) one,
- $w_{ij} \neq 0$ does not imply $w_{ji} \neq 0$, better yet, criss-crossed relations are extremely rare, though not impossible, and should be considered with care,
- circular relations (e.g. $H \rightarrow F \rightarrow E \rightarrow A \rightarrow H$) are allowed,
- a node without entering arrows, called a **driver**, acts as a control knob for modeling scenarios,
- a node without exiting arrows, called a **receiver**, is considered an outcome,

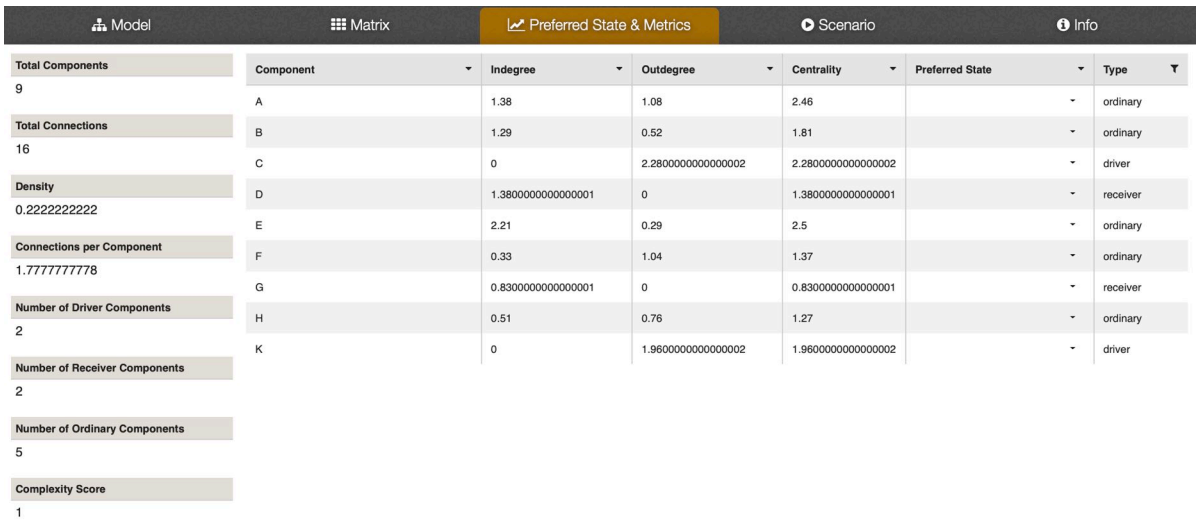
- a node with entering and exiting arrows is called an **ordinary** node, it is as much important as the number of connections with the other nodes.

The Mental Modeller web application takes care of all the mentioned rules, through a graphical design interface (fig. 0). The weight matrix can be visualised within the application via the **Matrix** tab (fig.1). The leftmost column bears the names of the arrows' originating nodes, while the top row bears the names of the receiving nodes. we see, e.g., that w_{FE} = -0.39, i.e. the arrow from *F* to *E* stands for an inverse relation: an increase of *F* causes a decrease of *E* and vice versa. Pay attention to the direction of the relation: causes on the leftmost column ad outcomes on the top row.

	A	B	C	D	E	F	G	H	K
A				0.57				-0.51	
B					0.52				
C	0.66			-0.55	0.67		-0.4		
D									
E	0.29								
F		0.65			-0.39				
G									
H	-0.43					0.33			
K		0.64		0.26	-0.63		0.43		

Figure 1 - The weight matrix of fig.0 model.

Some details on the nodes can be found in the Preferred State & Metrics tab of the application (fig.2). We will see in the following how to compute them using a spreadsheet.



Component	Indegree	Outdegree	Centrality	Preferred State	Type
A	1.38	1.08	2.46		ordinary
B	1.29	0.52	1.81		ordinary
C	0	2.2800000000000002	2.2800000000000002		driver
D	1.3800000000000001	0	1.3800000000000001		receiver
E	2.21	0.29	2.5		ordinary
F	0.33	1.04	1.37		ordinary
G	0.8300000000000001	0	0.8300000000000001		receiver
H	0.51	0.76	1.27		ordinary
K	0	1.9600000000000002	1.9600000000000002		driver

Figure 2 - Some node analysis performed in MentalModeler.

In particular, the **indegree** and the **outdegree** of a node are defined as the sum of the absolute values of the weights of the entering and exiting arrows, respectively (Özesmi and Özesmi, 2004):

$$id_i = \Sigma_j \mid w_{ji} \mid \qquad \text{and} \qquad id_i = \Sigma_j \mid w_{ij} \mid$$

pay attention to the order of the indices: w_{ji} goes from node *i* to node *j*.
The **centrality** is defined as the sum of in- and outdegree: $cen_i = \Sigma_j \mid w_{ji} \mid + \Sigma_j \mid w_{ii} \mid$.
The mentioned parameters are a relative measure of the importance of a node as a driving one (outdegree), as a receiving one (indegree) and as a joint in the model (centrality). In particular, drivers have a null outdegree, while receivers have a null indegree. Other measures of the importance of a node are the number of entering and exiting connections.
As per the model itself, some structural measures can be evaluated:

- the **density** *d* is the ratio of the total number of arrows *M* with respect to the maximum allowed number of possible connections for *N* nodes: $d = M / N (N-1)$, obviously *d* cannot exceed 1 (all nodes connected).
- the **complexity** *c* of the model is defined as the ratio of the number of receivers over the drivers, note that, despite the name, it does not measure how rich and involved the relations among nodes are.

The Mental Modeller Web Application allows to export the weight matrix (i.e. the model itself) as a comma-separated-values (csv) file, that looks like this:

```
"","A","B","C","D","E","F","G","H","K"
"A","","","","0.57","","","","-0.51",""
"B","","","","","0.52","","","","",""
"C","0.66","","","-0.55","0.67","","-0.4","","",""
"D","","","","","","","","","",""
"E","0.29","","","","","","","","",""
"F","","0.65","","","-0.39","","","","",""
"G","","","","","","","","","",""
"H","-0.43","","","","","0.33","","","",""
"K","","0.64","","0.26","-0.63","","0.43","","",""
```

such model.csv file is the starting point for the weight matrix analysis sketched in the following section.

Practical Spreadsheet Procedure

The first step, obviously, is the import of the csv file into the spreadsheet[4] as follows:
The second step consists in adding a few extra columns: five columns for holding the results of the calculation of: the number of entering arrows (**IN**), the number of exiting arrows (**OUT**), the indegree (**ID**), the outdegree (**OD**) and centrality (**CEN**).

[4] This example has been produced with Apple Numbers.

	A	B	C	D	E	F	G	H	K
A				0.57				-0.51	
B					0.52				
C	0.66			-0.55	0.67		-0.4		
D									
E	0.29								
F		0.65			-0.39				
G									
H	-0.43					0.33			
K		0.64		0.26	-0.63		0.43		

Figure 3 - The freshly imported csv.
Note the same arrow highlighted in fig.1.

It is also advisable to mark the diagonal elements, it will be useful for the final polish of the table. Now add a row below and as many columns as the nodes number to the right, obtaining an augmented matrix (fig.4).

	IN	OUT	ID	OD	CEN	A	B	C	D	E	F	G	H	K	A	B	C	D	E	F	G	H	K
A									0.57				-0.51		0.00	0.00	0.00	**0.57**	0.00	0.00	0.00	**0.51**	0.00
B										0.52					0.00	0.00	0.00	0.00	**0.52**	0.00	0.00	0.00	0.00
C						0.66			-0.55	0.67		-0.40			**0.66**	0.00	0.00	**0.55**	**0.67**	0.00	**0.40**	0.00	0.00
D															0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E						0.29									**0.29**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F							0.65			-0.39					0.00	**0.65**	0.00	0.00	**0.39**	0.00	0.00	0.00	0.00
G															0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H						-0.43					0.33				**0.43**	0.00	0.00	0.00	0.00	**0.33**	0.00	0.00	0.00
K							0.64		0.26	-0.63		0.43			0.00	**0.64**	0.00	**0.26**	**0.63**	0.00	**0.43**	0.00	0.00

Figure 4 - The absolute values $|w_{ji}|$ in the augmented matrix, the weights are colour-coded for ease of reading.

The augmented elements will contain the absolute values of the weights (fig.4)
The function for the evaluation of the absolute value is generally called ABS(). It is possible -but unlikely- that a localised operative system implies different spreadsheet function names.
Exploiting the weights w_{ji} and the absolute weights $|w_{ji}|$ of the augmented matrix we can readily evaluate our variables of interest: **OUT** is evaluated as the COUNT() of the weights of the matrix (fig.5a) and **OD** is evaluated as the SUM() of the augmented weights (fig.5b). Repeat for all the rows.

	IN	OUT	ID	OD	CEN	A	B	C	D	E	F	G	H	K	A	B	C	D	E	F	G	H	K
A		2							0.57				-0.51		0.00	0.00	0.00	**0.57**	0.00	0.00	0.00	**0.51**	0.00

Figure 5a - Evaluation of **OUT** as COUNT(weights).

	IN	OUT	ID	OD	CEN	A	B	C	D	E	F	G	H	K	A	B	C	D	E	F	G	H	K
A		2		1.08					0.57				-0.51		0.00	0.00	0.00	**0.57**	0.00	0.00	0.00	**0.51**	0.00

Figure 5b: Evaluation of **OD** as SUM(absolute weights).

Now evaluate the **IN** and **ID** parameters applying the COUNT() and SUM() column-wise, following the respective node names as they appear in the top row of the weights and augmented matrix (fig.6).

	IN	OUT	ID	OD	CEN	A	B	C	D	E	F	G	H	K	A	B	C	D	E	F	G	H	K
A		2		1.08					0.57				-0.51		0.00	0.00	0.00	**0.57**	0.00	0.00	0.00	**0.51**	0.00
B		1		0.52						0.52					0.00	0.00	0.00	0.00	**0.52**	0.00	0.00	0.00	0.00
C		4		2.28		0.66			-0.55	0.67		-0.40			**0.66**	0.00	0.00	**0.55**	**0.67**	0.00	**0.40**	0.00	0.00
D		0		0.00											0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E		1		0.29		0.29									**0.29**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F		2		1.04			0.65			-0.39					0.00	**0.65**	0.00	0.00	**0.39**	0.00	0.00	0.00	0.00
G		0		0.00											0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H		2		0.76		-0.43					0.33				**0.43**	0.00	0.00	0.00	0.00	**0.33**	0.00	0.00	0.00
K		4		1.96			0.64		0.26	-0.63		0.43			0.00	**0.64**	0.00	**0.26**	**0.63**	0.00	**0.43**	0.00	0.00
						3									1.38								

Figure 6 - Left: **IN** is COUNT(weights) - Right: **ID** is SUM(absolute weights).
Just like the corresponding row-wise functions of fig.6a and fig.6b.

The resulting table is shown in fig.7. Now we must *transpose*, i.e. switch the rows and columns of a copy of the table, then copy the transposed values as columns for **IN** and **ID**.

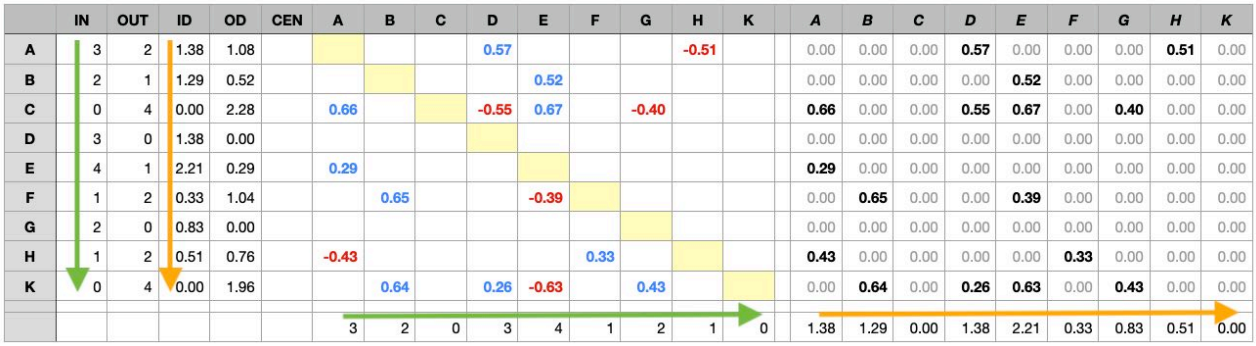


Figure 7 - Transposing the **IN** and **ID** cells.

In the unfortunate case of a lack of transpose function of the spreadsheet, one should copy all the cells of fig.7 one by one, following the arrows order. Now we can compute **CEN,** the last node variable, which is simply the SUM() of **ID** and **OD**. The completed matrix is shown in fig.8.

	IN	OUT	ID	OD	CEN	A	B	C	D	E	F	G	H	K	A	B	C	D	E	F	G	H	K
A	3	2	1.38	1.08	2.46				0.57				-0.51		0.00	0.00	0.00	**0.57**	0.00	0.00	0.00	**0.51**	0.00
B	2	1	1.29	0.52	1.81					0.52					0.00	0.00	0.00	0.00	**0.52**	0.00	0.00	0.00	0.00
C	0	4	0.00	2.28	2.28	0.66			-0.55	0.67		-0.40			**0.66**	0.00	0.00	**0.55**	**0.67**	0.00	**0.40**	0.00	0.00
D	3	0	1.38	0.00	1.38										0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E	4	1	2.21	0.29	2.50	0.29									**0.29**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F	1	2	0.33	1.04	1.37		0.65			-0.39					0.00	**0.65**	0.00	0.00	**0.39**	0.00	0.00	0.00	0.00
G	2	0	0.83	0.00	0.83										0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H	1	2	0.51	0.76	1.27	-0.43					0.33				**0.43**	0.00	0.00	0.00	0.00	**0.33**	0.00	0.00	0.00
K	0	4	0.00	1.96	1.96		0.64		0.26	-0.63		0.43			0.00	**0.64**	0.00	**0.26**	**0.63**	0.00	**0.43**	0.00	0.00
						3	2	0	3	4	1	2	1	0	1.38	1.29	0.00	1.38	2.21	0.33	0.83	0.51	0.00

Figure 8 - Almost finished. All the numbers have been evaluated.

At last we can dispose of the extra rows and columns used for the calculations. For the sake of finishing, let's order the nodes according to the following rules: 1. Descending **OUT**, 2. Ascending **IN**: note that after the ordering the column and row order of the nodes names does not match!

The columns should be re-arranged to match the order of the rows. This is why we marked the diagonal elements in the first place: just arrange the columns to rebuild the diagonal. This new row arrangement naturally highlights the drivers (top rows) *C* and *K*, the receivers (bottom rows) *G* and *D*, and the remaining ordinary nodes *F, H, A, B* and *E* in the middle rows.

		IN	OUT	ID	OD	CEN	C	K	F	H	A	B	E	G	D
DRIVER	C	0	4	0.00	2.28	2.28					0.66		0.67	-0.40	-0.55
	K	0	4	0.00	1.96	1.96						0.64	-0.63	0.43	0.26
ORDINARY	F	1	2	0.33	1.04	1.37						0.65	-0.39		
	H	1	2	0.51	0.76	1.27			0.33		-0.43				
	A	3	2	1.38	1.08	2.46				-0.51					0.57
	B	2	1	1.29	0.52	1.81							0.52		
	E	4	1	2.21	0.29	2.50					0.29				
RECEIVER	G	2	0	0.83	0.00	0.83									
	D	3	0	1.38	0.00	1.38									

Figure 9 - The polished matrix.

The resulting matrix (fig.9) shows a clear block structure. The left and bottom blocks are necessarily empty, due to the ordering criteria adopted: since drivers cannot receive arrows the left block are empty, and since receivers cannot bear exiting arrows, the bottom blocks are empty. The top-right block represent the direct driver-receiver connections, while the central block represents the inner relations, not directly connected with either drivers or receivers. Other types of ordering are possible, e.g. by centrality, but the resulting matrix lacks a clearly readable block structure.

Evaluating the Fuzzy Model's Indices

The density, complexity and hierarchical index mentioned can be easily computed by elementary spreadsheet techniques exploiting the matrix table obtained beforehand as described in the previous section. Said *N* the number of nodes and *M* the number of connections, let's call N_d and N_r the number of drivers and receivers, respectively. These numbers are easily evaluated as the COUNT() of different cells of the weights matrix: *N* is COUNT(CEN), *M* is COUNT(weights), N_d is COUNT(CEN, drivers only).
N_r is COUNT(CEN, receivers only), see fig.10.The use of COUNT() on the centrality variable assures all non-zero values as input.

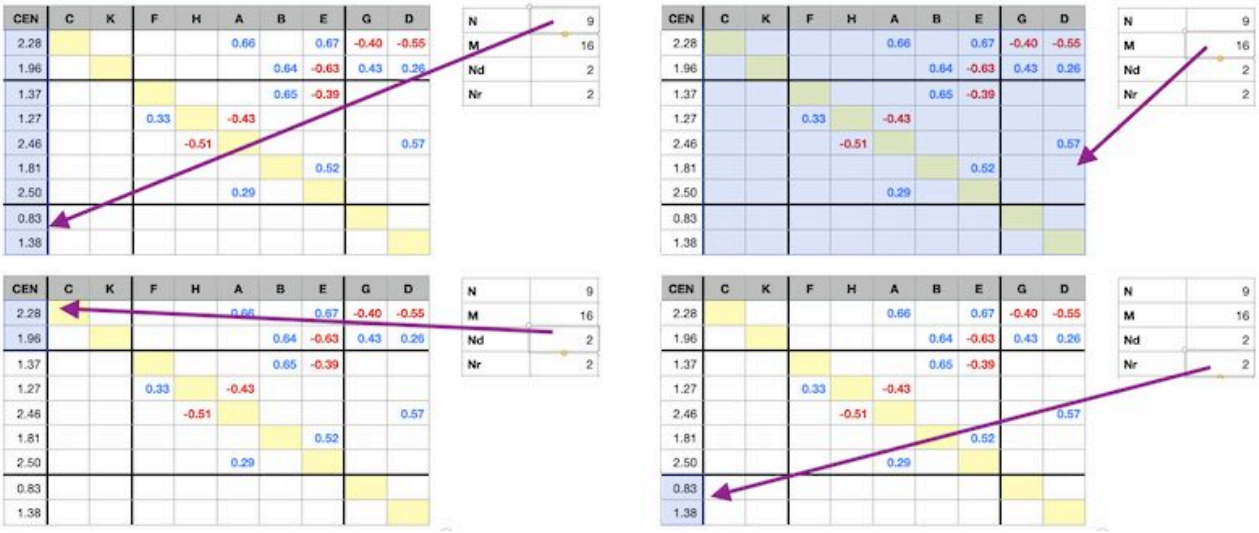


Figure 10 - *N, M, N_d* and *N_r* evaluation via the COUNT() function.

The evaluation of density and complexity is straightforward, it is just a matter of cell algebra: *d = M / N (N-1)* and *c = N_r / N_d*. The total number of connections, **CONN**, is also easily evaluated as the sum of **IN** and **OUT**. The appendix contains all the variables and the relative indices of the fuzzy cognitive maps produced by the FOODLEVERS partners.

Appendix: FCM Matrix Analysis

This appendix contains all the data collected by the FOODLEVERS partners, except the UK Focus Group, which produced a separate report. The dataset is presented nation-wise and consists in lists of variables, graphical maps and weights matrices.

Each variable is accompanied by a set of figures, sketched in the following tables:

The details of the calculations are explained in the text. The statistical significativity has been computed differently for drivers and ordinaries (bearing exiting arrows) vs receivers (no exiting arrows).

IN	Entering connections	
OUT	Exiting connections	
CONN	Connections	IN + OUT
ID	Indegree	Sum of abs(weights in)
OD	Outdegree	Sum of abs(weights out)
CEN	Centrality	ID + OD
SIG	Significativity	**Σw_{out} outside μ ±½σ, μ ±σ, μ ±2σ** (drivers and ordinary)
		CEN > 1, 2, 3 Quartile of receivers' CEN distribution (receivers)

SIG	+++
	++
	+
	- - -
	- -
	-
	* * *
	* *
	*

For drivers and ordinaries the significativity is expressed as a distance from the mean in terms of standard deviations, graphically expressed as +++, ++, + for direct influence and - - -, - - , - for reverse influence, roughly indicating a positive or negative effect on the attached receiving variables.

The significativity for receivers has been expressed as centrality's quartiles membership: * * * = 4th quartile, * * 3rd = quartile, * 2nd = quartile.

The weight matrices' rows represent the outgoing nodes (originating variables) and the columns the incoming nodes (receiving variables). Weights range in the [-1, 1] interval.

The maps have been produced by the Mentalmodeler editor web application, openly available at https://www.mentalmodeler.com/scenario/.

Summary

According to Özesmi and Özesmi (2004), we evaluated a set of indicators for each fuzzy cognitive map: the number of nodes (i.e. variables) ***N*** (of which ***Nd*** drivers and ***Nr*** receivers), the number of connections ***M***, the density ***d*** = ***M*** / ***N*** (***N***-1) and the complexity ***c*** = N_r / N_d.

The indicators for each map are shown in the following table:

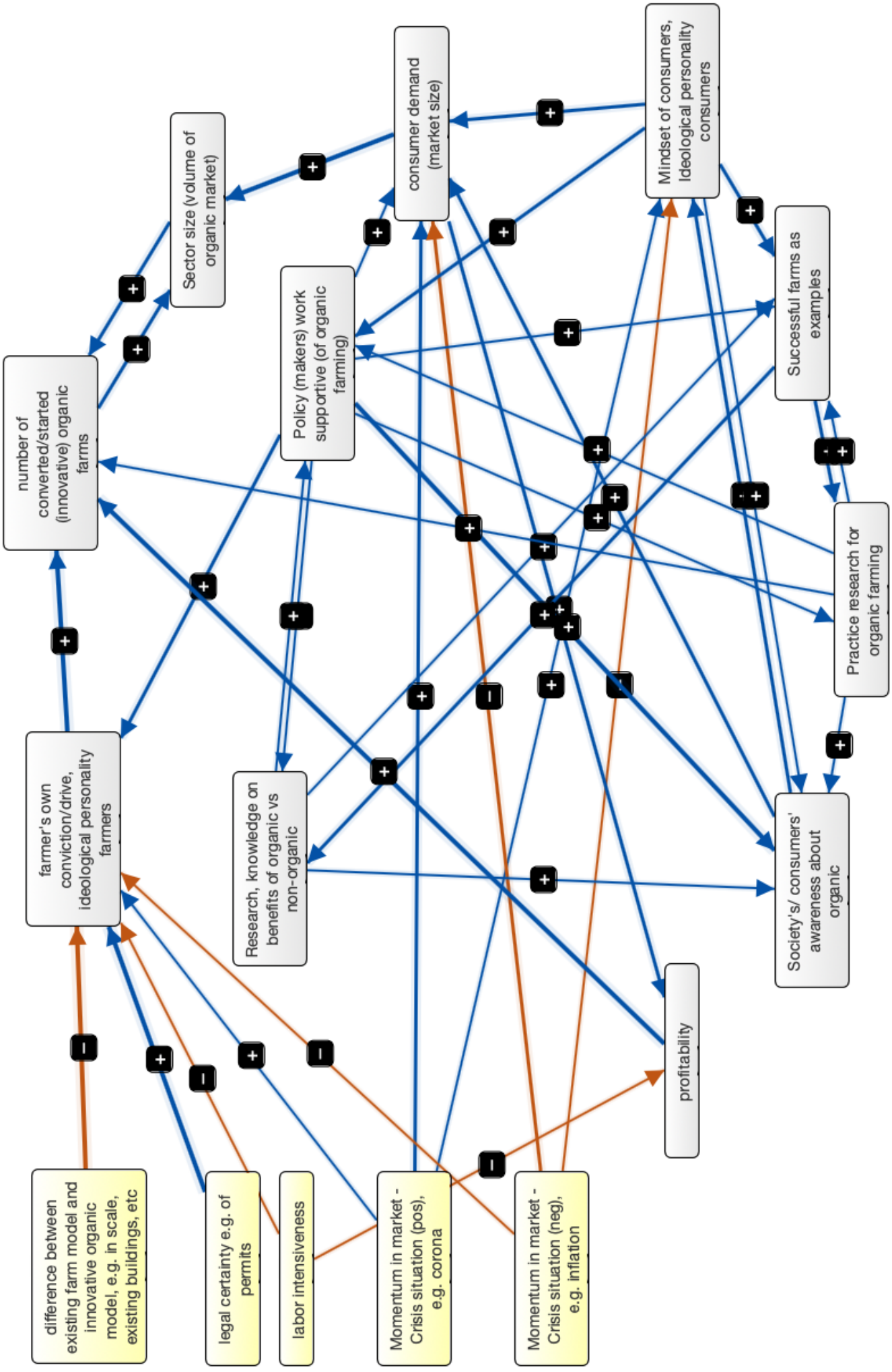
PAGE	MAP	d	c	M	N	Nd	Nr
1	BELGIUM SYNTHESIS	0.15	0.0	37	16	10	0
4	BELGIUM	0.06	0.0	84	39	16	0
7	FINLAND RESEARCHERS	0.06	0.3	23	20	9	3
10	FINLAND FARMERS AND ADVISORS	0.09	0.3	79	30	7	2
13	GERMANY	0.07	0.9	40	25	7	6
16	ITALY SYNTHESIS	0.22	1.0	29	12	2	2
19	ITALY CUMULATIVE	0.03	1.3	119	60	10	13
22	ITALY RESEARCHERS	0.05	5.5	53	34	2	11
25	ITALY FARMERS	0.12	0.5	28	16	6	3
28	ITALY ADVISORS	0.09	0.5	23	17	6	3
31	ITALY POLICY MAKERS	0.13	0.5	17	12	4	2
34	POLAND	0.94	—	68	9	0	0
37	ROMANIA SYNTHESIS	0.16	3.0	33	15	1	3
40	ROMANIA CUMULATIVE	0.06	1.6	77	37	8	5
43	ROMANIA RESEARCHERS	0.11	1.0	23	15	3	3
46	ROMANIA FARMERS	0.13	1.5	28	15	3	2
49	ROMANIA ADVISORS	0.14	2.0	30	15	4	2

References

Uygar Özesmi and Stacy L. Özesmi, *Ecological models based on people's knowledge: a multi-step fuzzy cognitive mapping approach*, Ecological Modelling 176 (2004) 43-64, Elzevier B.V. doi:10.1016/j.ecolmodel.2003.10.027.

BELGIUM SYNTHESIS

		VAR	SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**BS01**	Momentum in market - Crisis situation (pos), e.g. corona	+++	3		3	0.0	1.3	1.3
	BS02	Momentum in market - Crisis situation (neg), e.g. inflation	- - -	3		3	0.0	1.3	1.3
	BS03	difference between existing farm model and innovative organic model, e.g. in scale, existing buildings, etc	- - -	1		1	0.0	1.0	1.0
	BS04	legal certainty e.g. of permits	+++	1		1	0.0	1.0	1.0
	BS05	labor intensiveness	- -	2		2	0.0	0.7	0.7
Ordinary	**BS06**	farmer's own conviction/drive, ideological personality farmers	+++	7	6	1	3.7	1.0	4.7
	BS07	consumer demand (market size)	+++	7	5	2	3.0	1.7	4.6
	BS08	Policy (makers) work supportive (of organic farming)	+++	9	3	6	1.3	3.0	4.3
	BS09	Society's/ consumers' awareness about organic	+++	6	4	2	2.0	1.2	3.2
	BS10	Mindset of consumers, Ideological personality consumers	+++	7	3	4	1.2	2.3	3.5
	BS11	Number of converted/started (innovative) organic farms	+++	5	4	1	3.0	0.7	3.7
	BS12	Successful farms as examples	++	6	4	2	1.7	1.3	3.0
	BS13	Research, knowledge on benefits of organic vs non-organic	++	5	2	3	1.0	1.0	2.0
	BS14	Sector size (volume of organic market)	++	3	2	1	1.7	0.7	2.3
	BS15	Profitability	++	3	2	1	1.0	1.0	2.0
	BS16	Practice research for organic farming	++	6	2	4	1.0	1.3	2.3

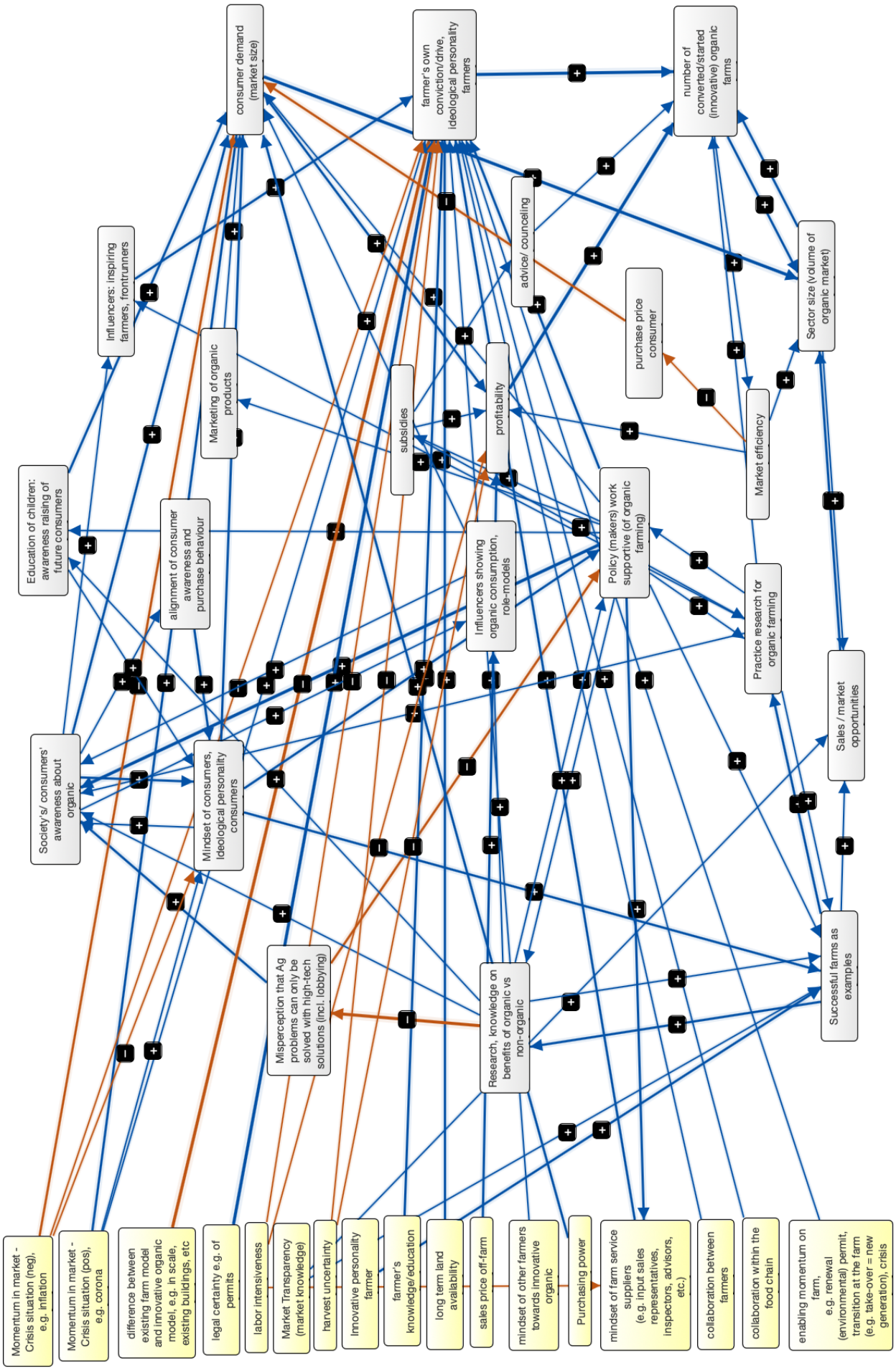

consumer demand (market size)
Mindset of consumers, Ideological personality consumers
Sector size (volume of organic market)
Policy (makers) work supportive (of organic farming)
Successful farms as examples
number of converted/started (innovative) organic farms
Practice research for organic farming
farmer's own conviction/drive, ideological personality farmers
Research, knowledge on benefits of organic vs non-organic
Society's/ consumers' awareness about organic
profitability
difference between existing farm model and innovative organic model, e.g. in scale, existing buildings, etc
legal certainty e.g. of permits
labor intensiveness
Momentum in market - Crisis situation (pos), e.g. corona
Momentum in market - Crisis situation (neg), e.g. inflation

BELGIUM SYNTHESIS WEIGHTS

VAR	BS06	BS07	BS08	BS09	BS10	BS11	BS12	BS13	BS14	BS15	BS16
BS01	0.33	0.66			0.33						
BS02	-0.33	-0.66			-0.33						
BS03	-1.00										
BS04	1.00										
BS05	-0.33									-0.33	
BS06						1.00					
BS07									1.00	0.66	
BS08	0.66	0.33		1.00			0.33	0.33			0.33
BS09		0.66			0.50						
BS10		0.66	0.66	0.33			0.66				
BS11									0.66		
BS12								0.66			0.66
BS13			0.33	0.33			0.33				
BS14						0.66					
BS15						1.00					
BS16			0.33	0.33		0.33	0.33				

BELGIUM

		VAR	SIG	CONN	IN	OUT	ID	OD	CEN
Driver	BE01	Momentum in market - Crisis situation (pos), e.g. corona	+++	3		3	0.0	1.3	1.3
	BE02	Momentum in market - Crisis situation (neg), e.g. inflation	- - -	3		3	0.0	1.3	1.3
	BE03	difference between existing farm model and innovative organic model, e.g. in scale, existing buildings, etc	- - -	1		1	0.0	1.0	1.0
	BE04	legal certainty e.g. of permits	+++	1		1	0.0	1.0	1.0
	BE05	labor intensiveness	- -	3		3	0.0	1.0	1.0
	BE06	Market Transparency (market knowledge)	+	2		2	0.0	0.7	0.7
	BE07	harvest uncertainty	-	2		2	0.0	0.7	0.7
	BE08	Innovative personality farmer	+	1		1	0.0	0.7	0.7
	BE09	farmer's knowledge/education	+	1		1	0.0	0.7	0.7
	BE10	long term land availability	+	1		1	0.0	0.7	0.7
	BE11	sales price off-farm	+	1		1	0.0	0.7	0.7
	BE12	Purchasing power	+	1		1	0.0	0.7	0.7
	BE13	mindset of other farmers towards innovative organic		1		1	0.0	0.3	0.3
	BE14	collaboration between farmers		1		1	0.0	0.3	0.3
	BE15	collaboration within the food chain		1		1	0.0	0.3	0.3
	BE16	enabling momentum on farm, e.g. renewal (environmental) permit, transition at the farm (e.g. take-over = new generation), crisis		1		1	0.0	0.3	0.3
Ordinary	BE17	farmer's own conviction/drive, ideological personality farmers	+++	16	15	1	7.9	1.0	8.9
	BE18	consumer demand (market size)	+++	12	10	2	5.6	1.7	7.3
	BE19	Policy (makers) work supportive (of organic farming)	+++	14	4	10	2.0	4.6	6.6
	BE20	Society's/ consumers' awareness about organic	+++	11	6	5	3.0	2.2	5.1
	BE21	Mindset of consumers, Ideological personality consumers	+++	9	5	4	2.2	2.3	4.5
	BE22	number of converted/started (innovative) organic farms	+++	7	5	2	3.3	1.0	4.3
	BE23	Successful farms as examples	++	9	6	3	2.6	1.7	4.3
	BE24	Research, knowledge on benefits of organic vs non-organic	++	8	2	6	1.0	2.7	3.6
	BE25	Sector size (volume of organic market)	++	6	4	2	2.7	1.0	3.6
	BE26	profitability	++	7	6	1	2.6	1.0	3.6
	BE27	Practice research for organic farming	++	8	3	5	1.3	1.7	3.0
	BE28	Misperception that Ag problems can only be solved with high-tech solutions (incl. lobbying)	-	3	1	2	1.0	1.3	2.3
	BE29	Education of children: awareness raising of future consumers	+	4	2	2	0.7	1.0	1.7
	BE30	Sales / market opportunities	+	4	3	1	1.0	0.7	1.7
	BE31	mindset of farm service suppliers (e.g. input sales representatives, inspectors, advisors, etc.)	+	3	2	1	1.0	0.7	1.7
	BE32	subsidies		4	1	3	0.3	1.0	1.3
	BE33	Market efficiency		4	1	3	0.3	1.0	1.3
	BE34	Influencers showing organic consumption, role-models		4	2	2	0.7	0.7	1.3
	BE35	Influencers: inspiring farmers, frontrunners		3	2	1	0.7	0.7	1.3
	BE36	alignment of consumer awareness and purchase behaviour		2	1	1	0.3	0.7	1.0
	BE37	purchase price consumer		2	1	1	0.3	0.7	1.0
	BE38	advice/ counceling		2	1	1	0.3	0.3	0.7
	BE39	Marketing of organic products		2	1	1	0.3	0.3	0.7

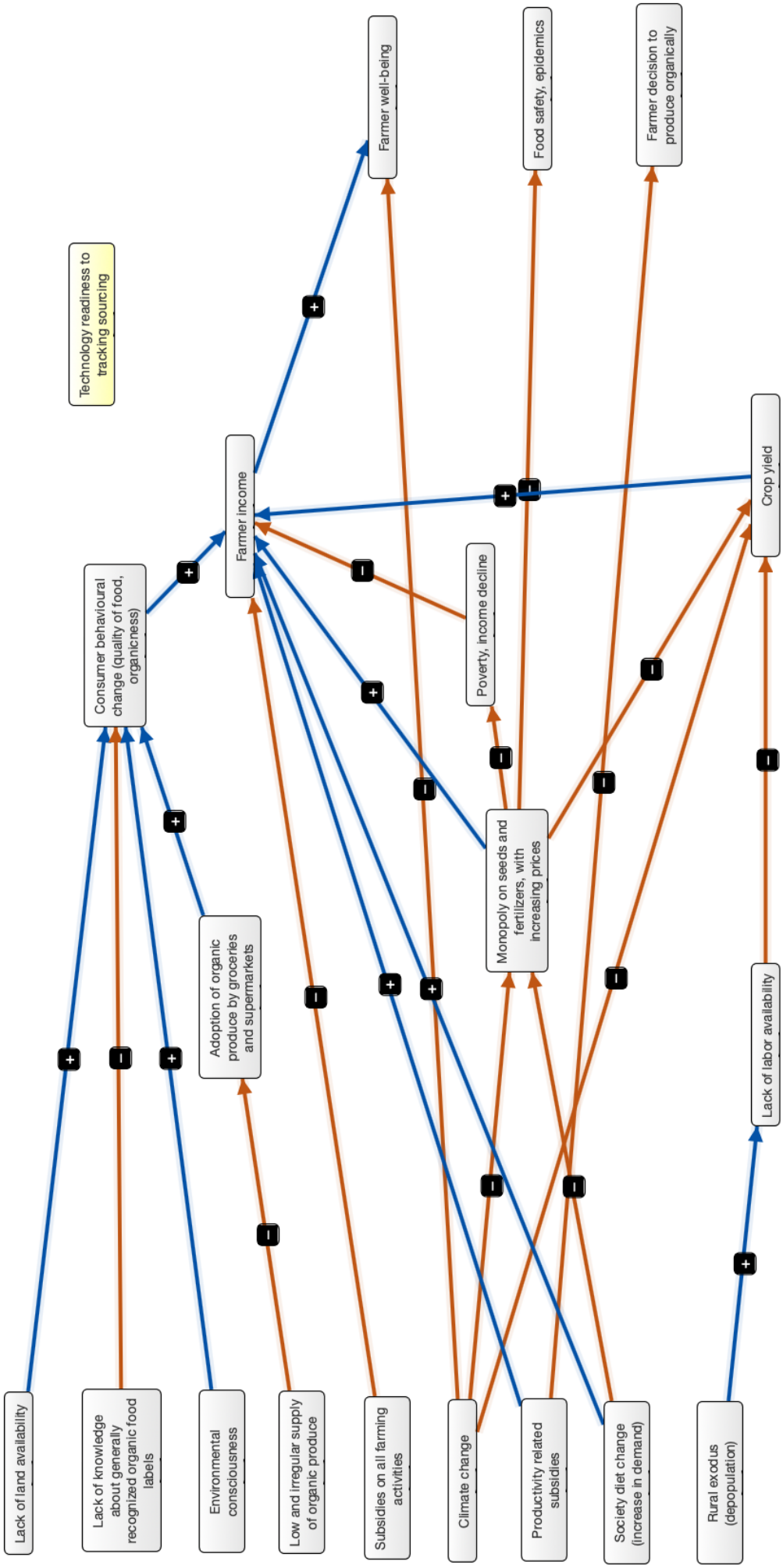

consumer demand (market size)
farmer's own conviction/drive, ideological personality farmers
number of converted/started (innovative) organic farms
Influencers: inspiring farmers, frontrunners
advice/ counceling
Sector size (volume of organic market)
purchase price consumer
Marketing of organic products
subsidies
profitability
Education of children: awareness raising of future consumers
alignment of consumer awareness and purchase behaviour
Influencers showing organic consumption, role-models
Policy (makers) work supportive (of organic farming)
Market efficiency
Practice research for organic farming
Society's/ consumers' awareness about organic
Mindset of consumers, Ideological personality consumers
Sales / market opportunities
Misperception that Ag problems can only be solved with high-tech solutions (incl. lobbying)
Research, knowledge on benefits of organic vs non-organic
Successful farms as examples
Momentum in market - Crisis situation (neg), e.g. inflation
Momentum in market - Crisis situation (pos), e.g. corona
difference between existing farm model and innovative organic model, e.g. in scale, existing buildings, etc
legal certainty e.g. of permits
labor intensiveness
Market Transparency (market knowledge)
harvest uncertainty
Innovative personality farmer
farmer's knowledge/education
long term land availability
sales price off-farm
mindset of other farmers towards innovative organic
Purchasing power
mindset of farm service suppliers (e.g. input sales representatives, inspectors, advisors, etc.)
collaboration between farmers
collaboration within the food chain
enabling momentum on farm, e.g. renewal (environmental) permit, transition at the farm (e.g. take-over = new generation), crisis

BELGIUM WEIGHTS

VAR	BE17	BE18	BE19	BE20	BE21	BE22	BE23	BE24	BE25	BE26	BE27	BE28	BE29	BE30	BE31	BE32	BE33	BE34	BE35	BE36	BE37	BE38	BE39
BE01	0.33	0.66			0.33																		
BE02	-0.33	-0.66			-0.33																		
BE03	-1.00																						
BE04	1.00																						
BE05	-0.33									-0.33					-0.33								
BE06							0.33							0.33									
BE07	-0.33									-0.33													
BE08							0.66																
BE09	0.66																						
BE10	0.66																						
BE11										0.66													
BE12		0.66																					
BE13	0.33																						
BE14	0.33																						
BE15	0.33																						
BE16	0.33																						
BE17						1.00																	
BE18									1.00	0.66													
BE19	0.66	0.33		1.00			0.33	0.33			0.33		0.33		0.66	0.33							0.33
BE20		0.66			0.50													0.33	0.33	0.33			
BE21		0.66	0.66	0.33			0.66																
BE22									0.66								0.33						
BE23								0.66			0.66			0.33									
BE24			0.33	0.33			0.33					-1.00	0.33					0.33					
BE25						0.66								0.33									
BE26						1.00																	
BE27			0.33	0.33		0.33	0.33												0.33				
BE28			-0.66	0.66																			
BE29		0.66			0.33																		
BE30									0.66														
BE31	0.66																						
BE32										0.33	0.33											0.33	
BE33									0.33	0.33											-0.33		
BE34		0.33		0.33																			
BE35	0.66																						
BE36					0.66																		
BE37		-0.66																					
BE38						0.33																	
BE39		0.33																					

FINLAND RESEARCHERS

		VAR	SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**FR01**	Climate change	- -	3		3		3.0	3.0
	FR02	Productivity related subsidies	+	2		2		2.0	2.0
	FR03	Society diet change (increase in demand)	+	2		2		2.0	2.0
	FR04	Low and irregular supply of organic produce		1		1		1.0	1.0
	FR05	Subsidies on all farming activities		1		1		1.0	1.0
	FR06	Lack of land availability		1		1		1.0	1.0
	FR07	Lack of knowledge about generally recognized organic food labels		1		1		1.0	1.0
	FR08	Environmental consciousness		1		1		1.0	1.0
	FR09	Rural exodus (depopulation)		1		1		1.0	1.0
Ordinary	**FR10**	Farmer income	+++	8	7	1	7.0	1.0	8.0
	FR11	Monopoly on seeds and fertilizers, with increasing prices	- - -	6	2	4	2.0	4.0	6.0
	FR12	Consumer behavioural change (quality of food, organicness)	++	5	4	1	4.0	1.0	5.0
	FR13	Crop yield	+	4	3	1	3.0	1.0	4.0
	FR14	Adoption of organic produce by groceries and supermarkets		2	1	1	1.0	1.0	2.0
	FR15	Poverty, income decline		2	1	1	1.0	1.0	2.0
	FR16	Lack of labor availability		2	1	1	1.0	1.0	2.0
Receiver	**FR17**	Farmer well-being	*	2	2		2.0		2.0
	FR18	Farmer decision to produce organically		1	1		1.0		1.0
	FR19	Food safety, epidemics		1	1		1.0		1.0
Isolated	**FR20**	Technology readiness to tracking sourcing		0					0.0

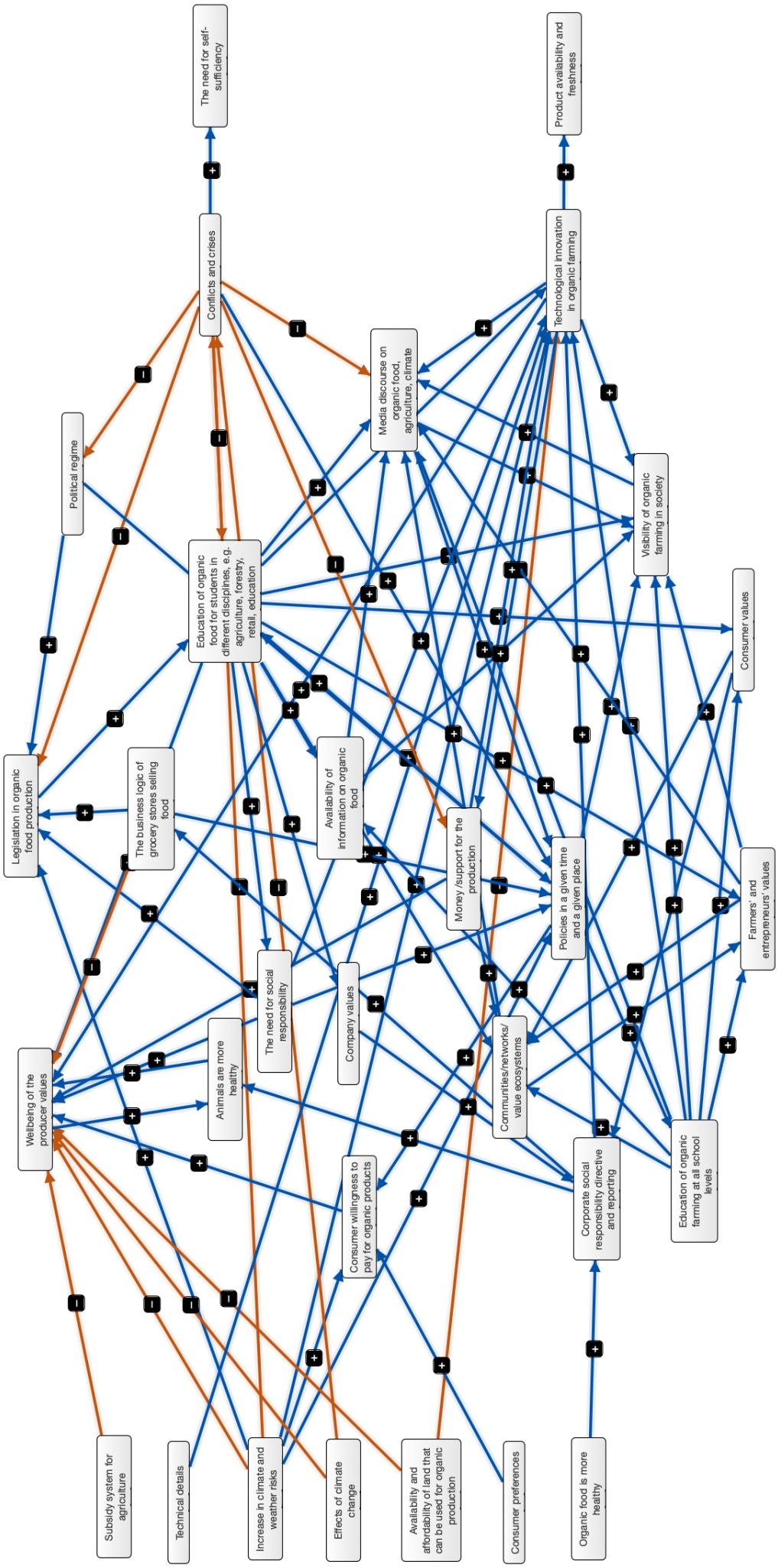

Technology readiness to tracking sourcing
Farmer well-being
Food safety, epidemics
Farmer decision to produce organically
Consumer behavioural change (quality of food, organicness)
Farmer income
Crop yield
Poverty, income decline
Monopoly on seeds and fertilizers, with increasing prices
Adoption of organic produce by groceries and supermarkets
Lack of labor availability
Lack of land availability
Lack of knowledge about generally recognized organic food labels
Environmental consciousness
Low and irregular supply of organic produce
Subsidies on all farming activities
Climate change
Productivity related subsidies
Society diet change (increase in demand)
Rural exodus (depopulation)

FINLAND RESEARCHERS WEIGHTS

VAR	FR10	FR11	FR12	FR13	FR14	FR15	FR16	FR17	FR18	FR19
FR01		-1.00		-1.00				-1.00		
FR02	1.00								-1.00	
FR03	1.00	-1.00								
FR04					-1.00					
FR05	-1.00									
FR06			1.00							
FR07			-1.00							
FR08			1.00							
FR09							1.00			
FR10								1.00		
FR11	1.00			-1.00		-1.00				-1.00
FR12	1.00									
FR13	1.00									
FR14			1.00							
FR15	-1.00									
FR16				-1.00						

FINLAND FARMERS AND ADVISORS

		VAR	SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**FF01**	Increase in climate and weather risks	+++	6		6		6.0	6.0
	FF02	Effects of climate change	-	2		2		2.0	2.0
	FF03	Availability and affordability of land that can be used for organic production	-	2		2		2.0	2.0
	FF04	Organic food is more healthy		1		1		1.0	1.0
	FF05	Consumer preferences		1		1		1.0	1.0
	FF06	Subsidy system for agriculture		1		1		1.0	1.0
	FF07	Technical details		1		1		1.0	1.0
Ordinary	**FF08**	Technological innovation in organic farming	+++	13	8	5	8.0	5.0	13.0
	FF09	Education of organic food for students in different disciplines, e.g. agriculture, forestry, retail, education	+++	13	3	10	3.0	10.0	13.0
	FF10	Wellbeing of the producer values	+++	12	11	1	11.0	1.0	12.0
	FF11	Media discourse on organic food, agriculture, climate	+++	10	8	2	8.0	2.0	10.0
	FF12	Policies in a given time and a given place	+++	10	6	4	6.0	4.0	10.0
	FF13	Conflicts and crises	- -	9	2	7	2.0	7.0	9.0
	FF14	Visibility of organic farming in society	++	8	7	1	7.0	1.0	8.0
	FF15	Education of organic farming at all school levels	++	8	1	7	1.0	7.0	8.0
	FF16	Communities/networks/value ecosystems	++	7	5	2	5.0	2.0	7.0
	FF17	Legislation in organic food production	+	6	5	1	5.0	1.0	6.0
	FF18	Corporate social responsibility directive and reporting	+	6	3	3	3.0	3.0	6.0
	FF19	Farmers' and entrepreneurs' values	+	6	3	3	3.0	3.0	6.0
	FF20	Money /support for the production	+	5	2	3	2.0	3.0	5.0
	FF21	The need for social responsibility	+	5	1	4	1.0	4.0	5.0
	FF22	Consumer willingness to pay for organic products		4	3	1	3.0	1.0	4.0
	FF23	Consumer values		4	2	2	2.0	2.0	4.0
	FF24	Availability of information on organic food		4	2	2	2.0	2.0	4.0
	FF25	The business logic of grocery stores selling food		4	1	3	1.0	3.0	4.0
	FF26	Animals are more healthy		3	2	1	2.0	1.0	3.0
	FF27	Political regime		3	1	2	1.0	2.0	3.0
	FF28	Company values		2	1	1	1.0	1.0	2.0
Receiver	**FF29**	The need for self-sufficiency	* * *	1	1		1.0		1.0
	FF30	Product availability and freshness	* * *	1	1		1.0		1.0

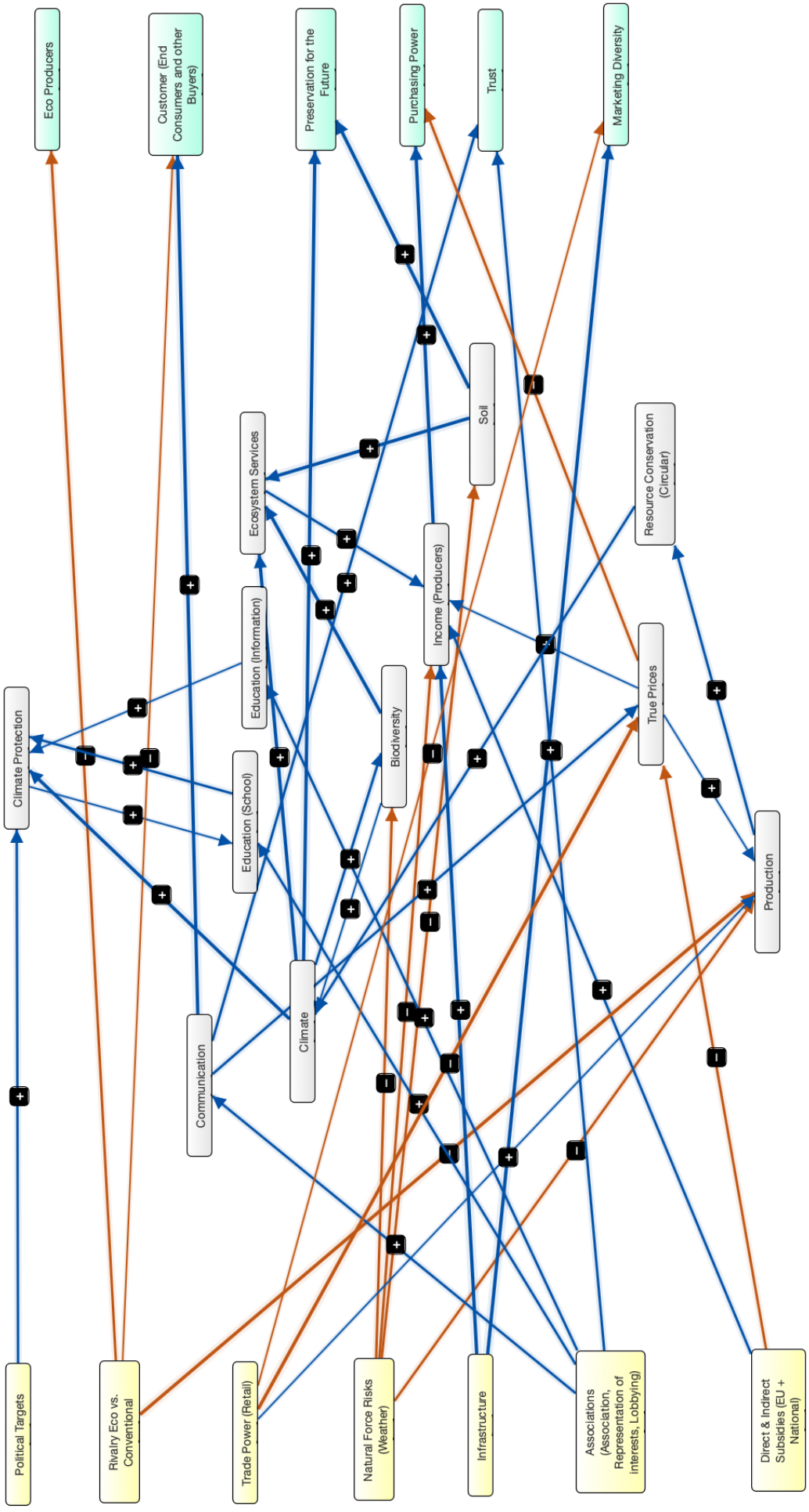

The need for self-sufficiency
Product availability and freshness
Conflicts and crises
Technological innovation in organic farming
Media discourse on organic food, agriculture, climate
Political regime
Visibility of organic farming in society
Education of organic food for students in different disciplines, e.g. agriculture, forestry, retail, education
Consumer values
Legislation in organic food production
The business logic of grocery stores selling food
Availability of information on organic food
Money /support for the production
Policies in a given time and a given place
Farmers' and entrepreneurs' values
The need for social responsibility
Company values
Wellbeing of the producer values
Animals are more healthy
Communities/networks/ value ecosystems
Consumer willingness to pay for organic products
Corporate social responsibility directive and reporting
Education of organic farming at all school levels
Subsidy system for agriculture
Technical details
Increase in climate and weather risks
Effects of climate change
Availability and affordability of land that can be used for organic production
Consumer preferences
Organic food is more healthy

FINLAND FARMERS AND ADVISORS WEIGHTS

VAR	FF08	FF09	FF10	FF11	FF12	FF13	FF14	FF15	FF16	FF17	FF18	FF19	FF20	FF21	FF22	FF23	FF24	FF25	FF26	FF27	FF28	FF29	FF30
FF01	1.00		-1.00		1.00	-1.00				1.00					1.00								
FF02			-1.00			-1.00																	
FF03	-1.00		-1.00																				
FF04											1.00												
FF05															1.00								
FF06			-1.00																				
FF07	1.00																						
FF08			1.00	1.00			1.00						1.00										1.00
FF09	1.00		1.00	1.00			1.00		1.00			1.00		1.00		1.00	1.00				1.00		
FF10																			1.00				
FF11					1.00		1.00																
FF12		1.00					1.00	1.00							1.00								
FF13		-1.00		-1.00	1.00					-1.00			-1.00							-1.00		1.00	
FF14				1.00																			
FF15	1.00			1.00			1.00		1.00			1.00				1.00	1.00						
FF16				1.00								1.00											
FF17		1.00																					
FF18	1.00																	1.00	1.00				
FF19				1.00			1.00		1.00														
FF20	1.00		1.00						1.00														
FF21	1.00		1.00		1.00					1.00													
FF22			1.00																				
FF23									1.00		1.00												
FF24				1.00			1.00																
FF25			-1.00		1.00					1.00													
FF26			1.00																				
FF27					1.00					1.00													
FF28											1.00												

GERMANY

		VAR	SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**GE01**	Associations (Association, Representation of interests, Lobbying)	+++	4		4	0.0	3.0	3.0
	GE02	Natural Force Risks (Weather)	-	4		4	0.0	2.0	2.0
	GE03	Infrastructure	+	2		2	0.0	2.0	2.0
	GE04	Rivalry Eco vs. Conventional	-	3		3	0.0	1.7	1.7
	GE05	Trade Power (Retail)	-	3		3	0.0	1.7	1.7
	GE06	Direct & Indirect Subsidies (EU + National)	-	2		2	0.0	1.3	1.3
	GE07	Political Targets		1		1	0.0	0.7	0.7
Ordinary	**GE08**	Climate	+++	6	2	4	1.1	3.7	4.8
	GE09	Income (Producers)	+++	6	5	1	2.8	1.0	3.8
	GE10	True Prices	- - -	6	3	3	2.4	1.1	3.5
	GE11	Ecosystem Services	++	4	3	1	3.0	0.5	3.5
	GE12	Communication	++	4	1	3	0.8	2.6	3.4
	GE13	Climate Protection	++	5	4	1	2.5	0.3	2.8
	GE14	Production	+	5	4	1	1.9	0.7	2.6
	GE15	Biodiversity	+	4	2	2	1.2	1.4	2.6
	GE16	Soil		3	1	2	0.5	2.0	2.5
	GE17	Resource Conservation (Circular)		2	1	1	0.7	0.7	1.4
	GE18	Education (School)		3	2	1	0.9	0.5	1.4
	GE19	Education (Information)		2	1	1	0.8	0.3	1.1
Receiver	**GE20**	Preservation for the Future	* *	2	2		2.0	0.0	2.0
	GE21	Purchasing Power	*	2	2		1.7	0.0	1.7
	GE22	Trust	*	2	2		1.6	0.0	1.6
	GE23	Marketing Diversity	*	2	2		1.5	0.0	1.5
	GE24	Customer (End Consumers and other Buyers)		2	2		1.3	0.0	1.3
	GE25	Eco Producers		1	1		0.5	0.0	0.5

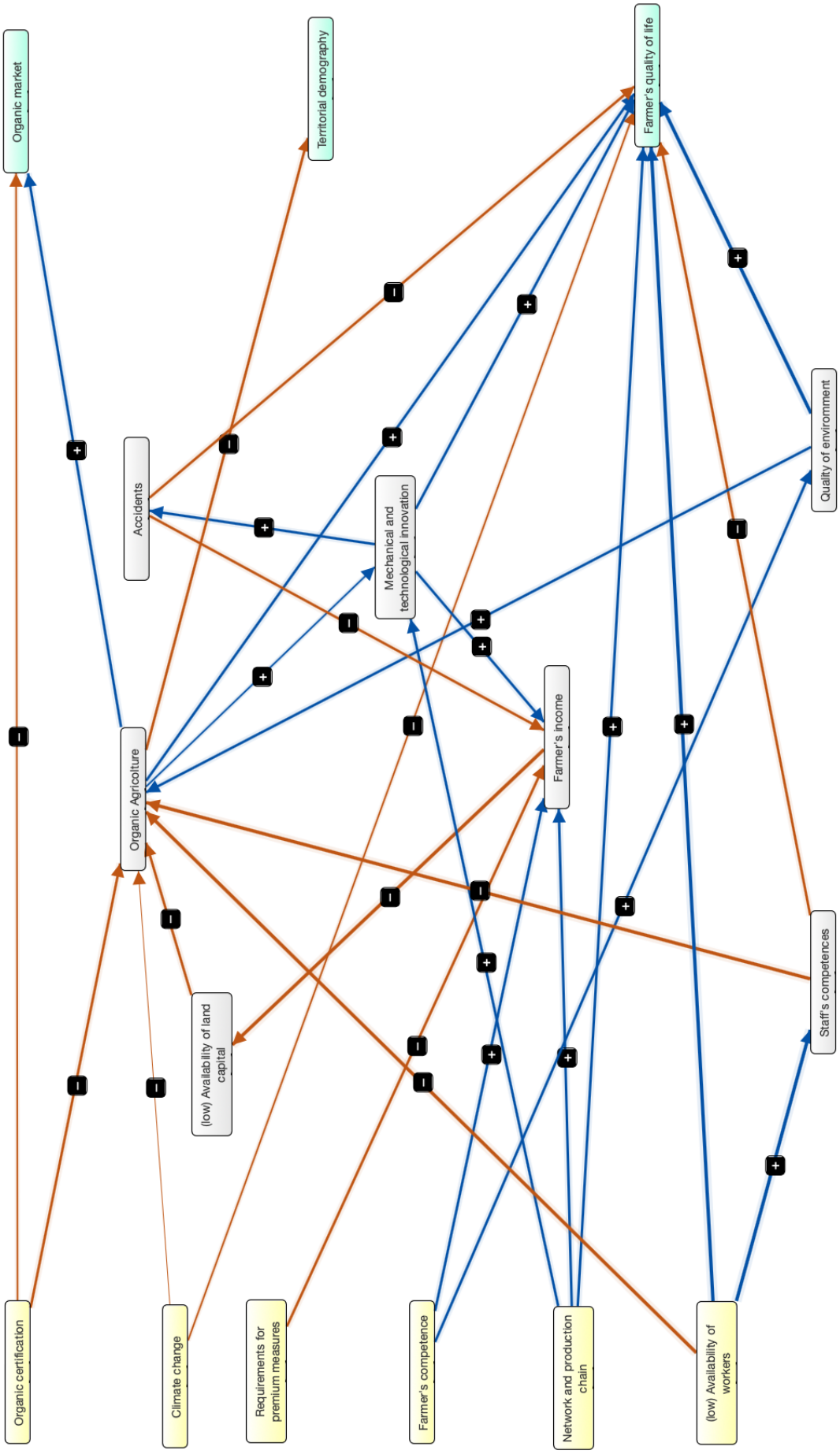

Eco Producers
Customer (End Consumers and other Buyers)
Preservation for the Future
Purchasing Power
Trust
Marketing Diversity
Soil
Ecosystem Services
Resource Conservation (Circular)
Income (Producers)
Education (Information)
Climate Protection
Biodiversity
True Prices
Education (School)
Production
Climate
Communication
Political Targets
Rivalry Eco vs. Conventional
Trade Power (Retail)
Natural Force Risks (Weather)
Infrastructure
Associations (Association, Representation of interests, Lobbying)
Direct & Indirect Subsidies (EU + National)

GERMANY WEIGHTS

VAR	GE08	GE09	GE10	GE11	GE12	GE13	GE14	GE15	GE16	GE17	GE18	GE19	GE20	GE21	GE22	GE23	GE24	GE25
GE01					0.80						0.60	0.80			0.80			
GE02		-0.50					-0.50	-0.50	-0.50									
GE03		1.00														1.00		
GE04							-0.90										-0.30	-0.50
GE05			-0.90				0.29									-0.49		
GE06		0.60	-0.70															
GE07						0.70												
GE08				1.00		1.00		0.70					1.00					
GE09														1.00				
GE10		0.21					0.21							-0.71				
GE11		0.51																
GE12			0.80												0.80		1.00	
GE13											0.30							
GE14										0.71								
GE15	0.41			1.00														
GE16				1.00									1.00					
GE17	0.70																	
GE18						0.50												
GE19						0.30												

ITALY SYNTHESIS

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**IS01**	Climate Change	- - -	3		3		3.0	3.0
	IS02	Requirements for Premium Resources		4		4		2.5	2.5
Ordinary	**IS03**	Short Value Chain	+++	8	4	4	4.0	3.5	7.5
	IS04	Collaborative Networking	+++	7	1	6	1.0	5.5	6.5
	IS05	Resistance and Resilience of the Productive System	++	6	4	2	4.0	2.0	6.0
	IS06	Multifunctional Agricolture	++	6	5	1	4.5	1.0	5.5
	IS07	Inner Areas Demography	++	5	1	4	0.5	3.5	4.0
	IS08	Ecological Biodiversity		3	1	2	1.0	2.0	3.0
	IS09	Food Local System		4	3	1	2.0	1.0	3.0
	IS10	Culture, Education, Awareness		3	1	2	1.0	1.0	2.0
Receiver	**IS11**	Farmers Quality of Life	* *	5	5		4.5		4.5
	IS12	Hyrogeological Risks		4	4		2.5		2.5

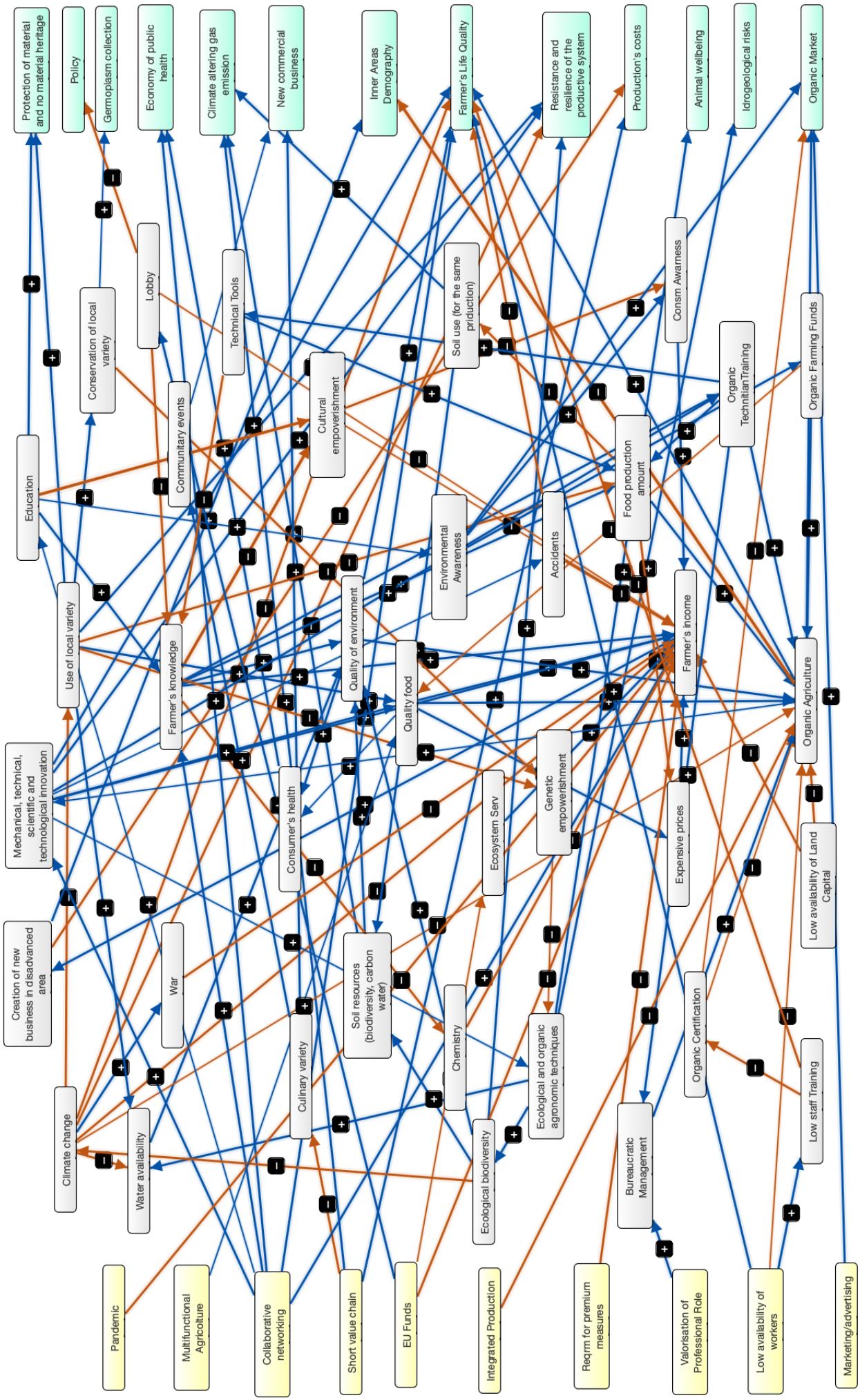

Organic market
Territorial demography
Farmer's quality of life
Accidents
Mechanical and technological innovation
Quality of environment
Organic Agricolture
Farmer's income
(low) Availability of land capital
Staff's competences
Organic certification
Climate change
Requirements for premium measures
Farmer's competence
Network and production chain
(low) Availability of workers

ITALY SYNTHESIS WEIGHTS

VAR	IS03	IS04	IS05	IS06	IS07	IS08	IS09	IS10	IS11	IS12
IS01			-1.00						-1.00	1.00
IS02	-1.00			-0.50	-0.50					-0.50
IS03		1.00		1.00					1.00	0.50
IS04			1.00	1.00		1.00		1.00	1.00	-0.50
IS05				1.00					1.00	
IS06			1.00							
IS07	1.00		1.00	1.00			0.50			
IS08	1.00						1.00			
IS09	1.00									
IS10							0.50		0.50	

ITALY CUMULATIVE

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Driver	IC01	Collaborative networking	+++	6		6	0.0	3.0	3.0
	IC02	EU Funds	-	3		3	0.0	1.8	1.8
	IC03	Short value chain		3		3	0.0	1.6	1.6
	IC04	Low availability of workers		3		3	0.0	1.6	1.6
	IC05	Low availability of Land Capital	- -	2		2	0.0	1.1	1.1
	IC06	Marketing/advertising		1		1	0.0	0.7	0.7
	IC07	Valorisation of Professional Role		1		1	0.0	0.7	0.7
	IC08	Reqrm for premium measures	-	1		1	0.0	0.7	0.7
	IC09	Pandemic	-	1		1	0.0	0.7	0.7
	IC10	Integrated Production	-	1		1	0.0	0.6	0.6
	IC11	Multifunctional Agricolture		1		1	0.0	0.5	0.5
Ordinary	IC12	Farmer's income		18	17	1	9.6	0.5	10.1
	IC13	Organic Agriculture		15	11	4	5.8	2.5	8.3
	IC14	Farmer's knowledge		10	4	6	2.2	4.1	6.2
	IC15	Mechanical, technical, scientific and technological innovation	+++	9	2	7	0.9	3.5	4.5
	IC16	Use of local variety	++	8	1	7	0.5	3.7	4.3
	IC17	Climate change	- - -	8	1	7	0.6	3.7	4.3
	IC18	Quality food	++	8	4	4	2.0	2.0	4.0
	IC19	Food production amount	-	7	4	3	2.2	1.5	3.7
	IC20	Quality of environment	++	7	4	3	2.1	1.6	3.7
	IC21	Organic TechnitianTraining	++	6	2	4	1.0	2.3	3.4
	IC22	Ecological and organic agronomic techniques	++	6	2	4	1.0	2.2	3.1
	IC23	Cultural empoverishment	- -	4	2	2	2.0	1.0	3.0
	IC24	Education		5	1	4	0.5	2.4	2.9
	IC25	Ecological biodiversity	+	5	1	4	0.5	2.1	2.7
	IC26	Lobby	- -	4	1	3	0.8	1.7	2.4
	IC27	Water availability		4	3	1	1.7	0.5	2.2
	IC28	Environmental Awareness	++	4	1	3	0.4	1.6	2.1
	IC29	Soil resources (biodiversity, carbon water)	+	4	2	2	1.0	1.0	2.0
	IC30	Bureaucratic Management		3	2	1	1.3	0.6	1.9
	IC31	Organic Farming Funds		3	1	2	0.6	1.2	1.8
	IC32	Technical Tools		3	1	2	0.6	1.1	1.7
	IC33	Accidents	- -	3	1	2	0.4	1.3	1.7
	IC34	Consm Awarness		3	2	1	1.1	0.6	1.6
	IC35	Low staff Training	- -	3	1	2	0.5	1.1	1.6
	IC36	Conservation of local variety		3	1	2	0.6	1.0	1.6
	IC37	Creation of new business in disadvanced area		3	1	2	0.5	1.0	1.5
	IC38	Culinary variety	+	3	1	2	0.5	1.0	1.5
	IC39	Consumer's health		3	2	1	1.0	0.5	1.5
	IC40	Soil use (for the same priduction)	+	3	1	2	0.5	1.0	1.5
	IC41	Genetic empowerishment	-	3	2	1	1.0	0.5	1.5
	IC42	Expensive prices		3	2	1	1.0	0.5	1.5
	IC43	Organic Certification	- -	3	1	2	0.5	0.9	1.4
	IC44	Chemistry	-	2	1	1	0.7	0.6	1.3
	IC45	War	-	2	1	1	0.6	0.5	1.1
	IC46	Ecosystem Serv		2	1	1	0.5	0.6	1.0
	IC47	Communitary events		2	1	1	0.5	0.5	1.0
Receiver	IC48	Farmer's Life Quality	* * *	8	8		4.6	0.0	4.6
	IC49	Organic Market	* * *	4	4		2.3	0.0	2.3
	IC50	Resistance and resilience of the productive system	* * *	4	4		2.1	0.0	2.1
	IC51	Climate altering gas emission	* *	3	3		1.6	0.0	1.6
	IC52	Inner Areas Demography	* *	2	2		1.4	0.0	1.4
	IC53	Protection of material and no material heritage	*	2	2		1.1	0.0	1.1
	IC54	Production's costs	*	2	2		1.1	0.0	1.1
	IC55	Economy of public health		2	2		1.0	0.0	1.0
	IC56	New commercial business		2	2		1.0	0.0	1.0
	IC57	Animal wellbeing		1	1		0.6	0.0	0.6
	IC58	Policy		1	1		0.6	0.0	0.6
	IC59	Idrogeological risks		1	1		0.5	0.0	0.5
	IC60	Germoplasm collection		1	1		0.5	0.0	0.5

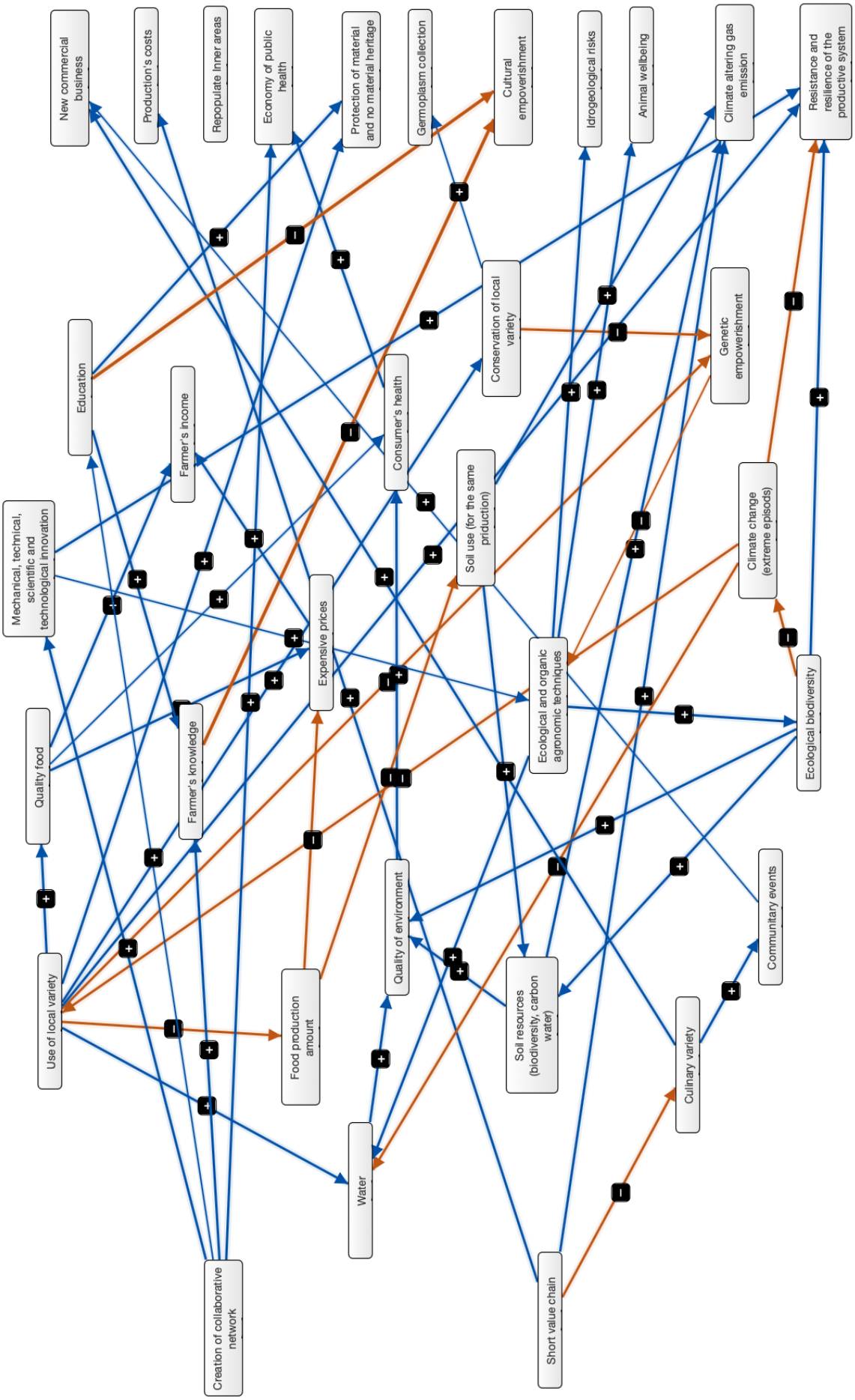

Protection of material and no material heritage
Policy
Germoplasm collection
Economy of public health
Climate altering gas emission
New commercial business
Inner Areas Demography
Farmer's Life Quality
Resistance and resilience of the productive system
Production's costs
Animal wellbeing
Idrogeological risks
Organic Market
Organic Farming Funds
Organic TechnitianTraining
Consm Awarness
Soil use (for the same priduction)
Technical Tools
Lobby
Conservation of local variety
Communitary events
Cultural empoverishment
Education
Food production amount
Accidents
Environmental Awareness
Quality of environment
Quality food
Farmer's knowledge
Use of local variety
Farmer's income
Organic Agriculture
Genetic empowerishment
Ecosystem Serv
Consumer's health
Mechanical, technical, scientific and technological innovation
Expensive prices
Low availability of Land Capital
Creation of new business in disadvanced area
War
Soil resources (biodiversity, carbon water)
Chemistry
Ecological and organic agronomic techniques
Culinary variety
Organic Certification
Low staff Training
Climate change
Water availability
Ecological biodiversity
Bureaucratic Management
Pandemic
Multifunctional Agricolture
Collaborative networking
Short value chain
EU Funds
Integrated Production
Reqrm for premium measures
Valorisation of Professional Role
Low availability of workers
Marketing/advertising

ITALY CUMULATIVE WEIGHTS

VAR	IC12	IC13	IC14	IC15	IC16	IC17	IC18	IC19	IC20	IC21	IC22	IC23	IC24	IC25	IC26	IC27	IC28	IC29	IC30	IC31	IC32	IC33	IC34	IC35	IC36	IC37	IC38	IC39	IC40	IC41	IC42	IC43	IC44	IC45	IC46	IC47	IC48	IC49	IC50	IC51	IC52	IC53	IC54	IC55	IC56	IC57	IC58	IC59	IC60
IC01	0.50		0.52	0.50									0.48																							0.52							0.50					
IC02	-0.60														0.76																				-0.47														
IC03																											-0.52												0.55			0.53						
IC04		-0.44																						0.51													0.65												
IC05	-0.53	-0.52																																															
IC06																																				0.70												
IC07																			0.69																														
IC08	-0.66																																																
IC09	-0.65																																																
IC10		-0.55																																															
IC11							0.49																																										
IC12																										0.50																								
IC13				0.44																																0.60	0.52			-0.89								
IC14	0.70							0.58	0.59	0.53		-1.00																				-0.65																	
IC15	0.56						0.53			0.50	0.48											0.38															0.57		0.50										
IC16							0.52	-0.50								0.58									0.56					-0.50									0.53			0.55							
IC17	-0.54	-0.47			-0.52											-0.52																		0.62			-0.51		-0.52								
IC18	0.50	0.50																										0.48			0.50																
IC19		0.52																											-0.50		-0.50																	
IC20		0.50																										0.53									0.53											
IC21		0.54						0.57											0.62		0.60																												
IC22														0.53		0.56																															0.56		0.50	
IC23	-0.49																						-0.54																										
IC24			0.50									-1.00					0.43																										0.50						
IC25						-0.55			0.55									0.50																						0.52										
IC26	-0.49		-0.60																																											-0.56			
IC27									0.50																																								
IC28																				0.55			0.51															0.57												
IC29									0.50																																0.50									
IC30		0.60																																															
IC31		0.76					-0.48																																										
IC32			-0.53					0.56																																									
IC33	-0.66																																			-0.63												
IC34	0.55																																															
IC35																																-0.51				-0.57												
IC36																														-0.52																	0.48
IC37																																								0.52		-0.52						
IC38																																			0.50								0.50					
IC39																																										0.50					
IC40																		0.50																							0.50							
IC41											-0.48																																					
IC42	0.50																																															
IC43		-0.42																																			-0.49											
IC44	-0.62																																															
IC45	-0.50																																															
IC46	0.57																																															
IC47																																															

ITALY RESEARCHERS

	VAR		SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**IR01**	Creation of collaborative network	+++	4		4	0.0	2.0	2.0
	IR02	Short value chain		3		3	0.0	1.6	1.6
Ordinary	**IR03**	Use of local variety	++	8	1	7	0.5	3.7	4.3
	IR04	Ecological and organic agronomic techniques	+++	6	2	4	1.0	2.2	3.1
	IR05	Ecological biodiversity	+	5	1	4	0.5	2.1	2.7
	IR06	Education		4	1	3	0.5	2.0	2.5
	IR07	Water		4	3	1	1.7	0.5	2.2
	IR08	Climate change (extreme episods)	- - -	4	1	3	0.6	1.6	2.1
	IR09	Quality of environment		4	3	1	1.6	0.5	2.1
	IR10	Farmer's knowledge	- -	3	2	1	1.0	1.0	2.0
	IR11	Quality food	++	4	1	3	0.5	1.5	2.0
	IR12	Soil resources (biodiversity, carbon water)	+	4	2	2	1.0	1.0	2.0
	IR13	Conservation of local variety		3	1	2	0.6	1.0	1.6
	IR14	Creation of new business in disadvanced area		3	1	2	0.5	1.0	1.5
	IR15	Culinary variety	+	3	1	2	0.5	1.0	1.5
	IR16	Consumer's health		3	2	1	1.0	0.5	1.5
	IR17	Food production amount	- -	3	1	2	0.5	1.0	1.5
	IR18	Soil use (for the same priduction)	+	3	1	2	0.5	1.0	1.5
	IR19	Farmer's income		3	2	1	1.0	0.5	1.5
	IR20	Genetic empowerishment	- -	3	2	1	1.0	0.5	1.5
	IR21	Expensive prices		3	2	1	1.0	0.5	1.5
	IR22	Mechanical, technical, scientific and technological innovation	+	3	1	2	0.5	1.0	1.5
	IR23	Communitary events		2	1	1	0.5	0.5	1.0
Receiver	**IR24**	Resistance and resilience of the productive system	* * *	4	4		2.1	0.0	2.1
	IR25	Cultural empoverishment	* * *	2	2		2.0	0.0	2.0
	IR26	Climate altering gas emission	* * *	3	3		1.6	0.0	1.6
	IR27	Protection of material and no material heritage	* *	2	2		1.1	0.0	1.1
	IR28	Production's costs	* *	2	2		1.1	0.0	1.1
	IR29	Economy of public health	*	2	2		1.0	0.0	1.0
	IR30	New commercial business	*	2	2		1.0	0.0	1.0
	IR31	Animal wellbeing	*	1	1		0.6	0.0	0.6
	IR32	Repopulate Inner areas		1	1		0.5	0.0	0.5
	IR33	Idrogeological risks		1	1		0.5	0.0	0.5
	IR34	Germoplasm collection		1	1		0.5	0.0	0.5

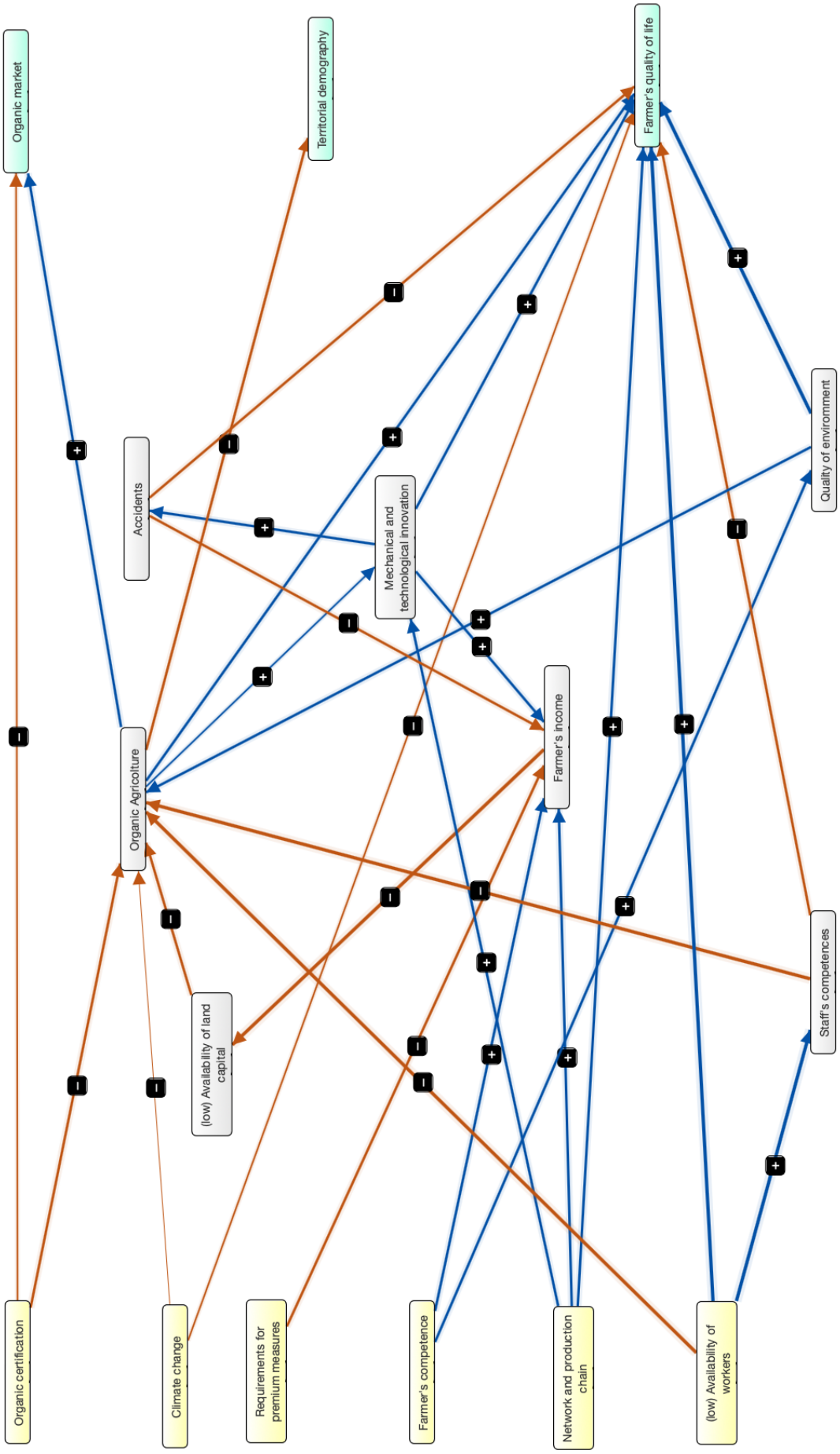

New commercial business
Production's costs
Repopulate Inner areas
Economy of public health
Protection of material and no material heritage
Germoplasm collection
Cultural empoverishment
Idrogeological risks
Animal wellbeing
Climate altering gas emission
Resistance and resilience of the productive system
Education
Farmer's income
Consumer's health
Conservation of local variety
Genetic empowerishment
Mechanical, technical, scientific and technological innovation
Soil use (for the same priduction)
Climate change (extreme episods)
Quality food
Farmer's knowledge
Expensive prices
Ecological and organic agronomic techniques
Ecological biodiversity
Use of local variety
Food production amount
Quality of environment
Soil resources (biodiversity, carbon water)
Communitary events
Water
Culinary variety
Creation of collaborative network
Short value chain

ITALY RESEARCHERS WEIGHTS

VAR	IR03	IR04	IR05	IR06	IR07	IR08	IR09	IR10	IR11	IR12	IR13	IR14	IR15	IR16	IR17	IR18	IR19	IR20	IR21	IR22	IR23	IR24	IR25	IR26	IR27	IR28	IR29	IR30	IR31	IR32	IR33	IR34
IR01				0.48				0.52												0.50							0.50					
IR02													-0.52											0.55		0.53						
IR03					0.58				0.52		0.56				-0.50			-0.50				0.53			0.55							
IR04			0.53		0.56																								0.56		0.50	
IR05						-0.55	0.55			0.50												0.52										
IR06								0.50															-1.00		0.50							
IR07							0.50																									
IR08	-0.52				-0.52																	-0.52									
IR09														0.53																		
IR10																							-1.00									
IR11														0.48			0.50		0.50													
IR12							0.50																	0.50								
IR13																		-0.52														0.48
IR14																										-0.52				0.52		
IR15																					0.50							0.50				
IR16																											0.50					
IR17																-0.50			-0.50													
IR18										0.50														0.50								
IR19												0.50																				
IR20		-0.48																														
IR21																	0.50															
IR22		0.48																				0.50										
IR23																												0.48				

ITALY FARMERS

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**IF01**	(low) Availability of workers		3		3	0.0	2.9	2.9
	IF02	Network and production chain	++	3		3	0.0	2.1	2.1
	IF03	Farmer's competence	++	2		2	0.0	1.6	1.6
	IF04	Organic certification	-	2		2	0.0	0.9	0.9
	IF05	Requirements for premium measures	-	1		1	0.0	0.8	0.8
	IF06	Climate change		2		2	0.0	0.4	0.4
Ordinary	**IF07**	Organic Agricolture	+	10	6	4	4.2	2.2	6.4
	IF08	Farmer's income	-	6	5	1	3.7	0.9	4.6
	IF09	Mechanical and technological innovation	++	5	2	3	1.3	1.7	3.0
	IF10	Staff's competences	- -	3	1	2	1.0	1.8	2.8
	IF11	Quality of envirommment	++	3	1	2	0.8	1.8	2.6
	IF12	Accidents	- -	3	1	2	0.5	1.5	2.0
	IF13	(low) Availability of land capital	-	2	1	1	0.9	0.8	1.7
Receiver	**IF14**	Farmer's Life Quality	* * *	8	8		5.6	0.0	5.6
	IF15	Organic market	*	2	2		0.9	0.0	0.9
	IF16	Territorial demography		1	1		0.5	0.0	0.5

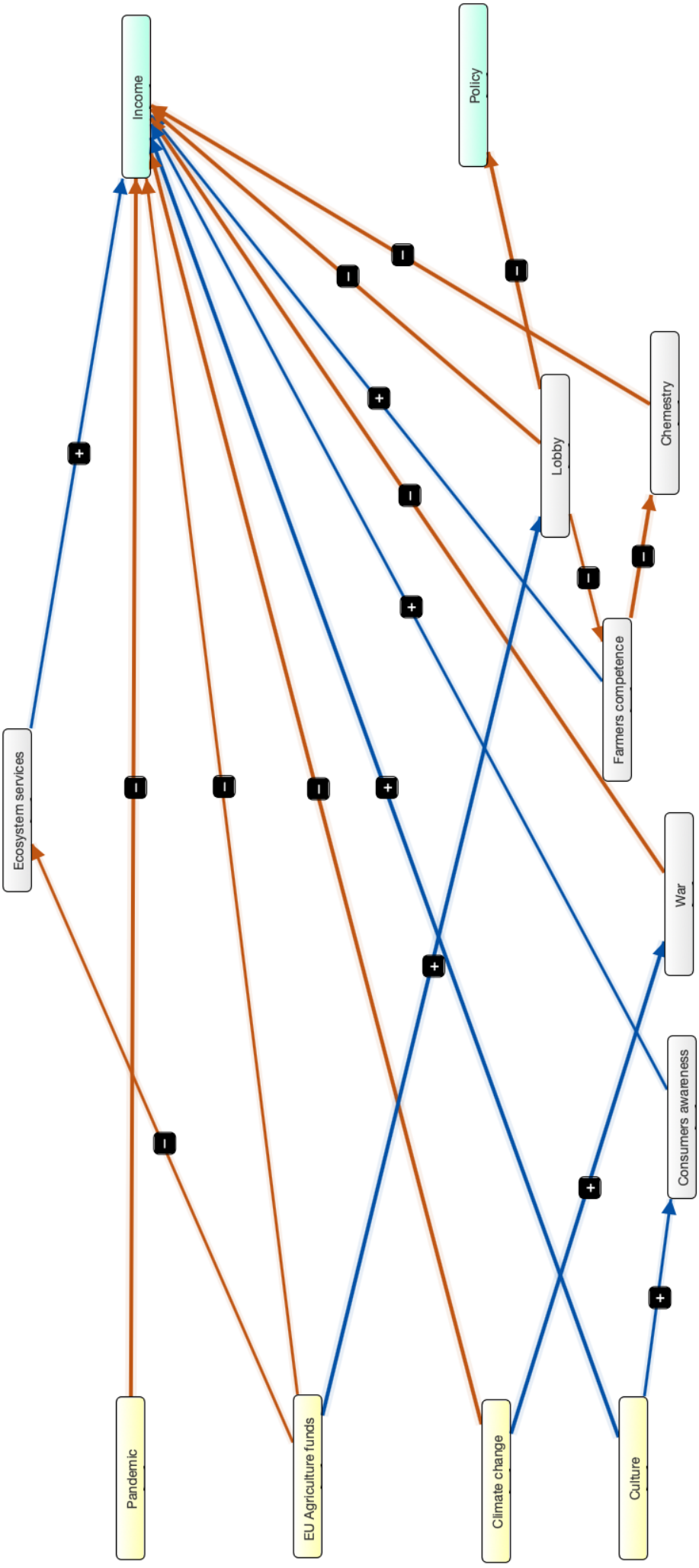

Organic market
Territorial demography
Farmer's quality of life
Accidents
Mechanical and technological innovation
Quality of environment
Organic Agricolture
Farmer's income
(low) Availability of land capital
Staff's competences
Organic certification
Climate change
Requirements for premium measures
Farmer's competence
Network and production chain
(low) Availability of workers

ITALY FARMERS WEIGHTS

VAR	IF07	IF08	IF09	IF10	IF11	IF12	IF13	IF14	IF15	IF16
IF01	-1.00			1.00				0.90		
IF02		0.80	0.80					0.50		
IF03		0.80			0.80					
IF04	-0.52								-0.39	
IF05		-0.80								
IF06	-0.11							-0.30		
IF07			0.49					0.70	0.50	-0.50
IF08							-0.90			
IF09		0.50				0.51		0.70		
IF10	-1.00							-0.83		
IF11	0.80							1.00		
IF12		-0.81						-0.70		
IF13	-0.80									

ITALY POLICY MAKERS

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**IP01**	Climate change	+	2		2	0.0	2.0	2.0
	IP02	EU Agriculture funds	++	3		3	0.0	1.9	1.9
	IP03	Culture	++	2		2	0.0	1.7	1.7
	IP04	Pandemic	-	1		1	0.0	1.0	1.0
Ordinary	**IP05**	Lobby	- - -	4	1	3	0.9	2.5	3.4
	IP06	Farmers competence		3	1	2	0.5	1.8	2.3
	IP07	Chemestry	-	2	1	1	1.0	1.0	2.0
	IP08	War	-	2	1	1	1.0	1.0	2.0
	IP09	Ecosystem services		2	1	1	0.5	0.7	1.2
	IP10	Consumers awareness		2	1	1	0.7	0.5	1.2
Receiver	**IP11**	Income	* * *	10	10		8.5	0.0	8.5
	IP12	Policy		1	1		1.0	0.0	1.0

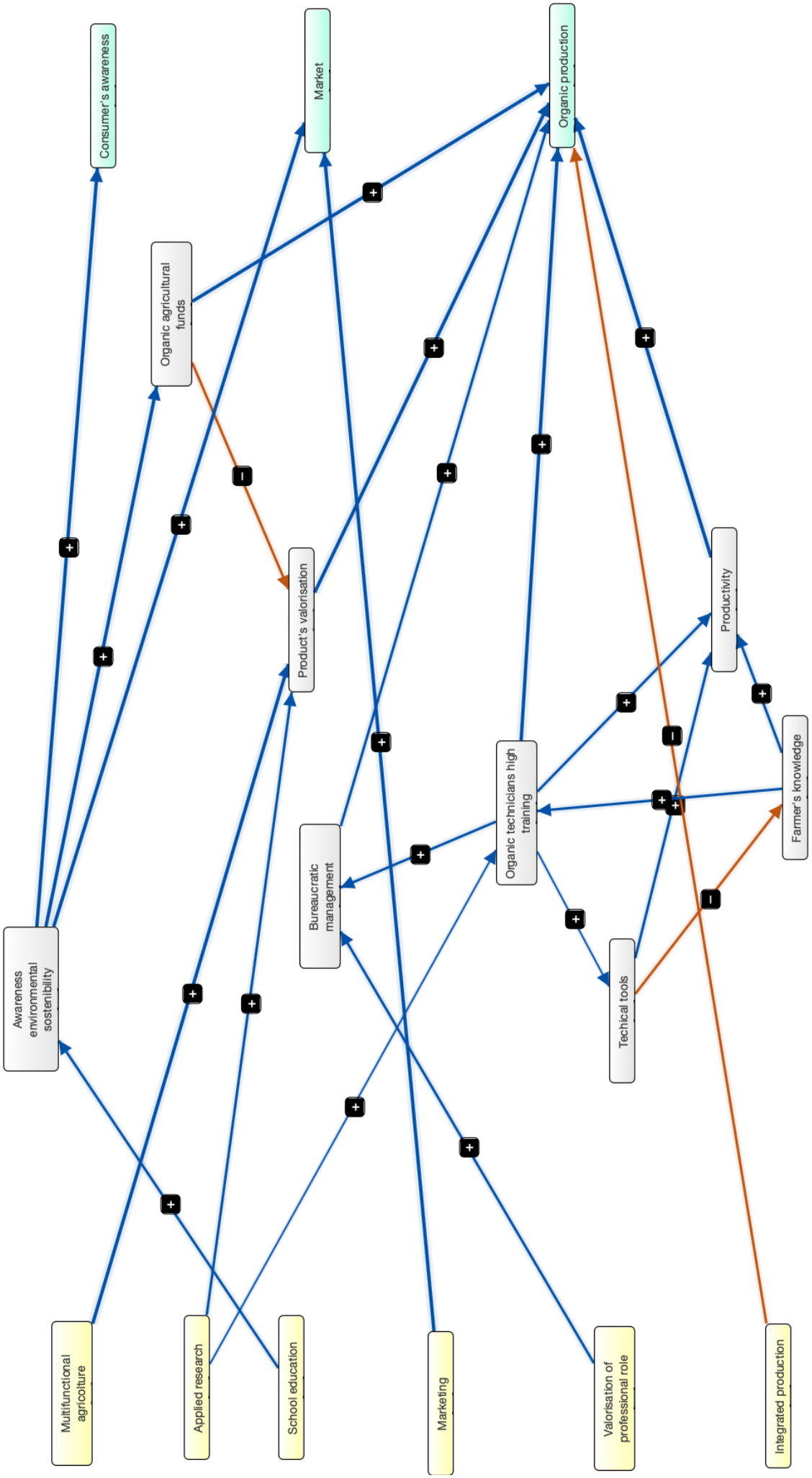

Income
Policy
Chemestry
Lobby
Farmers competence
War
Consumers awareness
Culture
Climate change
EU Agriculture funds
Pandemic
Ecosystem services

ITALY POLICY MAKERS WEIGHTS

VAR	IP05	IP06	IP07	IP08	IP09	IP10	IP11	IP12
IP01				1.00			-1.00	
IP02	0.90				-0.50		-0.50	
IP03						0.70	1.00	
IP04							-1.00	
IP05		-0.50					-1.00	-1.00
IP06			-1.00				0.80	
IP07							-1.00	
IP08							-1.00	
IP09							0.70	
IP10							0.50	

ITALY ADVISORS

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**IT01**	Applied research		2		2	0.0	1.2	1.2
	IT02	Marketing		1		1	0.0	1.0	1.0
	IT03	Multifunctional agricolture		1		1	0.0	0.9	0.9
	IT04	Valorisation of professional role		1		1	0.0	0.8	0.8
	IT05	Integrated (?) production	- -	1		1	0.0	0.8	0.8
	IT06	School education		1		1	0.0	0.6	0.6
Ordinary	**IT07**	Organic technicians high training	+++	6	2	4	0.9	2.9	3.8
	IT08	Awareness environmental sostenibility	+++	4	1	3	0.6	3.0	3.6
	IT09	Product's valorisation		4	3	1	2.5	0.9	3.4
	IT10	Productivity		4	3	1	2.0	0.9	2.9
	IT11	Organic agricultural funds	-	3	1	2	1.0	1.7	2.7
	IT12	Bureaucratic management		3	2	1	1.6	0.7	2.3
	IT13	Farmer's knowledge		3	1	2	0.6	1.2	1.8
	IT14	Techical tools	-	3	1	2	0.3	1.1	1.4
Receiver	**IT15**	Organic production	* * *	6	6		5.2	0.0	5.2
	IT16	Market	*	2	2		2.0	0.0	2.0
	IT17	Consumer's awareness		1	1		1.0	0.0	1.0

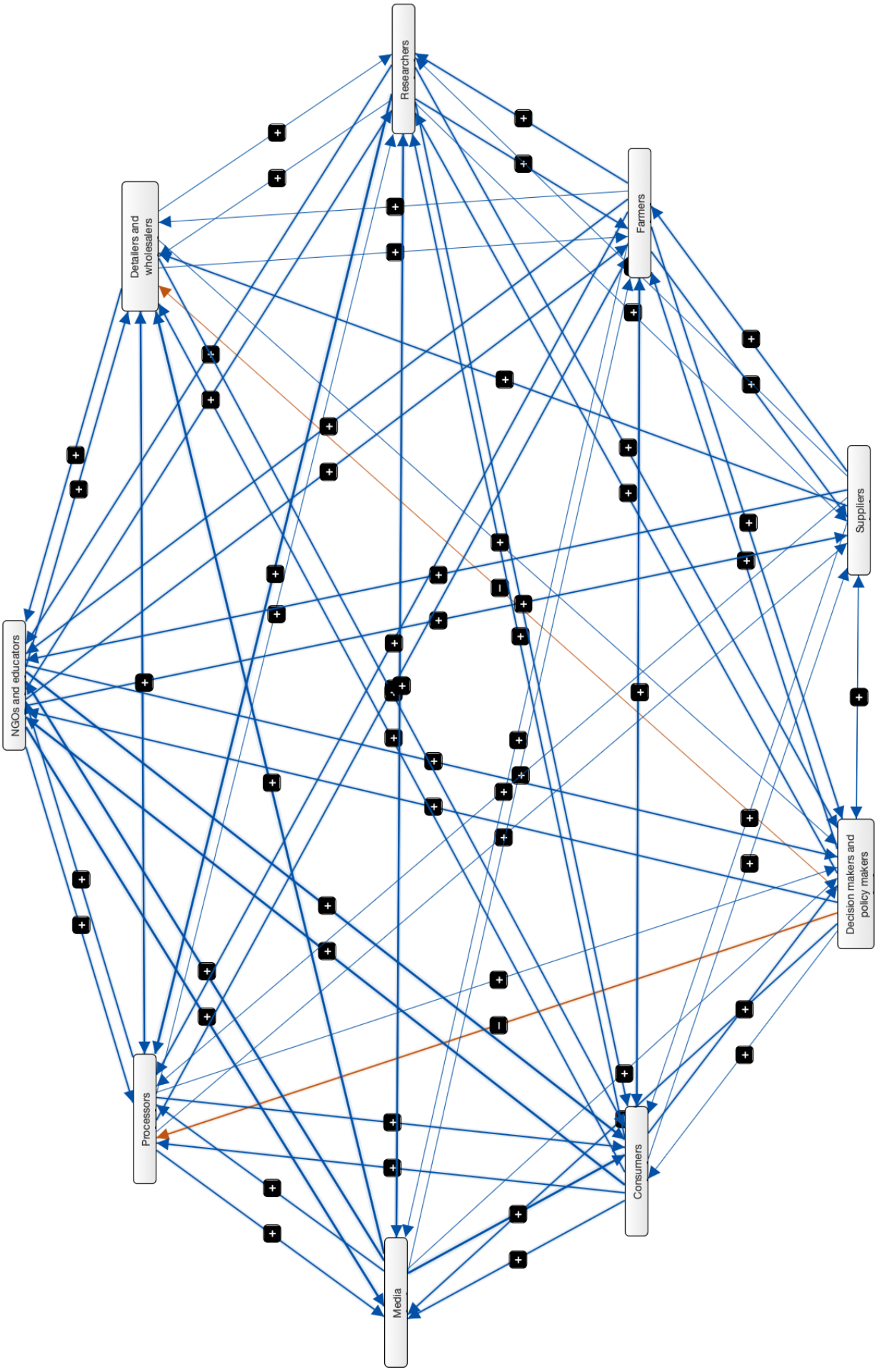

Consumer's awareness
Market
Organic production
Organic agricultural funds
Product's valorisation
Productivity
Awareness environmental sostenibility
Bureaucratic management
Organic technicians high training
Farmer's knowledge
Techical tools
Multifunctional agricoiture
Applied research
School education
Marketing
Valorisation of professional role
Integrated production

ITALY ADVISORS WEIGHTS

VAR	IA07	IA08	IA09	IA10	IA11	IA12	IA13	IA14	IA15	IA16	IA17
IA01	0.40		0.80								
IA02										1.00	
IA03			0.90								
IA04						0.80					
IA05									-0.80		
IA06		0.61									
IA07				0.80		0.80		0.30	1.00		
IA08					1.00					1.00	1.00
IA09									0.90		
IA10									0.90		
IA11			-0.81						0.90		
IA12									0.70		
IA13	0.50			0.70							
IA14				0.50			-0.61				

POLAND

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Ordinary	**PO01**	NGOs and educators	+++	16	8	8	3.1	2.8	6.0
	PO02	Consumers	+++	16	8	8	2.8	2.1	4.9
	PO03	Processors	++	16	8	8	2.2	2.4	4.5
	PO04	Media	++	13	6	7	1.9	2.6	4.5
	PO05	Detailers and wholesalers	+	14	8	6	2.2	1.5	3.6
	PO06	Researchers	+	16	8	8	1.4	2.2	3.6
	PO07	Farmers		16	8	8	2.1	1.4	3.5
	PO08	Decision makers and policy makers		16	8	8	1.2	1.6	2.8
	PO09	Suppliers		13	6	7	0.7	1.1	1.8

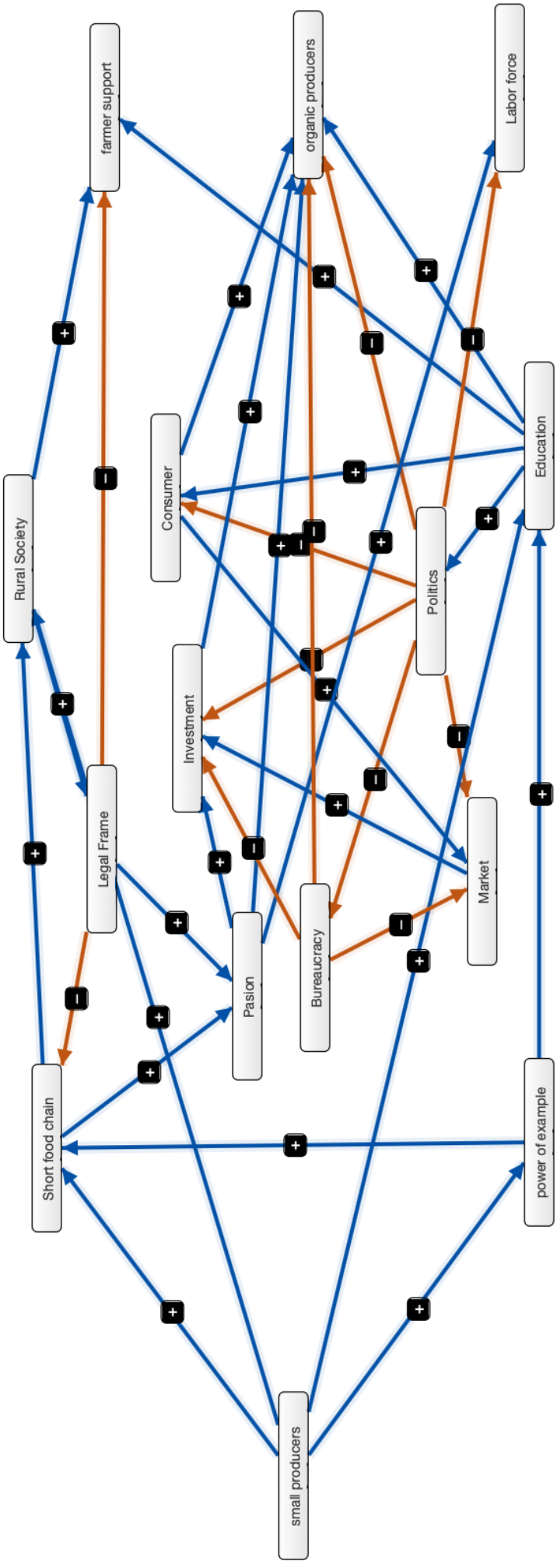

Researchers
Farmers
Detailers and wholesalers
Suppliers
NGOs and educators
Decision makers and policy makers
Processors
Consumers
Media

POLAND WEIGHTS

VAR	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09
PO01		0.57	0.37	0.70	0.42	0.18	0.22	0.18	0.19
PO02	0.53		0.25	0.18	0.40	0.19	0.36	0.18	0.01
PO03	0.42	0.47		0.25	0.40	0.15	0.46	0.13	0.08
PO04	0.72	0.64	0.25		0.50	0.24	0.13	0.10	
PO05	0.31	0.43	0.33			0.15	0.15	0.10	
PO06	0.42	0.22	0.50	0.27	0.15		0.25	0.25	0.11
PO07	0.31	0.18	0.19	0.03	0.12	0.22		0.19	0.20
PO08	0.17	0.15	-0.18	0.49	-0.01	0.21	0.26		0.13
PO09	0.24	0.11	0.08		0.17	0.10	0.26	0.09	

ROMANIA SYNTHESIS

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**RS01**	small producers	++	4		4		4.0	4.0
Ordinary	**RS02**	Politics	- - -	7	1	6	1.0	6.0	7.0
	RS03	Education	+++	6	2	4	2.0	4.0	6.0
	RS04	Investment	+++	5	4	1	4.0	1.0	5.0
	RS05	Short food chain	++	5	3	2	3.0	2.0	5.0
	RS06	Legal Frame	+++	4	1	3	1.0	3.0	4.0
	RS07	Market	+++	4	3	1	3.0	1.0	4.0
	RS08	Consumer	+++	4	2	2	2.0	2.0	4.0
	RS09	Pasion	++	4	2	2	2.0	2.0	4.0
	RS10	Bureaucracy	- -	4	1	3	1.0	3.0	4.0
	RS11	Rural Society	++	4	2	2	2.0	2.0	4.0
	RS12	power of example	++	3	1	2	1.0	2.0	3.0
Receiver	**RS13**	organic producers	+++	6	6		6.0		6.0
	RS14	farmer support	++	3	3		3.0		3.0
	RS15	Labor force	++	2	2		2.0		2.0


farmer support
organic producers
Labor force
Education
Consumer
Rural Society
Politics
Investment
Legal Frame
Market
Pasion
Bureaucracy
Short food chain
power of example
small producers

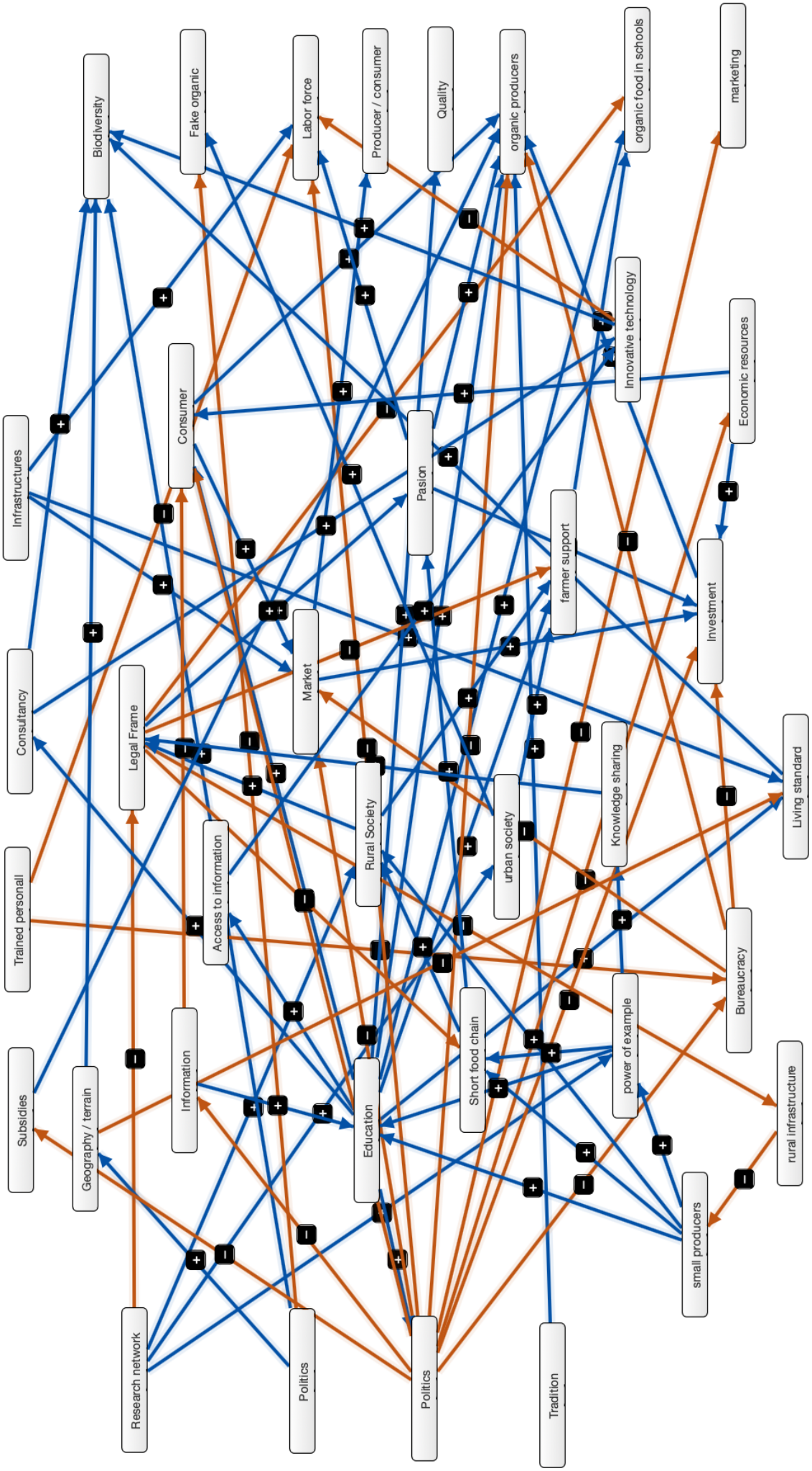
ROMANIA SYNTHESIS WEIGHTS

VAR	RS02	RS03	RS04	RS05	RS06	RS07	RS08	RS09	RS10	RS11	RS12	RS13	RS14	RS15
RS01		1.00		1.00						1.00	1.00			
RS02			-1.00			-1.00	-1.00		-1.00			-1.00		-1.00
RS03	1.00						1.00					1.00	1.00	
RS04												1.00		
RS05								1.00		1.00				
RS06				-1.00				1.00					-1.00	
RS07			1.00											
RS08						1.00						1.00		
RS09			1.00									1.00		1.00
RS10			-1.00			-1.00						-1.00		
RS11					1.00								1.00	
RS12		1.00		1.00										

ROMANIA CUMULATIVE

		VAR	SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**RC01**	Research network	+	4		4		4.0	4.0
	RC02	Politics	+	3		3		3.0	3.0
	RC03	Infrastructures	+	3		3		3.0	3.0
	RC04	Trained personall		2		2		2.0	2.0
	RC05	Tradition		1		1		1.0	1.0
Ordinary	**RC06**	Education	+++	12	3	9	3.0	9.0	12.0
	RC07	Politics	- - -	11	1	10	1.0	10.0	11.0
	RC08	Legal Frame	- - -	8	3	5	3.0	5.0	8.0
	RC09	Market	+++	6	4	2	4.0	2.0	6.0
	RC10	Consumer	+++	6	4	2	4.0	2.0	6.0
	RC11	Investment	+++	6	5	1	5.0	1.0	6.0
	RC12	small producers	++	5	1	4	1.0	4.0	5.0
	RC13	power of example	++	5	2	3	2.0	3.0	5.0
	RC14	Pasion	++	5	2	3	2.0	3.0	5.0
	RC15	Bureaucracy	- -	5	2	3	2.0	3.0	5.0
	RC16	Rural Society	++	5	3	2	3.0	2.0	5.0
	RC17	Short food chain	++	5	3	2	3.0	2.0	5.0
	RC18	farmer support	++	5	4	1	4.0	1.0	5.0
	RC19	Innovative technology	+	4	2	2	2.0	2.0	4.0
	RC20	Living standard	+	4	3	1	3.0	1.0	4.0
	RC21	urban society	+	3	1	2	1.0	2.0	3.0
	RC22	Consultancy	+	3	1	2	1.0	2.0	3.0
	RC23	Geography / terrain	+	3	1	2	1.0	2.0	3.0
	RC24	Information	+	3	1	2	1.0	2.0	3.0
	RC25	Economic resources	+	3	1	2	1.0	2.0	3.0
	RC26	rural infrastructure		2	1	1	1.0	1.0	2.0
	RC27	Knowledge sharing		2	1	1	1.0	1.0	2.0
	RC28	Access to information		2	1	1	1.0	1.0	2.0
	RC29	Subsidies		2	1	1	1.0	1.0	2.0
Receiver	**RC30**	organic producers	* * *	8	8		8.0		8.0
	RC31	Labor force	* *	5	5		5.0		5.0
	RC32	Biodiversity	* *	5	5		5.0		5.0
	RC33	organic food in schools	*	3	3		3.0		3.0
	RC34	Fake organic		2	2		2.0		2.0
	RC35	Producer / consumer		1	1		1.0		1.0
	RC36	Quality		1	1		1.0		1.0
	RC37	marketing		1	1		1.0		1.0

Romania

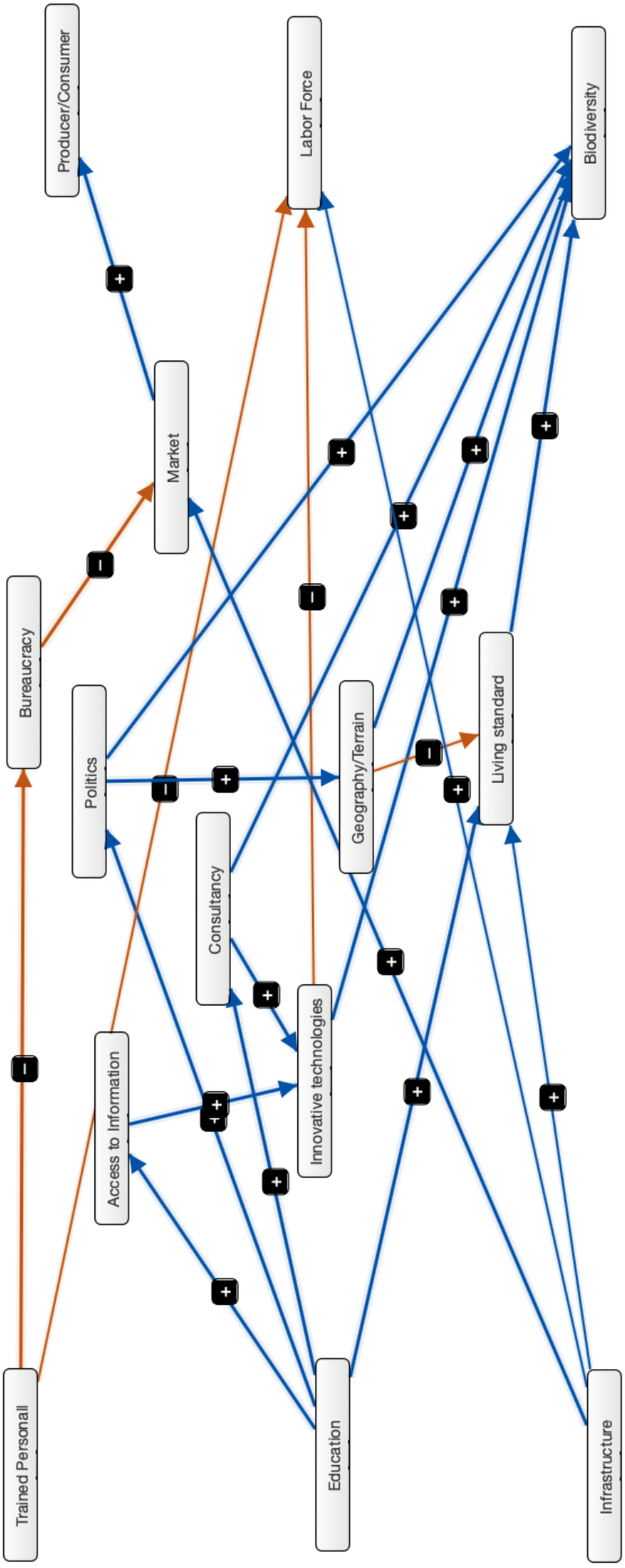

Biodiversity
Fake organic
Labor force
Producer / consumer
Quality
organic producers
organic food in schools
marketing
Infrastructures
Consumer
Pasion
Innovative technology
Economic resources
Consultancy
Legal Frame
Market
farmer support
Investment
Trained personall
Access to information
Rural Society
urban society
Knowledge sharing
Living standard
Subsidies
Geography / terrain
Information
Education
Short food chain
power of example
Bureaucracy
rural infrastructure
Research network
Politics
Politics
Tradition
small producers

ROMANIA CUMULATIVE WEIGHTS

VAR	RC06	RC07	RC08	RC09	RC10	RC11	RC12	RC13	RC14	RC15	RC16	RC17	RC18	RC19	RC20	RC21	RC22	RC23	RC24	RC25	RC26	RC27	RC28	RC29	RC30	RC31	RC32	RC33	RC34	RC35	RC36	RC37
RC01			-1.00					1.00			1.00					1.00																
RC02																		1.00									1.00		-1.00			
RC03				1.00											1.00											1.00					
RC04										-1.00																-1.00						
RC05																									1.00							
RC06		1.00			1.00								1.00		1.00		1.00						1.00		1.00			1.00			1.00	
RC07				-1.00	-1.00	-1.00				-1.00									-1.00	-1.00				-1.00	-1.00	-1.00						-1.00
RC08									1.00			-1.00	-1.00								-1.00							-1.00				
RC09						1.00																								1.00		
RC10				1.00																					1.00							
RC11																									1.00							
RC12	1.00							1.00			1.00	1.00																				
RC13	1.00											1.00										1.00										
RC14						1.00																			1.00	1.00						
RC15				-1.00		-1.00																			-1.00							
RC16			1.00										1.00																			
RC17									1.00		1.00																					
RC18																												1.00				
RC19																										-1.00	1.00					
RC20																											1.00					
RC21													1.00																1.00			
RC22														1.00													1.00					
RC23															-1.00												1.00					
RC24	1.00				-1.00																											
RC25					1.00	1.00																										
RC26							-1.00																									
RC27			1.00																													
RC28														1.00																		
RC29																									1.00							

ROMANIA RESEARCHERS

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**RR01**	Trained Personall		2		2	0.0	0.8	0.8
	RR02	Infrastructure	+	3		3	0.0	1.2	1.2
	RR03	Education	+++	4		4	0.0	2.3	2.3
Ordinary	**RR04**	Bureaucracy		2	1	1	0.5	0.5	1.0
	RR05	Financial Resources		2	1	1	0.3	0.8	1.0
	RR06	Access to Information	+	2	1	1	0.5	0.8	1.3
	RR07	Geography/Terrain	+	3	1	2	0.5	0.8	1.3
	RR08	Consultancy	++	3	1	2	0.5	1.0	1.5
	RR09	Market	++	3	2	1	1.0	0.8	1.8
	RR10	Innovative technologies	++	4	2	2	1.3	0.8	2.0
	RR11	Politics	++	4	1	3	0.8	1.3	2.0
	RR12	Living standard	+++	5	4	1	1.8	0.5	2.3
Receiver	**RR13**	Producer/Consumer		1	1		0.8	0.0	0.8
	RR14	Labor Force		3	3		1.0	0.0	1.0
	RR15	Biodiversity	* * *	5	5		2.5	0.0	2.5

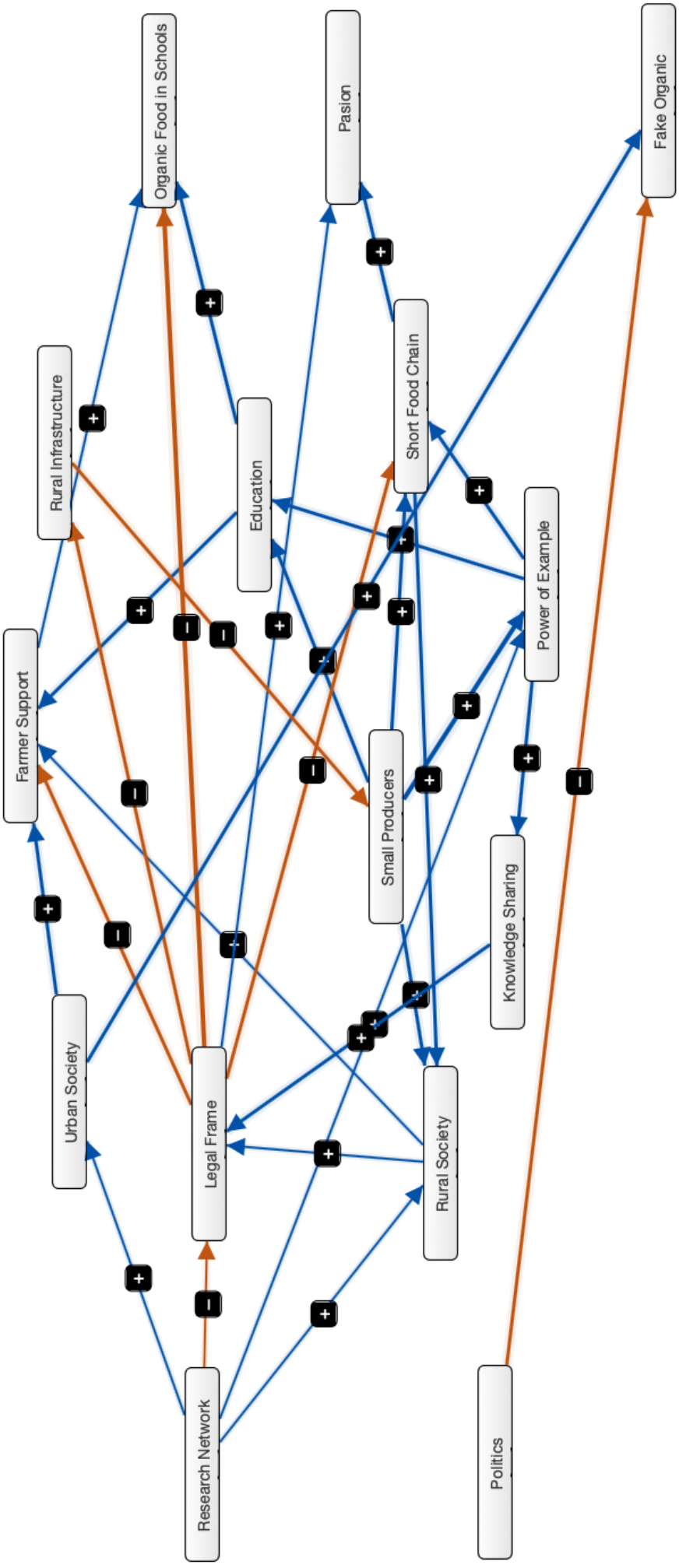

Producer/Consumer
Labor Force
Biodiversity
Market
Bureaucracy
Politics
Geography/Terrain
Living standard
Consultancy
Innovative technologies
Access to Information
Trained Personall
Education
Infrastructure

ROMANIA RESEARCHERS WEIGHTS

	RR04	RR05	RR06	RR07	RR08	RR09	RR10	RR11	RR12	RR13	RR14	RR15
RR01	-0.50										-0.25	
RR02						0.50			0.25		0.49	
RR03			0.50		0.50			0.75	0.50			
RR04						-0.50						
RR05									0.75			
RR06							0.75					
RR07									-0.25			0.50
RR08							0.50					0.50
RR09										0.75		
RR10											-0.25	0.50
RR11		0.25		0.50								0.50
RR12												0.50

ROMANIA FARMERS

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**RF01**	Politics		1		1	0.0	0.5	0.5
	RF02	Research Network		4		4	0.0	1.0	1.0
Ordinary	**RF03**	Knowledge Sharing	+	2	1	1	0.8	0.5	1.3
	RF04	Urban Society	+	3	1	2	0.3	1.0	1.3
	RF05	Rural Infrastructure	-	2	1	1	0.5	0.8	1.3
	RF06	Rural Society	+	5	3	2	1.3	0.5	1.8
	RF07	Farmer Support	++	5	4	1	2.0	0.3	2.3
	RF08	Education	++	4	2	2	1.3	1.3	2.5
	RF09	Power of Example	+++	5	2	3	1.3	2.0	3.3
	RF10	Short Food Chain	+++	5	3	2	2.0	1.3	3.3
	RF11	Small Producers	+++	5	1	4	0.8	3.0	3.8
	RF12	Legal Frame	- - -	8	3	5	1.0	3.0	4.0
Receiver	**RF13**	Fake Organic		2	2		1.0	0.0	1.0
	RF14	Pasion		2	2		1.0	0.0	1.0
	RF15	Organic Food in Schools	* *	3	3		2.0	0.0	2.0

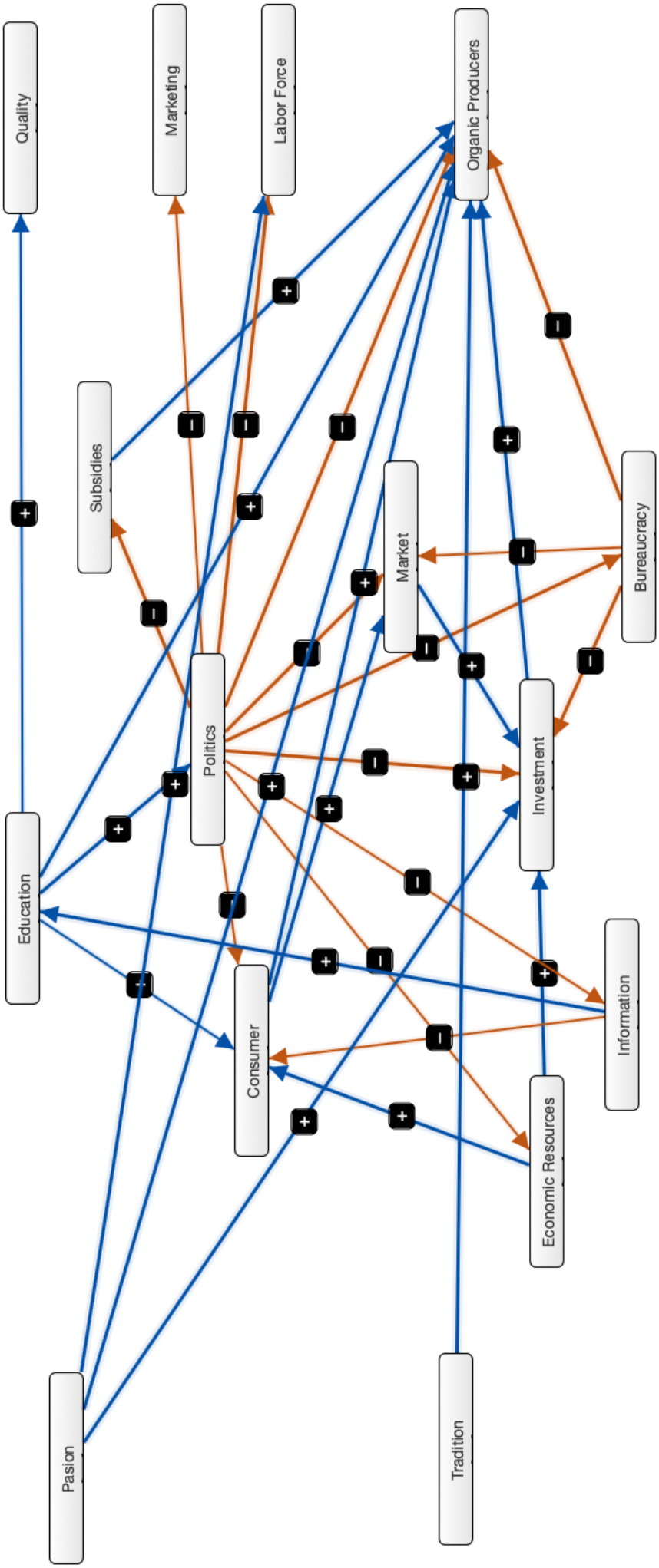

Organic Food in Schools
Pasion
Fake Organic
Rural Infrastructure
Education
Short Food Chain
Power of Example
Farmer Support
Small Producers
Knowledge Sharing
Urban Society
Legal Frame
Rural Society
Research Network
Politics

ROMANIA FARMERS WEIGHTS

VAR	RF03	RF04	RF05	RF06	RF07	RF08	RF09	RF10	RF11	RF12	RF13	RF14	RF15
RF01											-0.50		
RF02		0.25		0.25			0.25			-0.25			
RF03										0.50			
RF04					0.50						0.50		
RF05									-0.75				
RF06					0.25					0.25			
RF07													0.25
RF08					0.50								0.75
RF09	0.75					0.50		0.75					
RF10				0.50								0.75	
RF11				0.50		0.75	1.00	0.75					
RF12			-0.50		-0.75			-0.50				0.25	-1.00

ROMANIA ADVISORS

VAR			SIG	CONN	IN	OUT	ID	OD	CEN
Driver	**RA01**	Tradition		1		1	0.0	0.5	0.5
	RA02	Pasion	+	3		3	0.0	1.8	1.8
Ordinary	**RA03**	Information		3	1	2	0.3	0.8	1.0
	RA04	Economic Resources	+	3	1	2	0.3	1.3	1.5
	RA05	Subsidies	+	2	1	1	0.8	0.8	1.5
	RA06	Education	++	5	1	4	0.5	1.5	2.0
	RA07	Market	++	4	3	1	1.3	0.8	2.0
	RA08	Bureaucracy	- -	4	1	3	0.5	1.5	2.0
	RA09	Consumer	+++	6	4	2	1.3	1.3	2.5
	RA10	Investment	+++	6	5	1	3.3	0.8	4.0
	RA11	Politics	- - -	11	1	10	0.5	4.5	5.0
Receiver	**RA12**	Quality		1	1		0.3	0.0	0.3
	RA13	Marketing		1	1		0.3	0.0	0.3
	RA14	Labor Force		2	2		1.0	0.0	1.0
	RA15	Organic Producers	* * *	8	8		5.3	0.0	5.3


Quality
Marketing
Labor Force
Organic Producers
Subsidies
Market
Bureaucracy
Politics
Investment
Education
Consumer
Information
Economic Resources
Pasion
Tradition

ROMANIA ADVISORS WEIGHTS

VAR	RA03	RA04	RA05	RA06	RA07	RA08	RA09	RA10	RA11	RA12	RA13	RA14	RA15
RA01													0.50
RA02								0.50				0.50	0.75
RA03				0.50			-0.25						
RA04							0.50	0.75					
RA05													0.75
RA06							0.25		0.50	0.25			0.50
RA07								0.75					
RA08					-0.25			-0.75					-0.50
RA09					0.50								0.75
RA10													0.75
RA11	-0.25	-0.25	-0.75		-0.50	-0.50	-0.25	-0.50			-0.25	-0.50	-0.75