https://doi.org/10.17221/55/2022-AGRICECON

Strategic leadership, environmental uncertainty, and supply chain risk: An empirical investigation of the agribusiness industry

Denisa Bogdana Abrudan[1], *Dana Codruta Daianu*[2], *Mădălina Dumitrița Maticiuc*[1], *Nosheen Rafi*[3], *Masood Nawaz Kalyar*[4]*

[1]*Department of Management, Faculty of Economics and Business Administration, West University of Timisoara, Timisoara, Romania*
[2]*Department of Economics, Faculty of Economic Sciences, Aurel Vlaicu University of Arad, Arad, Romania*
[3]*Faculty of Management & Administration Sciences, University of Sialkot, Sialkot, Pakistan*
[4]*Lyallpur Business School, Government College University Faisalabad, Faisalabad, Pakistan*

**Corresponding author: masood.kalyar@yahoo.com*

Citation: Abrudan D.B., Daianu D.C., Maticiuc M.D., Rafi N., Kalyar M.N. (2022): Strategic leadership, environmental uncertainty, and supply chain risk: An empirical investigation of the agribusiness industry. Agric. Econ. – Czech, 68: 171–179.

Abstract: The present study aims to examine the influence of strategic leadership and environmental uncertainty on supply chain (SC) risk in the agribusiness industry. The notion of SC risk refers to supply risk, delivery risk, and manufacturing process risk, and it is argued that these risks are an outcome of environmental uncertainty. This study postulates that strategic leadership mitigates the detrimental effect of environmental uncertainty on SC risk. On the basis of data collected from 227 agribusiness-related firms, the analysis was performed using partial least squares structural equation modelling (PLS-SEM) to test the hypothesized relationships. The findings suggest that environmental uncertainty has a direct influence on each dimension of SC risk. In addition to that, a high level of strategic leadership mitigates the impact of environmental uncertainty on supply risk and delivery risk. However, the data did not support moderation for manufacturing process risks. Findings imply that firms operating in highly uncertain environments are more prone to risks; however, high levels of strategic leadership help manage uncertainties and mitigate risks.

Keywords: disruptions in supply chain; firm performance; risk-mitigating role of strategic leadership; role of the external environment; supply chain risk mitigation

Today's competitive environment is characterised by frequent product innovations, technological advancement, and market changes that have shortened the life cycles of existing products. Shorter product life cycles entail the frequent introduction of new products to ensure the firms' survival and to sustain competitiveness in the industry (Gupta 2021). As a result, firms have to manage various uncertainties in the business environment (Peters and Buijs 2022). However, dealing with these uncertainties also increases the complexity of supply chains (SCs) and, implicitly, makes them more prone to risks and vulnerability (Gupta 2021). For instance, the frequent introduction of new products increases demand uncertainty, whereas a broader range of products, high levels of customization, and requirements of advanced technological equipment usually create uncertainties in production processes as well as in product supply (Durugbo et al. 2020). As a result, such firms face higher risks in the form of production delays, SC disruption, longer customer order cycles, etc., which eventually damage the firm reputation, decrease sales, shrink market share, and ultimately lead to poor financial performance.

https://doi.org/10.17221/55/2022-AGRICECON

Recent studies show that changes in product design, manufacturing requirements and SC structures are key factors that contribute to SC uncertainty and risks. These risks are peculiar to complex SCs, happen frequently and are related to the supply, manufacturing, and delivery processes of a firm (Peters and Buijs 2022). Drawing upon existing literature, this study posits that environmental uncertainty is a driver of SC risk. It also presents a novel conceptualization of environmental uncertainty and suggests that it is an overarching construct comprising technology, manufacturing, demand, and supply-related uncertainties. A key distinction is that our study also considers manufacturing uncertainty as a dimension of environmental uncertainty (which gained little to no attention in past studies), besides demand, supply and technology. Each dimension of environmental uncertainty reflects a unique source(s) of unpredictability and hinders firms in their effort to achieve supply, manufacturing, and delivery goals in terms of time, quantity, and quality of firm offerings (Latan et al. 2018). In particular, the present study submits that firms experiencing high environmental uncertainty (i.e. lack of predictability in technology, manufacturing, demand, and supply characteristics) are more exposed to SC risk. Therefore, this study examines the influence of environmental uncertainty on SC risk, i.e. supply, delivery, and manufacturing process risk.

In addition to that, the growing effect of SC risk on firm performance highlights the importance of processes meant to reduce the likelihood of SC risk. In this regard, however, most of the literature revolves around SC design and structures that either increase or reduce the vulnerability of SCs to risk. For example, many studies have contended that an SC's vulnerability to risk is increased by supplier concentration, supplier dependence and global sourcing. These studies focus on cost-efficient SCs and argue that SC risks arise due to a lack of coordination among SC partners (Lohmer et al. 2020). Nevertheless, only a few researchers have sought to identify mechanisms to deal with vulnerabilities and to point out how to mitigate SC risk (Shekarian et al. 2020). In this regard, most of the existing studies identify SC flexibility and SC visibility as potential elements that mitigate SC risk (Sreedevi and Saranga 2017). Furthermore, they also argue that the performance and the resilience of particular SCs are due to the top management's leadership approach as well as to SC leaders (Gosling et al. 2016). Thus, this study draws upon the strategic leadership theory and argues that strategic leaders demonstrate strategic decision-making, proactive behaviours, strategic intent and directions, adaptability and focus on long-term strategic objectives to optimize SC activities (*cf.* Vera and Crossan 2004). As a result, the top management's strategic behaviour tends to mitigate the detrimental impact of environmental uncertainty and reduce SC risk. This study attempts to integrate both leadership and SC management literature and postulates strategic leadership as an SC risk-mitigating element.

Literature review and hypotheses development

SC risk. SC risk is defined as 'the potential deviations from the initial overall objective that, consequently, trigger the decrease of value-added activities at different levels' across the SC (Kumar et al. 2010, p. 3717). SC risks are classified into disruption risks and operational risks. Disruption risks are associated with disturbances arising from circumstances such as natural calamities, disasters, labour strikes, and terrorist attacks, whereas operational risks (also known as internal SC risks) arise due to 'uncertainty and lack of coordination between firm's demand and supply objectives' (Thun and Hoenig 2011). The present study considers operational risks which are related to the internal SC of a firm and comprise supply risk, delivery risk, and manufacturing process risk. According to a study, SC risks have become costly for firms due to the complex nature of SCs and the ever-changing nature of products because of advancements in industrial and technological segments and market developments. Furthermore, Birkie et al. (2017) suggest that half of SC risks occur in firm-owned segments of SC. In view of this, the present study takes operational risks into account and investigates environmental uncertainty as a driving force, and strategic leadership and SC visibility as mitigating factors.

Environmental uncertainty and SC risk. Environmental uncertainty represents a prevalence of situations and frequent changes in manufacturing, demand, supply, and/or technology, which make it difficult for a firm to predict subsequent changes in supply and delivery. For example, firms that have frequent offerings of new products and/or a wide range of customized products find it difficult to predict market demands and hence experience demand uncertainty (Guo and Liu 2020). Demand uncertainty also creates difficulties in upstream SC which involves procurement of product parts and materials. These sources add uncertainty to manufacturing and supply-related processes. Although highly customized and innovative products help firms to achieve a competitive advantage, such

https://doi.org/10.17221/55/2022-AGRICECON

products make SCs more complex because of the involvement of several upstream suppliers and diversified procurement activities. Likewise, besides the benefits technological advancements offer in product design and development, technology also increases complexities in manufacturing processes as upgrades on the supplier's end disrupt the firm's production efficiency and cause supply uncertainty. The variations in volume and size of customer orders influence the manufacturing process as it needs frequent changes, alignment, and even a combination of methods and materials. As a result, such variations do not only complicate the entire production process but also affect process efficiency and productivity. In addition to that, process variations influence the firm's production flexibility and lead to an unstable production environment on the shop floor, thus creating manufacturing uncertainty. These uncertainties hinder focal firms in achieving their SC objectives in terms of time, quality, and quantity (Pournader et al. 2020). Therefore, environmental uncertainty is likely to induce disruptions in upstream supply, the internal manufacturing process, and delivery to customers downstream, which tend to increase SC risk.

H_1: Environmental uncertainty increases (*i*) supply risk, (*ii*) delivery risk, (*iii*) manufacturing process risk.

The role of strategic leadership in mitigating SC risk. Strategic leadership refers to 'the functions performed by individuals at the top levels of an organization [chief executive officers (CEOs), top management team (TMT) members, directors, general managers] that are intended to have strategic consequences for the firm' (Samimia et al. 2020, p. 3). The strategic consequences of leadership come up as the outcome of strategic decision-making, active engagement with external stakeholders, information management, and the management of operations and conflicting demands. In simple words, strategic leadership involves proactive engagement of TMT members to constantly adapt to change and to get the firm's strategy in line with external changes. As a result, strategic leaders seek new ways of doing business to build and sustain competitive advantage (Samimia et al. 2020).

Studies suggest that strategic leadership in firms does not work in a vacuum; instead, organizational and business contexts affect the ways strategic leaders behave and engage in strategic decision-making. As such, environmental uncertainty provides an external context and triggers strategic decision-making and strategic intent to respond to external changes. From a firm's SC perspective, environmental uncertainty increases the chances of failure, disruption, and delays across different segments of the SC, it increases the strategic leaders' symbolic importance and the boundary-spanning of the firm's strategic business units (SBUs). For example, shifts in demand lead to frequent changes in order and lot sizes which, in turn, increase means-end ambiguity and trigger SC risks associated with supply, the manufacturing process, and delivery. Strategic leaders use inhibition to control outcomes by predicting shifts in demand, supply, and/or technology, and by calibrating manufacturing processes to minimize process variations. Strategic leaders also expend their cognitive abilities, knowledge, and expertise to anticipate strategic shifts, environmental changes and market risks, and respond through rigorous information processing, increased vigilance, reshaping strategies, identification and tapping into new opportunities (Shao 2019). In this way, strategic leaders are prone to sense external changes, seize opportunities and respond to changes through strategies that either reduce the effects of SC disruptions or minimize the occurrence of such disturbances. Hence, strategic leadership is expected to play a significant role and mitigate the detrimental effect of environmental uncertainty.

H_2: Strategic leadership moderates the effect of environmental uncertainty on (*i*) supply risk, (*ii*) delivery risk, (*iii*) manufacturing process risk so that the relationship is weak for firms with a high level of visibility.

MATERIAL AND METHODS

The present study involves the analysis of data collected through a survey questionnaire. The data were collected from agribusiness firms from Pakistan and the respondents were top-level managers. Since no comprehensive list of agribusiness firms exists, we used personal and professional networks to identify and contact key respondents for data collection. As such, we adopted the snowball sampling technique because this approach is most appropriate in collectivist societies, especially in circumstances where a predefined sampling frame does not exist (Bouckenooghe et al. 2015). We used a combination of physical and online means to approach the respondents. In terms of the former, one of the researchers approached the respondents in person and provided printed copies of self-administered questionnaires. As for the latter, the respondents were sent questionnaires by email with subsequent contact via telephone. All respondents were assured of the confidentiality of their re-

https://doi.org/10.17221/55/2022-AGRICECON

sponses, and that the data would be used for research purposes only.

It is important to note that Pakistan is an agrarian country and the agricultural sector has a 53.2% share of the gross domestic product (GDP), yet agricultural development is facing several challenges as it has seen a decline in recent years (Sabir et al. 2022). Economically, per capita income in Pakistan is low, poverty is high and a substantial part of the population is employed in the agriculture sector. Moreover, religion along with collectivistic values has a strong influence on all aspects of life. In addition to that, the country has faced waves of terrorism in past decades, which compounded the socio-economic development. All things considered, Pakistan's socio-political and economic dynamics set it apart, in terms of the research context, from Western countries, and its challenging circumstances are more likely to provide peculiar insights than data from a more stable business environment.

We adapted pre-developed questionnaires from literature and used a 5-point Likert scale to measure responses. The measurement scale for environmental uncertainty consists of 6 items and was adapted from Sreedevi and Saranga (2017), while SC risk was measured using the 6-item scale of Thun and Hoenig (2011), where each dimension of SC risk had two items. Strategic leadership was measured using a 6-item scale. These items were drawn from literature and are based upon the review of Samimi et al. (2020). The questionnaire is provided as electronic supplementary material (ESM; for ESM see the electronic version). A total of 227 firm-level usable responses were received, of which 73 firms had been in business for up to ten years, 129 between eleven and twenty years, and 25 firms for more than twenty years. Firm size was measured in terms of the number of employees: 108 respondent firms had up to 100 employees, 48 firms between 101 and 200, 36 firms between 201 and 300, 13 firms between 301 and 400, while 22 firms had more than 400 employees.

RESULTS AND DISCUSSION

Results. We used the partial least squares structural equation modelling (PLS-SEM) approach and analysis performed in WarpPLS 7.0 (Kock 2021). The validity and the reliability of the constructs were ensured before analysing the data for hypothesis testing. Results indicated that study constructs maintain reliability in terms of both Cronbach's alpha (α) and composite reliability (*CR*) (Table 1). Cronbach's alpha is a measure of inter-

Table 1. Results for construct reliability and validity (*P*-value < 0.001)

Construct	Item	Factor loading	α	*CR*	*AVE*	Full collinearity *VIF*
Supply chain (SC) risk						
Supply risk (SR)	SR1	0.937	0.861	0.935	0.878	1.226
	SR2	0.937				
Delivery risk (DR)	DR1	0.908	0.788	0.904	0.825	1.164
	DR2	0.908				
Manufacturing process risk (MR)	MR1	0.904	0.777	0.900	0.817	1.542
	MR2	0.904				
Environmental uncertainty (EU)	EU1	0.673	0.879	0.909	0.627	1.611
	EU2	0.703				
	EU3	0.857				
	EU4	0.809				
	EU5	0.825				
	EU6	0.864				
Strategic leadership (SL)	SL1	0.757	0.915	0.935	0.707	1.317
	SL2	0.714				
	SL3	0.919				
	SL4	0.874				
	SL5	0.856				
	SL6	0.906				

CR – composite reliability; *AVE* – average variance extracted; *VIF* – variance inflation factor; α – Cronbach's alpha
Source: Authors' own processing

https://doi.org/10.17221/55/2022-AGRICECON

nal consistency, that is how closely related a set of items are as a group. As suggested by Hair et al. (2009), all constructs meet the minimum value (0.70). The results also supported convergent and composite validity; both types of validity were ensured using the approach of Fornell and Larcker (1981) of comparing the average variance extracted (*AVE*) and square roots of *AVE*s. According to Fornell and Larcker (1981), the values of *AVE*s must be equal to (preferably greater than) 0.5 to capture convergent validity (Table 1). For discriminant validity, the square roots of *AVE*s must be greater than (*i*) 0.5 and (*ii*) correlation coefficients of respective constructs (Table 2). Since the study uses PLS-SEM, therefore hetero-trait-mono-trait (*HTMT*) is also relevant to ensure discriminant validity. The results of *HTMT* along with evaluation criteria are presented in Table 3. Overall, the data demonstrated a high degree of reliability and validity, and therefore provided the basis for further analysis. The correlation coefficients presented in Table 2 display mutual relationships between study constructs. These results show that environmental uncertainty is positively correlated with each dimension of SC risk; the coefficients are $r = 0.34$, $P < 0.01$, $r = 0.19$, $P < 0.01$, and $r = 0.48$, $P < 0.01$ for supply risk, delivery risk, and manufacturing process risk, respectively. PLS-SEM, with the linear inner model analysis algorithm, provides empirical results to test hypothesized relationships among the variables of the study. In particular, the results presented in Table 4 show that environmental uncertainty has a positive influence on supply risk [regression coefficient (b) = 0.38, $P < 0.01$], delivery risk ($b = 0.23$, $P < 0.01$), and manufacturing process risk ($b = 0.48$, $P < 0.01$). These results support hypothesis 1 [H_1(*i*, *ii*, *iii*)] and imply that greater environmental uncertainty is associated with increased SC risks. For hypothesis 2 [H_2(*i*, *ii*, *iii*)] results also demonstrated that strategic leadership moderates the environmental uncertainty-SC risk relationship; however, the relationship is significant only for supply risk ($b = –0.23$, $P < 0.01$) and delivery risk ($b = –0.26$, $P < 0.01$), implying that a high level of strategic leadership weakens that effect of environmental uncertainty on supply risk and delivery risk. The results did not provide support for hypothesis H_2(*ii*) and suggest that strategic leadership does not mitigate the impact of environmental uncertainty on manufacturing process risk [$b = 0.09$, not significant (n.s.)]. In addition to that, we checked for the potential influence of agribusiness firms' age and size on each dimension of SC risk. However, the data supported only the influence of firm size on manufacturing

Table 2. Correlation coefficients and square-roots of *AVE*s ($n = 227$)

Variables	(1) SR	(2) DR	(3) MR	(4) EU	(5) SL	(6) Firm age
(1) SR	**(0.937)**	–	–	–	–	–
(2) DR	0.019	**(0.908)**	–	–	–	–
(3) MR	0.111*	0.185***	**(0.904)**	–	–	–
(4) EU	0.343***	0.190***	0.475***	**(0.792)**	–	–
(5) SL	–0.005	–0.016	0.233***	–0.020	**(0.841)**	–
(6) Firm age	–0.034	0.068	–0.025	0.036	–0.089	–
(7) Firm size	0.015	0.006	–0.269	0.045	–0.460	–0.026

*, ***$P < 0.10$ and $P < 0.01$, respectively; *AVE* – average variance extracted; SR – supply risk; DR – delivery risk; MR – manufacturing process risk; EU – environmental uncertainty; SL – strategic leadership; square-roots of *AVE*s are on diagonal in parenthesis written in bold

Source: Authors' own processing

Table 3. Hetero-trait-mono-trait (*HTMT*) ratios

Construct	(1) SR	(2) DR	(3) MR	(4) EU
(1) SR	–	–	–	–
(2) DR	0.039***	–	–	–
(3) MR	0.136***	0.236***	–	–
(4) EU	0.380***	0.242***	0.580***	–
(5) SL	0.058***	0.047***	0.281***	0.097***

***$P < 0.01$, good if coefficient < 0.90, best if < 0.85; SR – supply risk; DR – delivery risk; MR – manufacturing process risk; EU – environmental uncertainty; SL – strategic leadership

Source: Authors' own processing

https://doi.org/10.17221/55/2022-AGRICECON

Table 4. Partial least squares structural equation modelling (PLS-SEM) results for hypotheses testing

Path	b	P-value	Result
Independent variable			
EU → SR	0.38***	< 0.001	$H_1(i)$, supported
EU → DR	0.23***	< 0.001	$H_1(ii)$, supported
EU → MR	0.48***	< 0.001	$H_1(iii)$, supported
Moderator			
EU × SL → SR	–0.23***	< 0.001	$H_2(i)$, supported
EU × SL → DR	–0.26***	< 0.001	$H_2(ii)$, supported
EU × SL → MR	0.09	0.090	$H_2(iii)$, not supported
Control variables			
Firm age → SR	–0.06	0.166	–
Firm age → DR	0.04	0.262	–
Firm age → MR	–0.04	0.254	–
Firm size → SR	–0.01	0.420	–
Firm size → DR	–0.02	0.413	–
Firm size → MR	–0.29***	< 0.001	–
Model fit and quality indices	Estimate	P-value	Criteria
Average path coefficient (APC)	0.178	< 0.010	–
Average R-squared (ARS)	0.200	< 0.001	–
Average adjusted R-squared (AARS)	0.185	< 0.001	–
Average block *VIF* (AVIF)	1.019	–	acceptable if ≤ 5, ideally ≤ 3.3
Average full collinearity *VIF* (AFVIF)	1.308	–	acceptable if ≤ 5, ideally ≤ 3.3
Tenenhaus goodness-of-fit (GoF)	0.414	–	small ≥ 0.1, medium ≥ 0.25, large ≥ 0.36
Simpson's paradox ratio (SPR)	0.833	–	acceptable if ≥ 0.7, ideally = 1
R-squared contribution ratio (RSCR)	1.000	–	acceptable if ≥ 0.9, ideally = 1
Statistical suppression ratio (SSR)	0.700	–	acceptable if ≥ 0.7
Nonlinear bivariate causality direction ratio (NLBCDR)	0.700	–	acceptable if ≥ 0.7

***P < 0.01; → regression path from predictor to outcome variable; b – standardized regression coefficient; EU – environmental uncertainty; SL – strategic leadership; SR – supply risk; DR – delivery risk; MR – manufacturing process risk; *VIF* – variance inflation factor

Source: Authors' own processing

risk (b = –0.29, P < 0.01), which implies that large firms are less prone to manufacturing risk than smaller counterparts. An integrated model showing estimates and the significance level is shown in Figure 1.

Discussion and implications. The present study aims to examine empirically the potential impact of agribusiness firms' environmental uncertainty on three dimensions of SC risk. More specifically, it was argued that firms with high environmental uncertainty in terms of demand, supply, manufacturing, and technological shifts are more exposed to supply risk, delivery risk, and manufacturing process risk. Moreover, it was also posited that a high level of strategic leadership tends to control and mitigate the detrimental effects of environmental uncertainty. This study offers a novel understanding of environmental uncertainty by conceptualizing manufacturing uncertainty as a fourth dimension of the construct – an element to which prior studies paid little to no attention. Likewise, this study regards risks pertinent to supply, the manufacturing process, and delivery as pillars of SC risk. Thus, a novel conceptualization of both constructs and their relationship has been put forward and tested empirically. The findings of our study are consistent with prior studies conducted in different cultural settings and point out the negative impact of environmental uncertainty on the SC as well as firm results (Sreedevi and Saranga 2017; Inman and Green 2022). As noted before, firms need to offer new products frequently in order to remain competitive; however, both the frequency and the customization of products increase SC uncertainty. The firms' inability or failure to develop the required

https://doi.org/10.17221/55/2022-AGRICECON

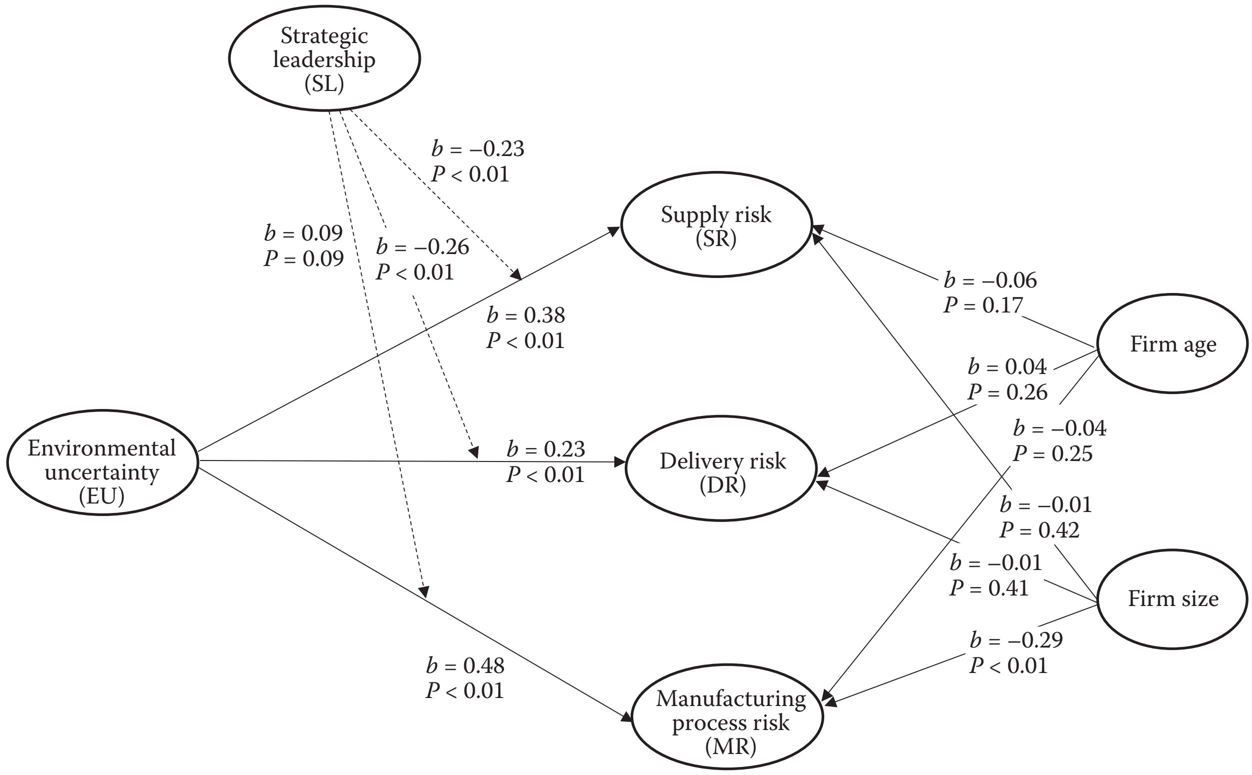

Figure 1. Partial least squares structural equation modelling (PLS-SEM) results

b – regression coefficient
Source: Authors' own processing

capabilities to tackle uncertainties may disturb the entire SC and, as a result, may affect the firms' ability to produce goods in the right quantities and to deliver them to the right market at the right time. Since SCs are interconnected, a disturbance in one segment of the SC is likely to affect other upstream and/or downstream segments and make SCs more vulnerable.

As uncertainties are unavoidable in today's business environment, this study highlights the importance of strategic leadership in mitigating risks. Since strategic leaders envision the firm's future by monitoring the external operating environment, they are likely to sense external changes and reconfigure the resources in response. More specifically, in highly uncertain environments, strategic leaders use dynamic capabilities to integrate and reconfigure the firms' resources in order to seize opportunities and mitigate potential threats. Our results support this approach and postulate that strategic leadership mitigates the effects of environmental uncertainty on SC risk. This study shows that strategic leaders sense shifts in demand, supply, manufacturing and technology, and reshape the firms' strategies to respond to these changes quickly. These strategy changes help firms to align their strategic orientation and operations with external environmental changes. As shown by the results, it is suggested that strategies pertinent to upstream SC guide firms to respond to supply disruptions and help to streamline processes across the entire SC, because upstream disruption also affects the firms' internal operations as well as downstream SC activities. These inferences are in line with the findings of Birasnav and Bienstock (2019) and Chatterjee et al. (2022) highlighting the role of leaders in managing supply networks and responding to external threats. Results also suggest that strategic leadership plays a key role in mitigating delivery risk, which implies that downstream agility and responsiveness enable firms to quickly respond to customer demands and fulfil market needs as swiftly as possible. These findings confirm those of Shao (2019) who pointed out the role strategic leaders play in environmental scanning, setting firm directions, (re)formulating strategies, and ensuring firm competitiveness.

However, results did not support the strategic leadership's role in mitigating manufacturing process risk; one main reason could be that strategic leaders (re)formulate corporate-level strategies rather than operational and manufacturing strategies – which are the responsibility

https://doi.org/10.17221/55/2022-AGRICECON

of operations/production managers. Hence, the operations/production managers' failure to translate corporate strategies into corresponding operational strategies is likely to trigger manufacturing risk. Therefore, a firm's internal collaboration and integration seem to be crucial in representing 'one big picture' of the firm and in functioning as a 'system'. Since firm size plays an important role in the manufacturing process, another reason that strategic leadership is not effective in mitigating manufacturing risk can be either the greater ability of large firms to effectively manage manufacturing processes or the flexibility these firms have in production systems to control variations and meet demand.

CONCLUSION

This study revealed that agribusiness firms with high uncertainty environments are more vulnerable and exposed to three forms of SC risk: supply, delivery, and manufacturing process risks. However, the firms' strategic leadership mitigates the vulnerabilities and facilitates risk management. In particular, strategic leadership moderates the effect of environmental uncertainty on supply and delivery risk, so a high level of strategic leadership weakens this relationship. However, the result did not support the mitigating role of strategic leadership in the case of manufacturing process risk, and this can be explained as a lack of strategic integration between manufacturing-related strategies and the firms' overall strategy, with larger firms more able to manage and adjust the manufacturing processes according to market changes.

Besides important contributions to theory and practice, the present study also has some limitations. Firstly, the study is based on a cross-sectional design and the data were collected at a single point in time. Furthermore, only one respondent representing each firm may lead to response bias due to the respondents' inclination to social desirability (Cerri et al. 2019). Future studies may use longitudinal designs and choose multiple respondents from one firm to increase methodological resonance and generalizability of empirical findings. Secondly, we did not account for the firms' life cycle and strategic orientation towards external changes due to the unavailability of a sampling frame. Researchers may consider and compare the firms' reactions to external threats to comprehend if a significant difference exists between/among prospector, analyser and/or reactor firms. Thirdly, this study postulated strategic leadership as a risk-mitigating factor. The literature suggests that the firms' context, the strength of relationships with partners, SC visibility, and SC flexibility may mitigate risks in different segments of SCs (Sreedevi and Saranga 2017; Altay et al. 2018; Dubey et al. 2020), thus future studies are encouraged to take a complementary or substitution-based approach to investigate whether two (or more) mitigating factors strengthen the mitigating effect or substitute each other's effects, respectively.

REFERENCES

Altay N., Gunasekaran A., Dubey R., Childe S.J. (2018): Agility and resilience as antecedents of supply chain performance under moderating effects of organizational culture within the humanitarian setting: A dynamic capability view. Production Planning & Control, 29: 1158–1174.

Birasnav M., Bienstock J. (2019): Supply chain integration, advanced manufacturing technology, and strategic leadership: An empirical study. Computers & Industrial Engineering, 130: 142–157.

Birkie S.E., Trucco P., Campos P.F. (2017): Effectiveness of resilience capabilities in mitigating disruptions: Leveraging on supply chain structural complexity. Supply Chain Management: An International Journal, 22: 506–521.

Bouckenooghe D., Zafar A., Raja U. (2015): How ethical leadership shapes employees' job performance: The mediating roles of goal congruence and psychological capital. Journal of Business Ethics, 129: 251–264.

Chatterjee S., Chaudhuri R., Shah M., Maheshwari P. (2022): Big data driven innovation for sustaining SME supply chain operation in post COVID-19 scenario: Moderating role of SME technology leadership. Computers & Industrial Engineering, 168: 108058.

Cerri J., Thøgersen J., Testa F. (2019): Social desirability and sustainable food research: A systematic literature review. Food Quality and Preference, 71: 136–140.

Dubey R., Gunasekaran A., Childe S.J., Papadopoulos T., Luo Z., Roubaud D. (2020): Upstream supply chain visibility and complexity effect on focal company's sustainable performance: Indian manufacturers' perspective. Annals of Operations Research, 290: 343–367.

Durugbo C.M., Al-Balushi Z., Anouze A., Amoudi O. (2020): Critical indices and model of uncertainty perception for regional supply chains: Insights from a Delphi-based study. Supply Chain Management: An International Journal, 25: 549–564.

Fornell C., Larcker D.F. (1981): Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18: 39–50.

Gosling J., Jia F., Gong Y., Brown S. (2016): The role of supply chain leadership in the learning of sustainable practice:

https://doi.org/10.17221/55/2022-AGRICECON

Toward an integrated framework. Journal of Cleaner Production, 137: 1458–1469.

Guo S., Liu N. (2020): Influences of supply chain finance on the mass customization program: Risk attitudes and cash flow shortage. International Transactions in Operational Research, 27: 2396–2421.

Gupta A.K. (2021): Innovation dimensions and firm performance synergy in the emerging market: A perspective from dynamic capability theory & signaling theory. Technology in Society, 64: 101512.

Hair J.F., Black W.C., Babin B.J. (2009): Multivariate Data Analysis: A Global Perspective. Upper Saddle River, US, Prentice Hall: 800.

Inman R.A., Green K.W. (2022): Environmental uncertainty and supply chain performance: The effect of agility. Journal of Manufacturing Technology Management, 33: 239–258.

Kock N. (2021): WarpPLS User Manual: Version 7.0. Laredo, US, ScriptWarp Systems: 142.

Kumar S.K., Tiwari M., Babiceanu R.F. (2010): Minimisation of supply chain cost with embedded risk using computational intelligence approaches. International Journal of Production Research, 48: 3717–3739.

Latan H., Jabbour C.J.C., de Sousa Jabbour A.B.L., Wamba S.F., Shahbaz M. (2018): Effects of environmental strategy, environmental uncertainty and top management's commitment on corporate environmental performance: The role of environmental management accounting. Journal of Cleaner Production, 180: 297–306.

Lohmer J., Bugert N., Lasch R. (2020): Analysis of resilience strategies and ripple effect in blockchain-coordinated supply chains: An agent-based simulation study. International Journal of Production Economics, 228: 107882.

Peters K., Buijs P. (2022): Strategic ambidexterity in green product innovation: Obstacles and implications. Business Strategy and the Environment, 31: 173–193.

Pournader M., Kach A., Talluri S. (2020): A review of the existing and emerging topics in the supply chain risk management literature. Decision Sciences, 51: 867–919.

Sabir M., Ali Y., Ali A., Khan J., Rehman Z.U. (2022): The choice between organic and inorganic farming: Lessons from Pakistan. Renewable Agriculture and Food Systems: 1–8.

Samimi M., Cortes A.F., Anderson M.H., Herrmann P. (2020): What is strategic leadership? Developing a framework for future research. The Leadership Quarterly: 101353.

Shao Z. (2019): Interaction effect of strategic leadership behaviors and organizational culture on IS-Business strategic alignment and Enterprise Systems assimilation. International Journal of Information Management, 44: 96–108.

Shekarian M., Nooraie S.V.R., Parast M.M. (2020): An examination of the impact of flexibility and agility on mitigating supply chain disruptions. International Journal of Production Economics, 220: 107438.

Sreedevi R., Saranga H. (2017): Uncertainty and supply chain risk: The moderating role of supply chain flexibility in risk mitigation. International Journal of Production Economics, 193: 332–342.

Thun J.H., Hoenig D. (2011): An empirical analysis of supply chain risk management in the German automotive industry. International Journal of Production Economics, 131: 242–249.

Vera D., Crossan M. (2004): Strategic leadership and organizational learning. Academy of Management Review, 29: 222–240.

Received: March 1, 2022
Accepted: March 30, 2022
Published online: April 27, 2022