Bassi et al. Agricultural and Food Economics (2016) 4:13
DOI 10.1186/s40100-016-0057-6

Agricultural and Food Economics

RESEARCH Open Access

Social farming: a proposal to explore the effects of structural and relational variables on social farm results

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This paper has been selected as a best paper of the 51th SIDEA Conference in Benevento (18–20 September 2014). It has been accepted for publication in this journal following the usual revision process.
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Abstract

Social farming is gaining increasing attention from multiple stakeholders in Europe because it can generate several socioeconomic benefits, for farming households too. The research—which is part of a project carried out by a healthcare authority in the Friuli Venezia Giulia region in order to investigate social farming in the local area—is a first attempt to analyse social farm results and to what extent they are affected by farm assets, as well as by the environment in which farms are embedded. The proposed model is based on the investigation of the causal relationships between "structural", "relational" and "social farm result" constructs (latent variables), and on the identification of their measurement scales (observed variables). The causal relationships between these three constructs have been tested via a structural equation model calculated with the linear structural relationship method. The findings show that social farm results are mainly influenced by the relational variables (e.g., social and economic relations). On the contrary, the structural variables (e.g., size) do not directly affect the results, but they do have a negative indirect effect on them which is mediated by the relational variables. The findings suggests that alongside structural investment support, it is also important to strengthen relations and networks at local level in order to reinforce social farm results. Overall the findings contribute to the further understanding of the driving forces affecting social farm performance and provide policy makers and practitioners with information for scaling-up social farming.

Keywords: Social farming, Social farm results, Structural equation model, Causal relationship

Background

The Healthcare Authority nr. 6 West Friuli (in Italian, Azienda per i Servizi Sanitari n. 6-Friuli occidentale) in the Friuli Venezia Giulia region carried out a project aimed at investigating social farming in the local area, the province of Pordenone (Italy). The project activities also included a preliminary study of social farm performance and how the performance may be affected by farm assets, as well as by the environment in which farms are embedded. The results of the research are presented here in order to contribute towards debates on the socioeconomic benefits of social farming, in particular on farms engaged in this multifunctional strategy.

Nowadays social farming is playing a key role in a growing number of multifunctional farms throughout Europe and is gaining ever more importance in EU policies. In fact, EU policies have gradually broadened their scope: from supporting agricultural practices to giving more attention and financial support to the improvement of the environment, the countryside and the quality of life in rural areas, as well as to the multifunctionality of rural economies. Multifunctionality, a core issue in the EU agricultural and rural development agenda, refers to the different functions that agriculture fulfils in society, functions that go well beyond the production of food and fibres. They include, for instance, the stewardship of natural resources, landscapes and biodiversity, the creation of new job opportunities and the enhancement of the rural area attractiveness for tourists and other users of rural services. The choices for farms within the multifunctional paradigm are diverse, the common denominator being that farmers are willing to accept multiple responsibilities; to reconsider their predominant orientation towards primary production and profit maximisation; to build new cross-sectoral and social alliances; and to adopt more socially responsible patterns of production and marketing (Dessein et al. 2013; Durand and van Huylenbroeck 2003; Knickel and Renting 2000; van der Ploeg and Renting 2000; Renting et al. 2009).

Among the various multifunctional practices, social farming allows the farms to broaden their scope of activities (van der Ploeg and Roep 2003). The term "social farming"—or alternatively care farming, farming for health, green care, *connective agriculture* for Leck et al. (2014) etc.—is used to describe farming activities aimed at promoting the care, rehabilitation and sheltered employment of disadvantaged people, i.e., people with psychophysical disabilities, convicts, drug addicts, minors and immigrants. Besides these examples, other social farming services include therapy, life-long education and other activities that contribute to social inclusion (Di Iacovo and O'Connor, 2009).

Since the past, agricultural and rural societies have developed diverse practices and forms of solidarity, social assistance and inclusion (Pascale 2010). Nowadays social farming results from a new, widespread positive perception of agricultural and rural resources, leading to an increasing interest in the beneficial effects of both nature and agricultural activities on the social, physical and mental wellbeing of people. According to Haubenhofer et al. (2010), social farming links aspects of the traditional healthcare system to agriculture (care farming; social and therapeutic horticulture), gardening (healing gardens), landscape or nature conservation (ecotherapy), animal keeping (animal-assisted intervention), or animal husbandry (care farming), as shown in Fig. 1.

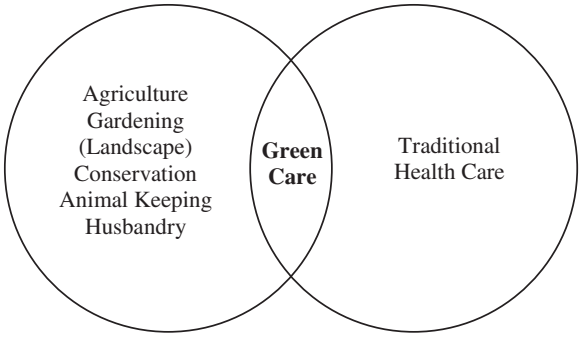

Fig. 1 Green Care and Traditional Health Care (Haubenhofer et al. 2010, p. 107)

Social farming is gaining increasing attention from multiple stakeholders in Europe because it can generate several socioeconomic benefits. It represents a new chance to diversify rural activities, to enhance the role of renewed agriculture in society, and to strengthen the economic and social viability of rural communities (Di Iacovo and O'Connor 2009). It helps farmers to become more integrated in local communities and fosters the reconnection between the rural and urban context, as well as the farming sector and society in general (Pascale 2010; Senni 2007). It provides important services to local communities by welcoming people onto farms (Hine et al. 2008b; Leck et al. 2014), so in this way being able to meet the needs of healthcare institutions that are keen to find new practices involving disadvantaged people, that are more embedded in local social contexts (Hine 2008; Hine et al. 2008a; Sempik et al. 2010). Furthermore, as social farming links different sectors, it may generate benefits for all sectors involved. In fact, social farming is a system where interaction, communication and information flow between the different actors are crucial to the functioning of the system itself. Furthermore, since interaction, communication and information flow are key elements of innovation, they also contribute to the development of the system and rural areas as a whole (Knickel et al. 2009; Leeuwis 2006; Spielman 2006).

Social farming activities, as well as the other broadening activities (agritourism, management of landscape etc.), are a potential new source of income for the farming household, simultaneously implying the delivery of goods and services that society is willing to pay for (Hassink and van Dijk 2006; van der Ploeg and Roep 2003). This opportunity could be crucial for small farmers: in fact, it could provide the additional income required to enable them to continue, thereby reducing the risk of land abandonment and helping to preserve local landscape, and cultural traditions (O'Connor et al. 2010). Henke and Salvioni (2010) pointed out that there is a high variability in income flows deriving from the various multifunctional practices they investigated, being positive and consistent in organic farming, traditional produce and agritourism. Nevertheless, it seems that also the other multifunctional practices may generate opportunities for farmers to stay in business on their own farms. An objective in which the territory plays a crucial role, offering the necessary conditions to achieve this. In fact, the relational system in which farms are embedded could foster farm performance, such as diversification process strengthening and income stabilisation.

Given the existing literature on social farming, it seems important to deepen the knowledge on the performance of farms engaged in this multifunctional strategy. For this reason and assuming that firm performance is directly and indirectly influenced by the structural variables of firms themselves and by their relations within the environment in which they are embedded (see, among others, Coda 1995), the research is aimed at exploring how these variables (structure and relations) may affect the results of farms engaged in social farming. In order to illustrate the research and its results, the paper is organised as follows: the next section describes research steps, i.e., farm identification, questionnaire planning, data collection and data analysis; then we present and discuss the main findings, i.e. the description of farms and the causal relationships between structure, environment and farm results; finally we draw some general conclusions.

Methods

The research scheme included social farm identification, questionnaire planning, data collection and data analysis.

In line with the healthcare authority project, aimed at investigating social farming in the province of Pordenone, the research focused on the population of farms already or potentially (in the short-term) involved in social farming in that area, consisting of thirty farms. The list of farms was organised by the abovementioned authority. These farms have different legal status: the most common is sole proprietorship (13 farms); then, there are 5 social cooperatives, while the remainder are associations, corporations or other types of companies. Two thirds of the farms are members of the local Forum of social farming (http://www.provincia.pordenone.it/sociale/index.php?id=425). The population size is a limitation regarding this research. Nevertheless, the research not only matches the needs of the authority, but it could be the base for future research on this topic.

The questionnaire was designed to collect information on structural and relational variables of social farms, as well as on their results (Table 1). Specifically, firm structure includes tangible and intangibles assets (Coda 1995). Among the firm-specific characteristics, the variable most often considered in empirical studies is firm size (Moen 2004; Sousa et al. 2008), but the list of determinants is very long, from the age of the firm to its international experience, internal capabilities and/or whether or not it is market-oriented. For social farms we considered as important: size (hectares), that may affect the capability to implement other activities connected to agriculture and engage more people in some of those activities; number of years in business, that may influence entrepreneurial capital (e.g., experience and know-how) and social capital (e.g., relationships within the local territory); agricultural activities implemented (horticulture, viticulture etc.), that may influence the diversification strategies and the possibility to employ and/or engage workers, including disadvantaged people; and finally, willingness to join a collective supply group, that could increase market opportunities for companies.

Relations between farms were investigated too, collecting data on the absence/presence and type of each farm's ties with the other investigated farms: knowledge, i.e., whether other farms or their operations are known; economic relations, i.e., existence of customer-supplier ties; social relations, e.g., collaboration in rehabilitation and sheltered employment activities, etc.; and other relations, e.g., participation in collective projects, technical information exchange, etc. (Bassi et al. 2014b).

Table 1 List of variables

Category	Variables	Description
Structural variables	▪ Farm size	▪ Number of hectares
	▪ Years in business	▪ Number of years in activity
	▪ Agricultural activity	▪ Type of activity
	▪ Collective supply	▪ Willingness to join a collective supply group (yes/no)
Relational variables (between the surveyed farms)	▪ Knowledge	▪ Other farms, their operations are known (yes/no)
	▪ Economic relations	▪ Existence of customer-supplier ties (yes/no)
	▪ Social relations	▪ Collaboration in social activities (yes/no)
	▪ Other relations	▪ Other types of collaboration (yes/no)
Social farm results	▪ Market problems	▪ The farm faces market problems (yes/no)
	▪ Farm diversification	▪ Number and type of other activities implemented
	▪ Disadvantaged people	▪ Number of disadvantaged people engaged

Finally, for the economic, social and development results[1] (Coda 1995) eligible for social farms, proxy variables have been chosen: market problems faced by farms, which can describe, at least to some extent, their income flow; number of disadvantaged people engaged in farm activities, as an indicator of social results referring to both these people and the local community; and farm diversification, as an indicator of development strategies implemented by the farms.

Data was collected from December 2013 to September 2014 via interviews with the owner or manager of each farm (not self-reporting).

Regarding data analysis, the following hypotheses were tested (Fig. 2):

H1: structural variables have a positive effect on social farm results;
H2: structural variables have a positive effect on relational variables;
H3: relational variables have a positive effect on social farm results

We propose this pioneering model considering the state of art in the analysis of social farm results, as well as the healthcare authority project aims.

The hypotheses have been tested via a structural equation model (SEM) that was calculated with the linear structural relationship (LISREL) method, via LISREL 9.1 software (Jöreskog and Sörbom 2013). According to Hoyle and Gottfredson (2015), in SEM whether the model can be estimated or not (i.e., non convergence and inadmissible solutions) is fundamental. If the model can be estimated, focus turns to evaluations of the degree to which the model accounts for the data (i.e., fit), and estimates and tests of parameters in the model. Moreover, the quoted authors indicate "there is no absolute definition of "small" in the area of statistical analysis". For these reasons and in order to extend research to other areas and farms, this methodology was adopted to test the proposed hypotheses.

Results and discussion

Farm description

Compared to the agricultural sector in the province of Pordenone as a whole, the size of the social farming sector is quite small in terms of both the number of farms, the 30 surveyed, and the agricultural surface, corresponding to 941 ha in total. In fact, according to the 2010 Agricultural census, the province accounts for 7901 farms covering 73,379 ha.

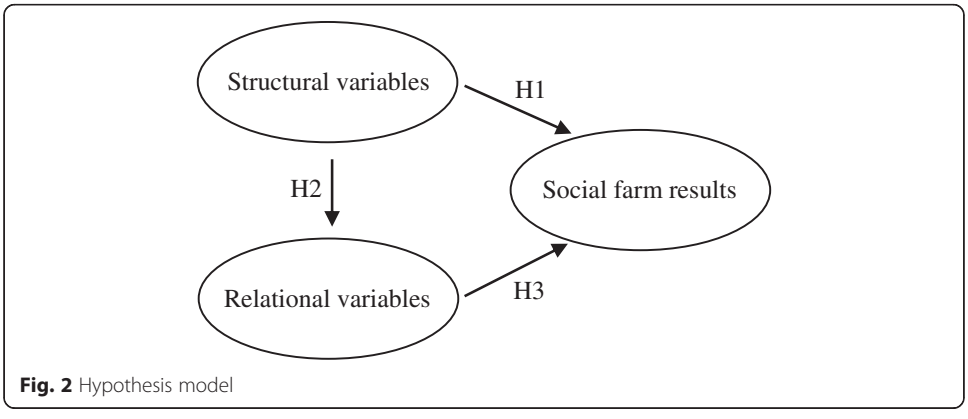

Fig. 2 Hypothesis model

The social farm size ranges from 0.41 to 150 ha. It is worth noting that there are 6 farms with more than 40 ha. Among them there are two vineyards, also engaged in cultural events periodically organised by their staff and, in general, well involved in the local community. Animal husbandry (cattle, pigs and poultry) is the core activity of two of the farms in this group, joined by other connected activities such as agritourism, direct sales and energy production. Mixed farming characterises the last two farms, where the land is predominately dedicated to fodder/forage and wood.

Most of the farms (57 %) started their activities less than 20 years ago (Table 2).

Although the number of social farms is small, there is variability in terms of agricultural specialisations. Among these, horticulture and animal husbandry are the most widespread activities (40 % of the farms), together with nursery farming, viticulture and mixed farming (Table 3). In this regard, some scholars indicate that there is a link between some productive specialisations and the vocation of the farms to social activities. In fact, it seems that farms involved in social farming often have an horticultural and livestock specialisation, coherent with the recognition of horticulture and animal therapy (Bokkers 2006; Di Iacovo and Pieroni 2006; Di Iacovo and O'Connor 2009; Elings 2006). Different studies show that people-plant interactions promote human well-being in different target groups, e.g., horticulture has positive effects on schizophrenic patients, Alzheimer patients or patients with other forms of dementia, as well as on the elderly, on children, burn-out patients, etc. (Elings 2006). It has also been shown that the use of animals as icebreakers in psychotherapy and the use of animal helpers for persons with physical disabilities are successful. Benefits of human-animal interactions occur on a psychological, physical, social and behavioural level. For instance, children interacting with farm animals in a residential treatment centre displayed a number of social, emotional and physical benefits (Bokkers 2006).

Finally, as regards the structural variables, 14 farms stated their willingness to be involved in collective activities, such as the collective supply of their products in order to improve market opportunities.

As regards the relational variables, the number of ties of each farm with the others surveyed were investigated. It is worth noting that the participation of most of them in the local Forum facilitated the knowledge and the activation of certain types of relations. As expected, among the different types of relations, social ties are more frequent; conversely, the economic exchanges, i.e., buying and selling goods and services amongst them, are less numerous (Table 4).

Regarding results, 27 % of the farms stated having difficulties in selling their products. Considering the number and type of connected activities, the farms have a high level of diversification. For instance, 43 % of the farms deepened their portfolio to include processing activities and 57 % to include direct sales; some farms

Table 2 Number of farms by years in business and size

Years in business	Farm size (ha)				
	<2	2–10	10–40	>40	Total
<5	4	3	1	0	8
5–20	1	2	4	2	9
>20	2	1	6	4	13
Total	7	6	11	6	30

Table 3 Number of farms by agricultural activity

Activity	Number of farms
Horticulture	6
Animal husbandry	6
Nursery farming (floriculture and horticulture)	5
Viticulture	4
Fruit farming	1
Arable farming	1
Mixed farming	7
Total	30

broadened their portfolio to include educational activities (50 %), leisure activities (40 %), agritourism (33 %) and/or renewable energy production (27 %). These are the most common diversification activities among the surveyed farms. As for the breadth of their activity portfolio, 40 % of the farms stated 1–3 connected activities other than agriculture, 30 % perform 4–6 activities, 17 % indicated 7–9 activities, and the remaining (13 %) have not diversified their business. Finally, the number of disadvantaged people engaged in farm activities ranges from 1 to 23, with a mean of 3.2 people. The types of disadvantage are various: 54 % have physical/mental disadvantages, 15 % are unemployed, 12 % immigrants, 12 % ex drug addicts, and the remaining (7 %) ex-prisoners.

Causal relationships

The structural equation model was calculated with the linear structural relationship method, via LISREL 9.1 software. A two-stage analysis was adopted, estimating, firstly, the measurement model and, secondly, the structural model.

The measurement model (first stage) enucleates the link between the observed variables (size, age etc.) and the corresponding latent variables (constructs), with a view to highlighting to what extent the former measures the latter; this corresponds to the classic confirmatory factor analysis (CFA). The measurement model therefore enables us to comment on the validity and reliability of the measurement scale used for each construct.

Overall, the results indicate that the scales perform well (Table 5). Specifically, the fit indices show that the specified measurement scales fit the data adequately

Table 4 Relational variables: number of relations (max, min and mean values)

	Knowledge	Economic relations	Social relations	Other types of relations
Min				
Forum members	4	–	–	–
Other farms	1	–	–	–
Max				
Forum members	29	4	22	14
Other farms	13	4	1	3
Mean				
Forum members	18	1	6	5
Other farms	6	1	–	1

Table 5 Latent constructs and measurement scale

Constructs and observed variables	Label	Factor loading	Standard error	*AVE*
Structural construct	STR	–	–	0.50
Farm size	size	0.99	0.00	–
Years in business	age	0.57	0.68	–
Agricultural activity	activ	0.46	0.79	–
Collective supply	coll	0.32	0.90	–
Relational construct	REL	–	–	0.51
Knowledge	know	0.99	0.02	–
Economic relations	econ	0.33	0.89	–
Social relations	socio	0.57	0.67	–
Other relations	other	0.51	0.74	–
Social farm result construct	RES	–	–	0.43
Market problems	sales	0.27	0.93	–
Farm diversification	divers	0.17	0.97	–
Disadvantaged people	people	0.18	0.97	–

(e.g., the size has a loading factor of 0.99 regarding the structural construct). This is confirmed by the fact that all the average variance extracted (AVE) scores are very close to the recommended threshold of 0.45, according to Dillon and Goldstein (1984).

The structural model (second stage) identifies the causal relationships between the constructs. It is evaluated via several fit measures, which provide different output concerning the goodness-of-fit of the structural model: the goodness-of-fit index (GFI); the adjusted goodness-of-fit index (AGFI), which regulates the GFI for the degrees of freedom; the comparative fit index (CFI); and the root mean square error of approximation (RMSEA), which in recent years has become regarded as one of the most informative fit indices (Diamantopoulos and Siguaw 2000) due to its sensitivity to the number of estimated parameters in the model (Browne and Cudeck, 1993). The thresholds for these indices are discussed and disputed in many studies in literature (Scott 1994; Bagozzi and Yi 1988; Browne and Cudeck 1993; Hayduk 1987).

Table 6 lists the fit statistics for the structural model of the research. In general, higher values of GFI, AGFI and CFI indicate better fit. The results show that their values are close to the recommended 0.80 threshold for acceptable fit (Scott 1994; Bagozzi and Yi 1988), but do not meet the more restrictive 0.90 threshold level (Bollen 1989); whereas AGFI, which is a measure that represents overall degree of fit (squared residuals from prediction compared to the actual data), is on the low side. RMSEA is

Table 6 Main indices of fitting model

Indices	Value
GFI	0.76
AGFI	0.62
CFI	0.70
RMSEA (Test of Close Fit)	0.089
χ^2, with 41° of freedom (df)	50.52
χ^2/df	1.23

very close to the 0.08 level set by Browne and Cudeck (1993) as the maximum allowable for an acceptable model. The minimum fit function χ^2, equal to 50.52 with 41° of freedom, is significant (p = 0.001) and the ratio χ^2/df suggests a good fit (Hayduk 1987).

Overall, the indices suggest a reasonably well fitting model coherent with the quoted literature. Hence, also considering the limitation of the small sample size, we accept the validity of the model.

Figure 3 shows the LISREL-generated model of the causal relationships between the three latent constructs and Table 7 describes the values of these relationships, including the indirect effects.

The structural construct is found to have a direct and positive impact on the result construct (0.43), but due to a t-value of 0.73 this causal relationship does not support hypothesis H1 of our model. Contrary to hypothesis H2, the structural construct has a direct and negative influence on the relational construct (−0.55), with a high level of significance (t-value of −2.53). In H3 we argue that the relational construct has a direct and positive impact on the result construct: this hypothesis is significantly supported (1.93 with a t-value of 2.30).

One of the key advantages of using a structural equation model is the chance to estimate not only the direct effects, but also the indirect effects amongst latent constructs (Bollen 1989). As shown in Table 7, the structural construct also has a negative indirect effect on the result construct, mediated by the relational construct.

Conclusions

This research is a first attempt to analyse social farm results, specifically how they are affected by the internal (structure) and external (relations) environment. Given this aim, we proposed a model based on (i) the investigation of the relationships between

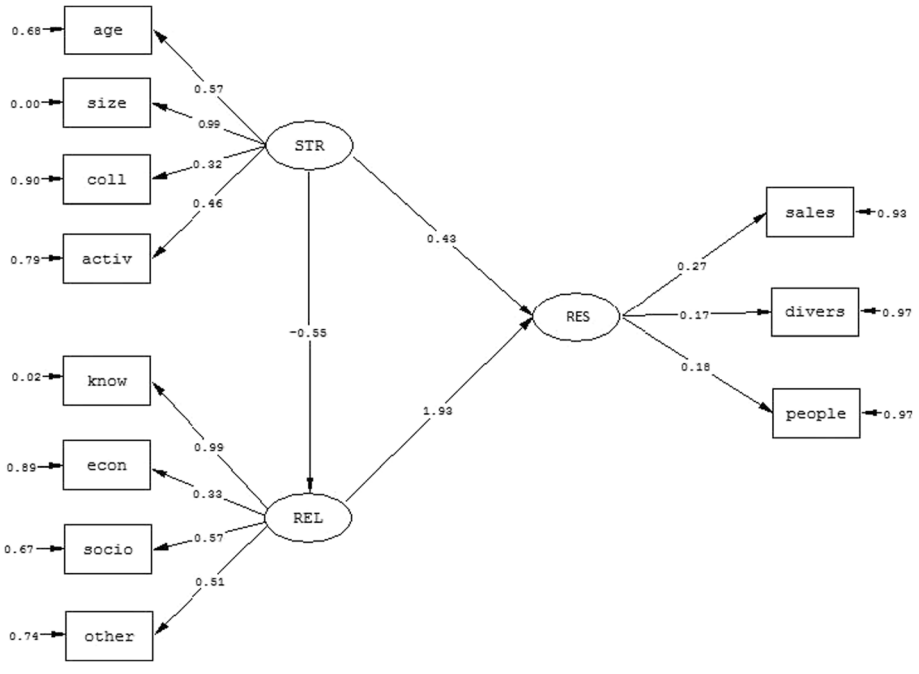

Fig. 3 The generated LISREL model

Table 7 Direct and indirect effects between the constructs

Hypothesis	Estimate (Standardised)	Standard error	t-value
Direct effects:			
(H1) STR → RES	0.43	0.05	0.73
(H2) STR → REL	−0.55	1.42	−2.53
(H3) REL → RES	1.93	0.12	2.30
Indirect effects:			
STR → RES	−0.63	–	–

three constructs (latent variables), here corresponding to "structural", "relational" and "social farm result" constructs, and on (ii) the identification of their measurement scales (observed variables). The causal relationships between these three constructs have been tested via a structural equation model calculated with the linear structural relationship method.

The findings show that the social farm results are mainly influenced by the relational variables. Indeed knowledge, i.e., whether other farms or their operations are known, is crucial, because it can represent the first step towards more consolidated ties between farms. The existence already of collaboration in rehabilitation and job placement activities for disadvantaged people and other ties between a number of the surveyed farms could bolster this process, even through the brokerage role that these farms can play. The recognition of the importance of relations is also attested to by the recent (2015) founding of the Regional Forum of social farming in the Friuli Venezia Giulia region, which includes many farms dealing in social inclusion.

On the contrary, the structural variables do not directly affect the results, but they do have a negative indirect effect on them which is mediated by the relational variables. Considering that the variable "size" explains the structural construct's measurement scales better than the other variables, it can be assumed that the smallest social farms are more proactive towards having relations with other farms in order to improve their performance. Future research should explore this assumption, which is coherent with the theory on collective action. In fact, according to this, collective action opens up new opportunities which would otherwise be impossible to access by small firms individually: resource access, economies of scale, economies of scope, network economies, and reduced transaction and coordination costs. These opportunities enhance socio-economic results at both firm level, in terms of new jobs and revenues, and territory level, in terms of the general growth of area attractiveness (Hakansson and Ford, 2002; Lamprinopoulou et al., 2006; Renting and van der Ploeg, 2001).

Overall the findings indicate some important policy implications. In their evolution, EU policies have recognised the increasing importance of social farming, and multifunctionality as a whole. In 2007–2013, the rural development programmes (RDP) offered several alternative options for funding social farming projects, even if not specifically addressed to it. They were mostly provided by Axis 3 measures, e.g., support for business creation and development, diversification into non-agricultural activities, basic services for rural population, and training for actors operating in the field covered by Axis 3, the latter being used for the establishment of social farming networks and support centres (O'Connor et al. 2010). In the current programming period, most of these initiatives have been strengthened and some national/regional RDP

explicitly refer to social farming, as in the case of two actions of measure 6 of Friuli Venezia Giulia RDP, i.e., business creation for non-agricultural activities in rural areas and diversification in agritourism, educational and social activities. Alongside the support of structural investments, our findings suggest that in order to reinforce social farm results it is also important to strengthen relations and networks at local level. In this regard, Bassi et al. (2014a) recommend that supportive policies for rural development should also scale-up networking processes, and indicate that training focusing on the improvement of network awareness and capability is an effective tool in these processes. In fact, the reinforcement of relational skills should precede the establishment of a network, in order to increase the chance that it functions in the long term.

The research has some limitations. They mainly regard the number and heterogeneity of the surveyed farms, due to the healthcare authority project constraints, and the measurement scales (observed variables) identified for the model implementation. Future research should widen the size of the sample and investigate social farming in other local, national and international areas. Even if the implementation of SEM with a small sample has estimated an admissible solution, it would be useful to test the proposed model in larger sample. Moreover, future research should carry out counterfactual analysis by measuring causal relationships outside the social farming environment, as well as identify other measurement scales and replace the proxy variables for the social farm result construct with more suitable data.

Finally, we argue that the findings of our research may contribute to the further understanding of the driving forces affecting social farm performance and provide policy makers and practitioners with useful information for scaling-up social farming.

Endnote

[1]Competitive results (market share, degree of market penetration, etc.) were not considered relevant for the purposes of this research.

Abbreviations

AGFI: adjusted goodness of fit index; AVE: average variance extracted; CFA: confirmatory factor analysis; CFI: comparative fit index; Df: degrees of freedom; EU: European Union; GFI: goodness of fit index; LISREL: linear structural relationship; RMSEA: root mean square error of approximation; SEM: structural equation model.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

IB conceived the research design and wrote the "Background" section. FN wrote the "Methods" section and carried out the LISREL analysis. LP carried out the data acquisition, the descriptive statistical analysis, and wrote the "Results and discussion—Farm description" section. All the other sections are written in common. All authors read and approved the final manuscript.

Authors' information

The authors of this work are members of the University of Udine (Italy), Department of Agricultural, Food, Environmental and Animal Sciences.

Acknowledgements

This research is part of a project which was supported by the Azienda per i Servizi Sanitari n. 6 - Friuli occidentale (Pordenone, Italy). We would like to thank Alberto Grizzo, of the above regional healthcare authority, who made a substantial contribution to the conception and design of the research, and Paolo Tomè, of Green Solutions S.r.l. (Udine, Italy), who was involved in the data acquisition. Many thanks to the anonymous referees for their critical comments, which have helped us to improve our article.

Received: 31 July 2015 Accepted: 1 June 2016
Published online: 10 June 2016

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