

The influence of organizational supply chain structure on smallholder performance

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Abstract – With the on-going globalisation, smallholders are increasingly challenged by the complex organizational structure of international food supply chains. The effects of this supply chain structure on the performance of smallholders are highlighted by the following analysis of raspberry production in Chile. The regression analysis of data obtained by a standardised survey of 81 Chilean raspberry producers revealed that organizational structure has a high influence on farm performance.

INTRODUCTION

Due to the globalization, companies in developing and transition countries are increasingly incorporated into the networks of international agri-food value chains and are confronted with consumer demands in industrialized countries. Over the years, the production in many countries of the global South shifted away from traditional agricultural products such as coffee, tea and cacao to non-traditional agricultural exports (NTAE), such as fruits and vegetables. (Challies, 2010). Many developing and transitioning countries such as Chile and other Latin American countries benefited from the introduction of NTAE on the micro- and macroeconomic level (Carter et al., 1992). In Chile, the use of NTAE has significantly increased and transformed rural areas. In this connection the raspberry production is important for livelihoods of Chilean smallholder (Challies, 2010). Especially smallholders are challenged by the growing complexity of organizational structures in food supply chains (Trienekens, 2011). Since inappropriate organizational structure is associated with decreasing organizational performance (Nickerson and Silverman, 2003), this study sought to determine how the organizational structure of high value food supply chains influence the performance of the farms. We establish the following hypotheses:

- H1: The intensity of vertical collaborations (with buyers),
- H2: The intensity of horizontal collaborations (with farmer groups, cooperatives etc.) and
- H3: The intensity of external collaborations (research institutes, external extension services etc.)

each has a positive influence on the performance of the farms. Challies (2010) qualitatively described similar influences by public and private institutions on the livelihoods of Chilean raspberry producers. These hypotheses will be tested by the application of a regression analysis on a quantitative data set. Based on the results we will provide management implications concerning the optimization of governance.

STUDY DESIGN AND DATA ANALYSIS

The data collection was conducted between September and November 2012 by surveying Chilean farmers who cultivate raspberries for export in the Región del Maule (near Linares) in Chile. This region represents the largest surface area planted with raspberries in Chile (Challies, 2010). The total data set consists of 81 raspberry producers.

For the data collection a standardized questionnaire with several indicators for the determinants of the research model was used. A multiple linear regression model was then conducted by using SPSS Version 20.

RESULTS AND DISCUSSION

On the average, the raspberry farms are 8.4 years old and cover 0.5 hectares. The farm size ranged from 0.03 to 4.5 hectares. The farmers sell their products to an average of 1.4 trading partners (minimum 1, maximum 4). Only six of the farmers surveyed use written contracts for business transactions. The average of horizontal collaborations is 0.57 (minimum 0, maximum 2) per farm. 37 of the farmers collaborate with the governmental office Instituto de Desarrollo Agropecuario (INDAP). 70 of the farmers are certified, in each case with Buenas Prácticas Agrícolas (BPA). The gross margin of the farms ranges from -250 pesos/kilo to 458.30 pesos/kilo with a mean of 207.61 pesos/kilo.

The regression analysis showed the influences of variables representing vertical collaboration, horizontal collaboration, external collaboration, social network, company characteristics and education of the farmer on the yield as a measure for farm performance. The results are presented in table 1.

The "consultation of external extension service" is the variable with the highest influence on the yield with a very high level of significance. The (dummy) variable describes whether farmers consult an external agricultural extension service or not. The positive influence is due to the consultation service itself,

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since these firms provide expert advice and training regarding fertilizer, agrochemicals, and irrigation and water management (Feder et al., 2004).

Table 1. Regression results.

	β	t	p
Vertical collaboration			
Number of buyers	0.285	3.175	0.003
Written contract	0.317	2.657	0.011
Duration of certification	0.54	0.508	0.614
Horizontal collaboration			
Number of horizontal collaborations	0.051	0.553	0.583
External collaboration			
Number of external collaborations	0.154	1.533	0.132
Consultation of external extension service	0.587	7.534	0.000
Innovations induced by research activities	-0.090	-1.090	0.282
Social network			
Percentage of social contacts working in the agribusiness	0.079	0.905	0.370
Number of friends working in the agribusiness	-0.113	-1.231	0.225
Frequency of meeting friends working in the agribusiness	-0.152	-1.595	0.118
Company characteristics			
Age of company	-0.143	-1.290	0.204
Land lease	0.319	2.832	0.007
Education			
Without education	-0.072	-0.717	0.477
Basic incomplete	-0.190	-1.311	0.197
Basic complete	-0.177	-1.301	0.200
Medium complete	-0.88	-0.693	0.492
Technical complete or university incomplete	-0.126	-1.328	0.191

^aSource: Author's calculations. Dependent variable: yield in kilogram, $R^2=0.779$, corr. $R^2=0.694$, $F=9.147^{***}$, $***P \leq 0.001$; $**P \leq 0.01$; $*P \leq 0.05$

The variable having the second highest influence on the yield with a high level of significance is the price to lease the land. This variable can be interpreted as an indicator for land quality. Troncoso et al. (2010) showed, that land quality greatly influences the rental price in the region around the city of Talca in Chile, i.e. where we collected our data. Thus, the higher the land lease, the higher the quality of the land and the higher the yield.

The positive influences of the variables "number of buyers" and "written contract" are nearly as high as the influence of the variable "land lease". This indicates that the more buyers a raspberry farmer has for his product, the higher the yield. The probable reason for this is that more trading partners are sharing knowledge and resources with the farmer. The formality of the trade relationship also has a positive influence on the yield. In this case, there is a stronger connection to the buyer, which also would result in a greater exchange of information and resources.

At the same time, the amount of formal education is not significant. Similarly, horizontal collaborations and social networks do not influence yield.

CONCLUSION

The increasingly growing complexity of organizational structures especially challenges smallholder producers of NTAE products such as the Chilean raspberry producers. The importance of the organizational structure of international food supply chains for the performance of the smallholder producers was determined by use of a regression analysis on survey data. Organizational structure was found to have a significant influence: The influence of the vertical coordination variables "number of buyers" and "written contract" is comparable to the company characteristic "land lease" (as an indicator for soil quality). Furthermore, the influence of collaboration with external extension services is even higher. Therefore, it can be suggested that farmers should participate in external extension services, use formal contracts and have trade relationships to several buyers.

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