

## ENTREPRENEURIAL SUPPLY CHAINS. EVIDENCE FROM ROMANIA

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**Abstract:** In its early stage of development the entrepreneurial theory focused on start-up firms and their role in the national economic development and growth process. In the past decades its focus has shifted towards the entrepreneurship within corporations or corporate entrepreneurship. Today CE is focusing not just on the economic value addition, but also on the environmental and social value an organization creates. Moreover, the social network approach to entrepreneurship resulted in the emergence of the concept of entrepreneurial supply chain, which extends the entrepreneurship from the organizational level to the level of supply chain. *Following the review of existing literature on entrepreneurial supply chains we employ an empirical research based on a national sample of 64 Romanian companies from various industries to analyse the characteristics of entrepreneurial supply chains in Romania. Research methodology employs structural equations modelling. Structural analysis is used to estimate the relationship between entrepreneurial competences in the context of supply chains and organizational performances. We argue that developing competences that are specific to supply chains is paramount to organizational success in an environment characterized by increased uncertainty and propose a scale for measuring these competences. Subsequent structural equations analyzes refines it, allowing management a better understanding of the specificity of entrepreneurial competences in Romanian supply chains. Empirical findings show that entrepreneurial competences are positively impacting the performances in national supply chains. According to analysis of the measurement scale of the relational capital, the management of Romanian ESC fails to ensure the customers integration necessary to maximize performances in supply chains. We consider that building effective ESC requires: (a) seeking customers' inputs to identify their needs and expectations, (b) disseminating customers' needs throughout the workforce and (c) implementing effective mechanism for resolving customers' complaints. Moreover, analysis of the measurement scale corresponding to organizational performances reveals that management fails to account for shareholders' interest, focusing its performance endeavors on profits, costs and sales. We consider that achieving the full benefits of ESC requires management to reach a balance between the interests of different categories of stakeholders. A successful transformation of Romanian supply chains in entrepreneurial one necessitate value added to all stakeholders, including customers and shareholders. Not ultimately, we underline that understanding the importance of ESC for organizational performance provides the management an impetus towards fostering the changes necessary to advance from a traditional supply chain to an entrepreneurial one. Our research provides management with insights into the measures and steps necessary to achieve the full potential of entrepreneurial supply chains. Besides policy implications for management, we*

*present the advantages of structural equations modeling for assessing the complex relationships that are specific to entrepreneurial supply chains*

**Keywords:** entrepreneurial supply chains, confirmatory analysis, risks drivers

**JEL classification:** M10, C54

### **1. Entrepreneurial supply chains and organizational performances**

A supply chain is a network of companies that adds value to transformed inputs and deliver them to its customers (Balan, 2008). According to Lu (2011), with the advent of supply chains, functions are replaced by processes and operational excellence 'is manifested only through its strategic fit' in the framework provided by supply chains. Consequently the enterprise centered business management is replaced by the supply chain management. Notwithstanding the performance benefits of supply chain integration or operational closeness, Lee (2012) shows that traditional supply chains are not achieving their performance related potential. A change enabler is needed to shift from traditional supply chains to entrepreneurial ones. According to the advocates of entrepreneurial transformation of supply chains, ESC leverage the benefits of relational capital and enhance the coordination impact on organizational performances through (a) providing governance mechanisms that facilitate coordination in supply chains, (b) facilitating the first-mover advantage and (c) providing the opportunity to leverage external resources (Sarkar, Echambadi and Harrison, 2001).

Based upon the strategic management, the ESC literature proposes a practical framework for achieving an ESC. Once a company has decided to become entrepreneurial using its supply chain, it envisages a strategic path, identifies objectives, a strategy is defined, implemented and monitored. All process is continuously revised in order to eliminate the strategic gap between the actual performance against the planned one (Lee, 2012). Person (2014) consider that the most important prerequisite for transformation is to develop a mechanism to enable innovation through a push-pull cycle of inputs, outputs and rewards. Thus, while de push-side of the mechanism encourages managers to accept a certain level of risk, the pull-side involves a system of rewards and incentive targeting innovative ideas (Person, 2014).

The research conducted by Hsu, et al. (2011) conceptualize a construct to measure entrepreneurship in the context of supply chains, named entrepreneurial supply chain management competence (ESCMC). The proposed construct comprises five competences essentials to an effective ESC: (a) innovation orientation, (b) risks-taking characteristics, (c) proactiveness orientation, (d) relational capital and (e) coordination capability. ESCMC extends the concept of entrepreneurial orientation (EO) from the firm level to the level of supply chains.

Empirical evidence shows that innovative orientation and proactiveness are positively associated with performances (Zahra and Nielson, 2002; Vij and Bedi, 2012). Risk proclivity is likely to leverage the benefits of supply chain collaborative closeness (Sodhi, Son and Tang, 2012). Finally, empirical studies support the existence of a positive, statistically significant relationship between all dimensions

of ESCMC and market performances of organizations (Hsu, et al., 2011; Wang and Yen, 2012).

## 2. Analysis of entrepreneurial orientation in the context of Romanian supply chains

Building upon ESC literature, present research aims at identifying the characteristics of entrepreneurial competences in Romanian supply chains. We also document the importance of entrepreneurial competences in supply chains on organizational performances.

### 2.1. Conceptual framework

Following Hsu, et al. (2011) we measure EO in the context of supply chains by ESCMC and formulate the main hypothesis of present research:

- Hypothesis 1: ESCMC is positively correlated with organizational performances;

Vij and Bedi (2012) documents the influence of moderators on organizational performances. This entitles us to formulate the second hypothesis of present research:

- Hypothesis 2: the relationship between ESCMC and organizational performances stays robust even after controlling for firm size and industry.

According to Miller and Friesen (1983) and Mohamad, et al. (2011), uncertainty acts as an antecedent of entrepreneurship. Thus our third hypothesis is:

- Hypothesis 3: uncertainty in supply chains is positively correlated with ESCMC.

Noting also that environmental stability also affects directly organizational performances (Wagner and Neshat, 2012; Sodhi, Son and Tang, 2012; Shah, 2009), for analyzing the entrepreneurship–organizational performance relationship we propose the conceptual framework presented in figure no. 1.

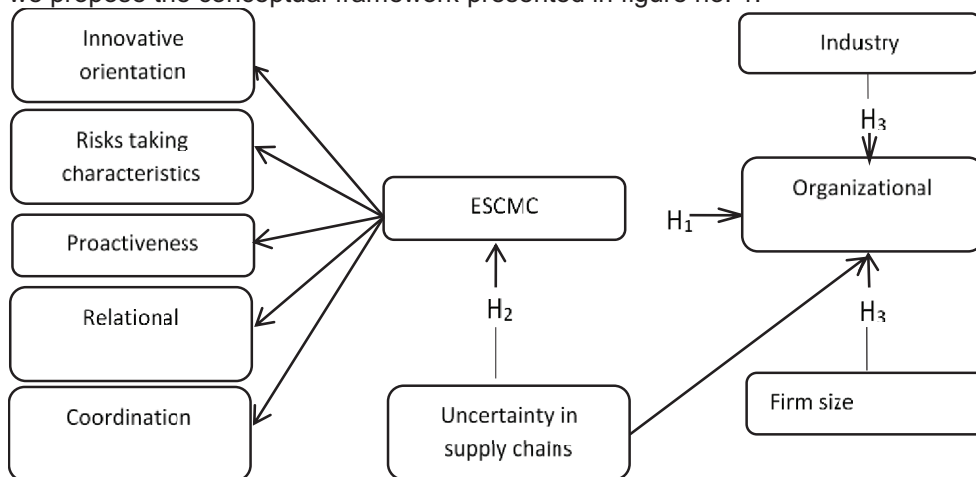


Figure no. 1: Conceptual framework

Our proposed conceptual framework incorporates the following constructs:

- innovation orientation
- risks-taking characteristics
- proactiveness orientation
- relational capital
- coordination capability
- uncertainty in supply chains
- ESCMC
- organizational performance

We have followed Hsu, et al. (2012) to identify the indicator variables corresponding to each of the five dimensions of the ESCMC. Consequently ESCMC is a second order latent construct. Its factors are in their turn latent variables. Indicator variables corresponding to innovation orientation, risk-taking characteristics and proactiveness orientation are presented in table no. 2. Those measuring relational capital are depicted in table no. 3. Table no. 4 presents the indicators corresponding to coordination capability in supply chains, uncertainty and organizational performances. In order to measure the uncertainty in supply chains we follow Wagner and Neshat (2012) and identify 5 corresponding indicators. Based on Richard, et al. (2009) and Ho, Au and Newton (2002) we use accounting indicators to quantify organizational performances.

## **2.2 Methodology**

As required by similar studies (Dunn, Seaker and Waller, 1994; Kumar and Nambirajan, 2013) we first conducted a throughout review of existing literature in search of adequate measurement scales. The survey was pre-tested and validated using the feedback of local supply chain managers.

In the autumn of 2013 we have conducted a research targeting an initial sample of 200 Romanian companies. We collected data using a survey-based questionnaire asking the respondents to assess (a) different aspects of ESCMC in their firm, (b) the uncertainty in supply chains and (c) different facets of organizational performances. In total we obtained 64 usable responses. Our response rate is 32%, similar to that reported by Wang and Yen (2012) (24.9%) and Hsu, et al. (2011) (37.5%). Sample size is also similar to that employed by research in the field (Antoncic and Scarlat, 2005). Analysis was conducted with statistical package SAS 9.3.

Our survey targeted senior level-executives. 48% from our respondents were senior level managers, followed by managers in the field of production (11%), logistics (9%) and procurement (8%). Most firms in our sample were micro and small enterprises (76%). The analysis of frequencies of companies in the working dataset reveals that the proposed analysis uses a sample of firms from various industries, covering all levels of a supply chain, from production to commerce (table no. 1).

**Table no.1: Frequencies by industry**

<b>Industry</b>	<b>Frequency</b>	<b>Percent</b>
Metallurgical	5	7.81
Electrical and electronics engineering	9	14.06
Chemicals	1	1.56
Furniture and wood	4	6.25
Constructions	9	14.06
Textiles	4	6.25
Food	7	10.94
Transport	5	7.81
Telecommunications	4	6.26
Commerce	8	12.50
Other	8	12.50

Table no.1 reveals that only 16 firms in our sample are from commerce and other services.

Following recommendations in the ESC literature, we have conducted the analysis in two stages. In the first stage we have analyzed the measurement model by means of a confirmatory factor analysis employing structural equation modeling (SEM). In the second stage we also used SEM to analyze the structural model.

For the measurement model we have chosen a confirmatory analysis because in its case the existing statistical techniques are more efficient in evaluating the overall model fit (Dunn, Seaker and Waller, 1994). Most importantly, our choice for SEM methodology was dictated by the complexity of the conceptual framework presented in figure no.1. Existing empirical research in the field at national level use either factor analysis or regression (Florian, 2013). However, as indicated by Yung (2010), simple regression and factor analysis are of limited use for estimating multiple equations, correlated errors, direct and indirect effects, latent variables and multiple group analysis.

For its advantages, SEM is the most prevalent research methodology employed in supply chains research (Kumar and Nambirajan, 2013; Kenneth, Whitten and Inman, 2008; Sarkar, Echambadi and Harrison, 2001).

### **2.3. Analysis of measurement scales**

The adequacy of the measurement model was assessed through an examination of the (a) content validity, (b) substantive validity, (c) unidimensionality and (d) reliability for each construct employed in the analysis (Albu, 1998).

Pre-testing ensured content validity of the concepts. Consequently the scales used in the analysis measure all facets of the underlying theoretical concepts. A throughout review of existing literature has ensured the substantive validity of the scales, all the items being conceptually and theoretically linked to the construct. Unidimensionality of a scale is 'the degree to which items load only on their respective constructs' (Dunn, Seaker and Waller, 1994). A 0.7 threshold level for factor loadings is accepted as a test for unidimensionality of a scale (Kenneth, Whitten and Inman, 2008). Reliability is the overall consistency of a scale measure. A measure of reliability is given by Cronbach's  $\alpha$ .

Once a model is estimated it is necessary to evaluate the overall fit of the model. A comprehensive presentation of them is found in Yung (2010). Following similar research, in order to assess model fit we use three absolute fit indices: goodness-of-fit (GFI), standardized root mean square residual (SRMR) and root mean square approximation (RMSEA). Adequate fit is given by high values of GFI (>0.9) and low values for SRMR and RMSEA (<0.08). We use one incremental fit index (Comparative fit index – CFI). The higher the values of CFI, the better is the overall model fit (Yung, 2010). Model fit statistics and the results for the analysis of unidimensionality and reliability of scales are presented in tables 2-5.

**Table no. 2: Innovative orientation, proactiveness and risk-taking behavior. Analysis of the measurement scales**

	Indicators	$\beta$	Standard Errors/ (t-values)	Model fit
Innovative orientation	Level of research	0.71	(0.08) 7.43	Cronbach Alpha=0.87 GFI = 0.96 RMSEA= 0.09 SRMSR= 0.03 CFI= 0.98
	Novelty of new products	0.87	(0.04) 9.57	
	Use of latest technological innovations	0.77	(0.06) 2.74	
	Speed of new product development	0.75	(0.06) 2.17	
	Number of new products introduced	0.78	(0.05) 3.03	
Risk-taking behavior	Management encourage change	0.78	(0.06) 12.65	Cronbach Alpha=0.87 GFI= 0.99 RMSEA= 0 SRMSR= 0 CFI= 0.98
	Employees are encourages to help organizations to implement change	0.85	(0.05) 15.45	
	High degree of unity of purpose throughout the organization	0.84	(0.05) 14.79	
Pro-activeness orientation	New technology in industry	0.83	(0.05) 14.76	Cronbach Alpha=0.84 GFI =0.99 RMSEA=0 SRMSR=0 CFI=0.98
	Anticipation of the full potential of new practices and technologies	0.83	(0.05) 14.83	
	Attempting to acquire next generation technology	0.79	(0.06) 13.10	
	Innovative and leading edge research	0.71	(0.08) 7.88	

As table no. 2 shows, innovative orientation, risk-taking characteristics and proactiveness orientation are unidimensional factors. In all three cases factor loadings exceed the 0.7 threshold value. In addition all estimated loadings are statistically significant, exceeding the 1.96 value required for 5% statistical significance under de normality assumption. Values of Cronbach's  $\alpha$  reported in table no.2 support the

reliability of all three constructs. Also the model fit as revealed by AGFI, SRMSR, RMSEA and CFI is adequate.

Analysis of the measurement model corresponding to relational capital is presented in table no. 3.

**Table no. 3: Relational capital. Analysis of the measurement scales**

Indicators	$\beta$	Standard errors	t-value	Model fit
Seeking customers inputs to identify their needs and expectations	0.56	0.09	6.23	Cronbach Alpha=0.90 GFI =0.85 RMSEA=0.12 SRMSR=0.04 CFI=0.91
Customer needs are disseminated and understood throughout the workforce	0.63	0.08	7.97	
Effective process for resolving customers' complaints	0.61	0.08	7.32	
Advocating close relationships with customers	0.79	0.05	14.70	
Easy channel for communicating with customers	0.67	0.07	9.10	
Continuous monitoring of suppliers' performances	0.73	0.06	11.41	
Easy channel for communicating with suppliers	0.76	0.05	13.32	
Advocating long-term relationships with suppliers	0.84	0.04	19.55	
Suppliers are involved in product, component, module development	0.76	0.05	13.11	
Suppliers are involved in setting the coordinates of inventory policy	0.70	0.06	10.29	

Results in table no. 3 show that only one of the indicator variables measuring the relational capital related to clients is above the 0.7 threshold value. Indicators with estimated loadings below 0.7 are eliminated from subsequent analysis.

Analysis of the measurement scales corresponding to coordination capability, uncertainty and organizational performances is presented in table no. 4.

**Table no. 4: Coordination capability, uncertainty in supply chains and organizational performances. Analysis of the measurement scales**

	<b>Indicators</b>	<b><math>\beta</math></b>	<b>Standard errors</b>	<b>t-value</b>	<b>Model fit</b>
Coordination capability	Focus on JIT production/distribution	0.73	0.06	11.42	Cronbach Alpha=0.90 GFI =0.90 RMSEA=0.17 SRMSR=0.05 CFI=0.92
	Focus on reengineering	0.80	0.05	15.33	
	Focus on standardization of operations	0.89	0.03	23.97	
	Focus on simplification of operations	0.84	0.04	18.93	
	Focus on outsourcing marginal operations	0.72	0.08	7.37	
Uncertainty in supply chains	Production (processes, operations, equipment and tools)	0.70	0.07	10.09	Cronbach Alpha=0.88 GFI =0.94 RMSEA=0.14 SRMSR=0.03 CFI=0.96
	Complexity of decisional process (multiple objectives, constraints)	0.90	0.03	24.40	
	Human resources (work attitude)	0.79	0.05	14.53	
	Forecasting horizon	0.74	0.06	11.84	
	Logistics infrastructure	0.76	0.06	12.70	
Performance	Average profits over the last three years	0.87	0.05	16.97	Cronbach Alpha=0.90 GFI =0.98 RMSEA=0 SRMSR=0.02 CFI=0.98
	Average costs over the last three years	0.78	0.06	12.70	
	Average ROI over the last three years	0.58	0.09	6.27	
	Increase in sales over the last three years	0.77	0.06	12.07	

Results in table 4 show that in Romanian supply chains performances are best measured only by three indicator variables: 'average profits', 'average costs over the last three years' and 'increase in sales over last three years'. Since factor loading for 'average ROI over the last three years' displays a factor loading below the 0.7, we eliminate it from subsequent analysis. Model fit and reliability are above threshold levels.

Analysis of the measurement model corresponding to the second order construct of ESCMC is presented in table no. 5.



**Table no. 5: Entrepreneurial supply chain management competence**

Indicators	$\beta$	Standard errors	t-value	Model fit
Innovative orientation	0.79	0.06	12.76	Cronbach Alpha=0.78 GFI =0.57 RMSEA=0.11 SRMSR=0.09 CFI=0.73
Risk-taking characteristics	0.84	0.05	15.97	
Proactiveness	0.96	0.03	30.80	
Relational capital	0.87	0.04	20.03	
Coordination capability	0.87	0.07	19.82	

Table no. 5 reveals that the construct used to assess ESCMC is unidimensional and reliable. However the fit indices show that the model would benefit from increasing the sample size.

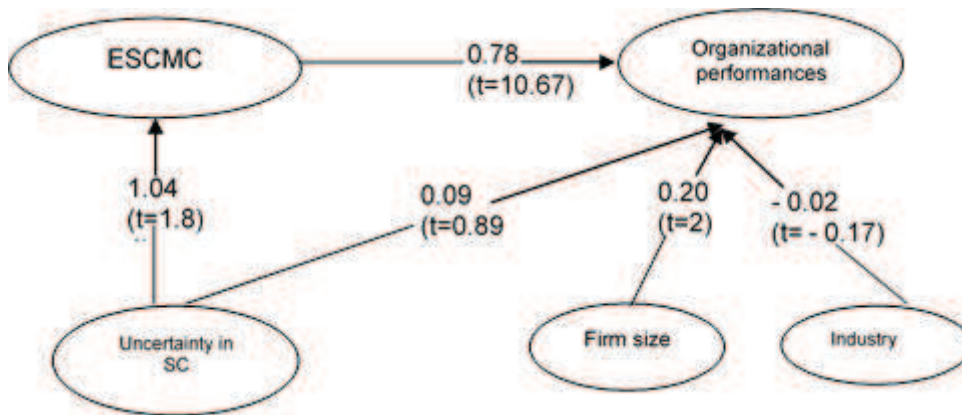
#### 2.4. Analysis of structural model

Table no. 6 shows the impact of the components of ESCMC on organizational performances.

**Table no. 6: association between entrepreneurial competences in supply chains and organizational performances**

Independent variables	$\beta$	Standard errors	T-value
Innovative orientation	0,03	0,003	9,94
Risk-taking characteristics	0,55	0,10	5,25
Proactiveness	0,03	0,003	9,62
Relational capital	0,01	0,002	9,50
Coordination capability	0,73	0,07	10,88

As table no. 6 shows, each of the entrepreneurial competences in the context of Romanian supply chains is positively impacting the organizational performances. The proposed hypothesis of research are tested using a structural model (figure. no. 2).



**Figure no. 2: Results of the structural model**

Results presented in figure no. 2 show a positive, statistical significant relationship between entrepreneurship in Romanian supply chains and organizational performances ( $\beta=0.78$ ,  $t=10.67$ ). This result provides evidence in support of our main hypothesis of research. Most importantly, this result is in accordance with previous empirical studies in ESC (Wang and Yen, 2012; Hsu, et al., 2011; Antoncic and Scarlat, 2005).

Uncertainty in supply chains affects directly ESCMC ( $\beta=1.04$ ,  $t=1.84$ ) which supports our second hypothesis of research. Firm size has a positive impact on organizational performances ( $\beta=0.20$ ,  $t=2$ ). The fact that organizational performance increases with firm' size provides support for the third hypothesis of present research. This result is reported by previous studies in the field of small and medium size enterprises (SMEs) in Romania (Barta, et al., 2011). However, since uncertainty in supply chains does not have a statistically significant impact on performances ( $t=0.89$ ), we can conclude that the evidence for our third hypothesis of research is mixed.

### **Concluding remarks**

Present study identifies the competences required for the transformation of traditional supply chains in ESC. We argue that re-thinking inter-firm alliances and relationships, collaborative design and planning of the overall architecture of the supply chain, rethinking the manufacturing system to develop flexible capacity while allowing economies of scales, and flexible pricing programs can foster the development of ESC. Results suggest that at national level it is necessary to put customers at the heart of all business endeavours, seeking customers' inputs to define their needs and tailoring customized solutions to solve their complaints. Management has to implement the change towards ESC through long-term thinking, delivering value for relevant stakeholders, expanding and building up capabilities and scaling up improvements.

Results of SEM reveal that, in the context of national supply chains, developing entrepreneurial competences foster organizational performances. Results are robust even after controlling for uncertainty in supply chains, firm size and industry. Finally, as a limitation we underline that the measures used in current research were based on perceptions of managers and the working dataset was relatively small. We mention that in some cases similar research use smaller samples (Antoncic and Scarlat, 2005). The practice of using perceptions of managers in analysis is common in ESC literature (Wang and Yen, 2012).

Notwithstanding its limitation, this study offers valuable managerial insight into the measures required for achieving the benefits of ESC and opens the way for future research in the field such as extending the number of controls employed in the analysis, accounting for interdependences among multiple performance dimensions and corroborating the problematic of ESC with aspects specific to risks management in supply chains.

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