4

Investigating the Supply Chain Performance of Agribusiness Firms from the IT Capability and Government Support Perspectives

Ranjan Chaudhuri, Sheshadri Chatterjee, and Demetris Vrontis

1 Introduction

The supply chain performance of agribusiness firms has been impacted over the past two decades by rapid market liberalization, globalization, stricter food safety and environmental regulations imposed by governments, and new trends in consumer lifestyles, which has led those firms to be increasingly concerned (Huggins & Valverde, 2018; Gaitan-Cremaschi et al., 2019). Along with environmental implications, they

R. Chaudhuri (✉)
Research Center, Léonard de Vinci Pôle Universitaire, Paris La Défense, France
e-mail: ranjanchaudhuri@hotmail.com

S. Chatterjee
Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur, Kharagpur, India
e-mail: sheshadri.academic@gmail.com

D. Vrontis et al. (eds.), *Business for Sustainability, Volume I*, Palgrave Studies in Cross-disciplinary Business Research, In Association with EuroMed Academy of Business, https://doi.org/10.1007/978-3-031-37361-9_4

have also been experiencing unprecedented, entangled challenges with locational and traceability issues, treating farmers' interests fairly, and treating animals humanely (Irani & Sharif, 2016; Saitone & Sexton, 2017). The successful performance of an agribusiness firm mainly depends on how it can compete with others in terms of efficiently streamlining its supply chain activities (Panahifar et al., 2018; Wu et al., 2018). Presently, in different countries, agribusiness is undergoing modernization in business practices, resulting in the creation of some major problems for those who follow traditional business practices, especially in the context of supply chain activities (Zeng & Lu, 2021). Researchers have argued that information asymmetry is a major issue that weakens sustainability in the supply chain performance of agribusiness firms (Mesic et al., 2018; Gaitan-Cremaschi et al,. 2019; Shu et al., 2019).

However, the business community in the agriculture sector has realized that applying appropriate Information Technology (IT) with active government support is the most effective way for resolving these challenges in managing the supply chain (Oh et al., 2016; Ojha et al., 2019). Researchers have demonstrated that agribusiness firms that increase their IT capabilities in supply chain management activities can effectively mitigate the information asymmetry and enhance the relationships with their supply chain partners to ensure better supply chain performance (Ding et al. 2014; Fu et al., 2017). IT capabilities have introduced important changes in improving production quality (Migliore et al., 2020), production efficiency (Camanzi & Troiano, 2021), sustainability (Malorgio & Marangon, 2021), and supply chain performance of the agribusiness firms (Zeng & Lu, 2021). The increased use of IT-based capabilities, comprising employees and infrastructural abilities, has

D. Vrontis
Department of Management, School of Business, University of Nicosia, Nicosia, Cyprus

Department of Management Studies, Adnan Kassar School of Business, Lebanese American University, Beirut, Lebanon
e-mail: vrontis.d@unic.ac.cy

helped agribusiness to develop satellite-based global positioning systems that closely and flawlessly navigate the supply chain flow and monitor field conditions (Mariyono, 2020; Rambe & Khaola, 2022; Chatterjee et al., 2021a). Thus, the agriculture industry is optimistic that technological improvements, especially in IT capabilities, could improve supply chain performance and meet the growing consumer demands for agricultural products (Chege & Wang, 2020; Rambe & Khaola, 2022).

Therefore, it is important for agricultural firms to develop in-house IT capabilities to meet these changing demands in the agricultural market. This concept corroborates the Resource-Based View (RBV) (Barney, 1991) since IT capability is considered a valuable, rare, and non-replicable resource. IT capability can also be considered a dynamic capability, as it could address the dynamic needs of the agricultural market, which supplements the concept of dynamic capability view (DCV) (Teece et al., 1997). Previous research has indicated that the IT capabilities of agribusiness firms directly impact firm performance (Jin et al., 2014; Mendoza-Fong et al., 2018). But studies did not explicitly explore how the IT capabilities of agribusiness firms could directly improve supply chain performance and how active government support could affect a firm's IT capabilities (Zeng & Lu, 2021). In this vein, the present study is aimed at addressing the following research questions (RQs).

RQ1: How does IT capability impact the supply chain performance of agribusiness firms?

RQ2: Does government support have a moderating impact on the relationship between IT capability and supply chain performance of agribusiness firms?

2 Literature Review and Theoretical Underpinning

In emerging economies, agribusiness plays a significant role in enhancing household income, especially in rural communities (Sargani et al., 2018; Singh, 2019; Patel et al., 2020). In developing economies, the agriculture sector is a main contributor to economic growth (Ansari & Khan, 2018).

Studies refer to countries like India and Pakistan as agriculturally dependent regions (Iqbal et al., 2015; Ali, 2016). Zeren and Akkus (2020) observed that emerging economies are powerhouses for international trade and investment in agriculture. Several researchers have also shown growing scholarly interest in studying the supply chain performance of agribusiness firms (Odongo et al., 2016; Kirwan et al., 2017).

Ngwenyama and Morawczynski (2009) argued that the rapid economic growth of a country depends on the applications of high-quality information and communication technology. More recent studies have demonstrated that agribusiness firms that continuously invest in IT infrastructure are able to develop supply chain management systems (Cai et al., 2016; Gao, 2018). Studies have demonstrated that governments of different emerging economies are continuously funding agribusiness firms to properly train employees to strengthen their IT capabilities to improve their logistics systems, economic infrastructure, and supply chain systems (Peng et al., 2016; Zhou & Wan, 2017). Thus, to achieve better supply chain performance, agribusiness firms should improve their IT capability, comprising employee ability and infrastructural ability.

It has been observed that the IT capability of agribusiness firms is an intangible and immobile resource, which is difficult to replicate, but helps to ensure better firm performance and competitiveness (Wernerfelt, 1984). This concept is in consonance with the idea of RBV (Barney, 1991). Here it is necessary to understand the concept of competencies, which Amit & Schoemaker (1993) broadly categorized into "firm-resources" and "firm-capabilities". As RBV is related to firm performance, which principally depends on IT capability, it is important to note that resources can be easily acquired, whereas capability is a valuable, rare, inimitable, and non-substitutable resource for firms (Barney et al., 2001; Hart & Dowell, 2011).

IT capability is associated with the competency of firms to acquire external resources, combine and reconfigure them with their internal resources, and then deploy them to support the business flow, which affects the supply chain management activities of agribusiness firms. Thus, IT capability, in the context of above discussion, is considered a VRIN (Valuable, Rare, Imperfectly Imitable and Non-substitutable) ability, corroborating the concept of RBV (Barney, 1991).

Again, as the agricultural market is changing rapidly, to appropriately react and respond to such changes, agribusiness firms must possess dynamic capability to acquire the IT resources to strengthen the supply chain flow. This concept is in consonance with DCV (Teece et al., 1997). According to Zeng and Lu (2021), technological resources do not necessarily always produce better firm performance, but they are considered essential for IT capability and to improve human resource ability as well as the infrastructural ability of agribusiness firms. Dynamic capability is interpreted as a firm's "ability to integrate, build, and reconfigure internal and external resources/competencies to address and possibly shape rapidly changing business environments" (Teece, 2012, p. 1995). It is argued that if a firm possesses proper IT resources but lacks dynamic capability, it may still achieve better performance for a short period of time, but not in the long term (Teece, 2012). Agribusiness firms must possess dynamic capability by improving their human resources and infrastructural abilities to shape the market in ways that could facilitate value creation and realization (Katkalo et al., 2010). This concept supports DCV (Teece et al., 1997).

3 Hypotheses Development and Conceptual Model

With the inputs from the literature and the theories, it was possible to identify that IT capability, including personnel and infrastructural ability, could impact agribusiness firms' supply chain performance. We have also identified from these inputs that government support has a critical moderating influence on the relationships between agricultural firms' supply chain performance and their two predictors. These factors will be discussed in this section as we formulate the hypotheses for developing a theoretical model.

3.1 IT Capability

In many studies, IT capability has been considered important in the context of a firm's supply chain management system (Kim 2017; Mendoza-Fong et al., 2018). IT capability also helps agribusiness firms to efficiently gather, store, and analyze information about suppliers and consumers and to accurately ascertain market demand (Mehta et al., 2003; Zhou & Wan, 2017). This capability is considered an effective and significant enabler of supply chain management (Peng et al., 2016). Advantages include minimizing variability in the processes, improving the quality of the processes, and enhancing the output in the supply chain system (Wamba et al., 2019). With IT capability, agricultural products can be tracked and traced through the supply chain in order to safeguard their quality (Ding et al., 2014). For example, IT capability can facilitate supply chain visibility and traceability, as information is effectively and promptly shared to manage the risks of agricultural products becoming contaminated and thereby improve quality (Fu et al., 2017). This capability can be best utilized when employees are efficient and knowledgeable, provided they have the necessary skillsets and the firm has adequate infrastructural facilities (Basile et al., 2021). Because IT capability helps agribusiness firms to quickly access information, operational and transactional costs are reduced. It also helps to promote quality service, which is necessary to improve agribusiness firms' supply chain performance (Zeng & Lu, 2021).

The applications of IT in the supply chain management context include WeChat, WhatsApp, electronic data interchange, e-commerce, and the internet of things (IoT) to name a few applications that can improve the communication system and strengthen the efficiency of the supply chain flow (Yan et al., 2016). All these advantages of IT capability can be realized by agribusiness firms if they have adequately trained and skillful staff who can extract the best potential from the IT capability. Such IT infrastructure, along with adequate and efficient human resource capability, can also improve the supply chain management system of agribusiness firms (Chaudhuri, 2022). Accordingly, the following hypotheses are formulated.

H1: Manpower capability (MPC) positively impacts the supply chain performance of agribusiness firms (SCP).
H2: Infrastructure capability (INC) positively impacts the supply chain performance of agribusiness firms (SCP).

3.2 Moderating Role of Government Support (GS)

This study demonstrates that by improving IT capabilities, it is possible to improve the supply chain management process of agribusiness firms. This is because a huge investment is necessary to update their infrastructure so that they can effectively use modern technologies like artificial intelligence, blockchain technology, big data analytics, and internet of things for the betterment of the supply chain process (Chaudhuri, 2022; Chaudhuri et al., 2022; Thrassou et al., 2022a, 2022b). Agribusiness firms, especially in developing economies, often suffer from resource constraints (Nguyen, 2021). To help them to continue their businesses by improving supply chain activities, governments need to help the firms by subsidizing financial loans. They can also help agribusiness firms by providing tax incentives and acting as a guarantor against a business loan (Bhattacharjee et al., 2021).

To use modern technology, the employees of these firms must have updated training. Inadequate infrastructure needs to be modernized with technology to conduct online training sessions with the employees (Lyapina et al., 2019). Agribusiness firms experience challenges to impart technological training, as they frequently have a paucity of funds, and we can conjecture that government support should play a critical role (Agrawal, 2012). Thus, government support is perceived to help agribusiness firms improve their overall supply chain performance. Accordingly, it is hypothesized as follows.

H3: Government support (GS) moderates the relationship between the manpower capability (MPC) and supply chain performance of agribusiness firms (SCP).

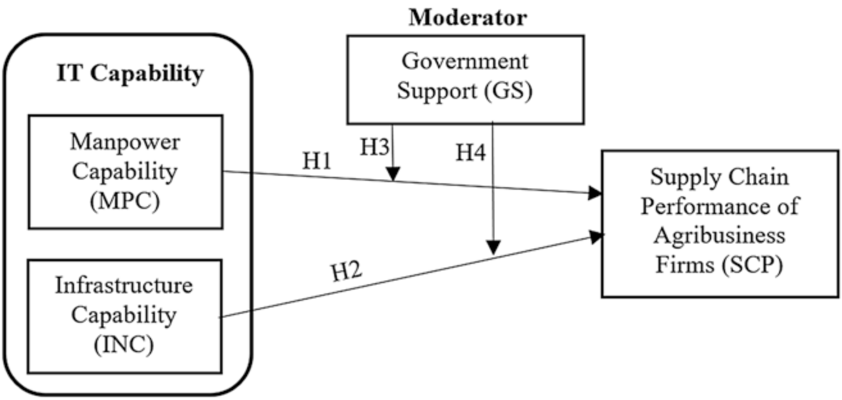

Fig. 4.1 The conceptual model (adopted from RBV and DCV)

H4: Government support (GS) moderates the relationship between the infrastructure capability (INC) and supply chain performance of agribusiness firms (SCP).

In terms of the above inputs, a theoretical model has been developed conceptually. It is shown in Fig. 4.1.

4 Research Methodology

To test the hypotheses and validate the proposed theoretical model, the Partial Least Squares (PLS) Structural Equation Modelling (SEM) approach was taken. As a multivariate technique, this approach is used for assessing the path relationships between the variables (Hair et al., 2016). PLS-SEM approach is deemed to be helpful to analyze an exploratory study like this and can analyze a complicated model that includes a moderator (Hair et al., 2016). The present study is an exploratory study possessing a complex model with a moderator. As such, PLS-SEM has been applied to analyze the data in the present study. The data obtained by conducting the survey was quantified with a 5-point Likert scale, anchored from 1 for Strongly Disagree (SD) to 5 for Strongly Agree (SA).

4.1 Research Instrument

The constructs in the set of questions were prepared based on knowledge from the existing literature. The questions in this questionnaire were prepared in the form of statements that were adjusted in terms of the context of this present study. All the questions were initially pretested with help from expert opinions. We consulted with seven experts who came from industries and were knowledgeable about the domain of this present study. Also, three academicians were consulted who have research experience in the field of this study. The opinion of these experts helped us to modify the language of the questionnaire, rendering them simpler.

After this pretest stage, the pilot test was conducted by analyzing the inputs from 25 respondents who were selected through the convenience sampling process. Those respondents were not included in the main survey. The outcomes of the pilot test help to improve the comprehensiveness, understandability, and readability of the set of questions. All these steps were taken with the intention to obtain unbiased replies from the respondents. In this way, 17 questions were finalized.

4.2 Collection of Data

To target respondents, some of the authors of this study attended conferences and seminars held between March 2022 and August 2022 in different places of India. The agendas of these events were aligned with the domain of this present study. At those conferences, resource persons were contacted who provided lists of employees who hold different positions at agribusiness firms spread across the northern and western parts of India. Those lists contained details of the prospective respondents who were willing to take part in the survey. The list contained 711 respondents in total.

Each prospective respondent was provided with a response sheet that contained the 17 questions. The respondents were also given a guideline that described that they needed to put one tick mark in one option out of five for each question. Also, all the prospective respondents were assured that their anonymity and confidentiality would be strictly

Table 4.1 Demographic information (N = 312)

Particulars	Category	Frequency (N)	Percentage (%)
Gender	Male	223	71.4
	Female	89	28.6
Age	Young adults (<35 years)	200	64.1
	Older adults (>35 years)	112	35.9
Educational qualification	Graduate	162	51.9
	Postgraduate	101	32.3
	PhD/Fellow	49	15.8
Hierarchy of employees	Individual contributors	119	38.2
	Junior managers	64	20.5
	Midlevel managers	54	17.3
	Senior managers	45	14.4
	Leaders	30	9.6

preserved, and they were requested to respond within two months. Within the stipulated time, 326 respondents returned the filled-in response sheets, which is a response rate of 45.8%. After reviewing the response sheets, it appeared that 14 responses were incomplete, and so those were not considered. Therefore, analysis was done on the inputs of 312 respondents against 17 items. The demographic information of 312 respondents is provided in Table 4.1.

5 Analysis of Data and Results

5.1 Measurement Properties

To verify the convergent validity, the loading factor (LF) of each of the items was estimated. Then, to examine the validity, reliability, as well as internal consistency of the constructs, AVE (average variance extracted), CR (composite reliability), and α (Cronbach's alpha) of all the constructs were assessed. The computed values of all the parameters were found to be within the specified range. The results are given in Table 4.2.

Table 4.2 Measurement properties

Constructs/Items	LF	AVE	CR	A	*t*-values
MPC		0.84	0.87	0.89	
MPC1	0.85				22.41
MPC2	0.96				23.56
MPC3	0.94				29.17
MPC4	0.90				32.67
MPC5	0.91				31.12
MPC6	0.95				27.17
INC		0.87	0.88	0.89	
INC1	0.87				26.01
INC2	0.84				34.19
INC3	0.95				31.67
INC4	0.95				30.66
INC5	0.90				25.02
INC6	0.97				26.11
SCP		0.75	0.81	0.86	
SCP1	0.87				24.17
SCP2	0.90				31.26
SCP3	0.91				19.38
SCP4	0.85				26.06
SCP5	0.78				27.11

Table 4.3 Discriminant validity test (Fornell and Larcker criteria)

Constructs	MPC	INC	SCP	AVE
MPC	0.92			0.84
INC	0.24	0.93		0.87
SCP	0.26	0.31	0.87	0.75

5.2 Discriminant Validity Test

We followed the Fornell and Larcker (1981) criteria to examine the discriminant validity of the constructs. With this process, the square roots of all the AVEs were estimated, and it was observed that they are greater than the corresponding bifactor correlation coefficients. The result satisfies the Fornell and Larcker criteria, confirming that the constructs have discriminant validity. The results are provided in Table 4.3.

Table 4.4 Moderator analysis (MGA)

Linkages	Hypotheses	*p*-value differences	Remarks
(MPC→SCP) × GS	H3	0.04	Significant
(INC→SCP) × GS	H4	0.01	Significant

5.3 Moderator Analysis (Multigroup Analysis)

This study considered that government support (GS) moderates the relationships covered by the linkages MPC→SCP (H1) and INC→SCP (H2). To verify the effects of the moderator GS on these two linkages, the impacts of GS have been categorized into two groups: Strong GS and Weak GS. Multigroup analysis was conducted to analyze the moderator, and the bootstrapping procedure was used to consider 5000 resamples. The criterion for significance of the moderating effects highlights that the *p*-value difference of the effects of the two categories of a moderator on the linkages should be either less than 0.05 or greater than 0.95 (Hair et al., 2016; Mishra et al., 2018). The results of the present study demonstrate that the effects of GS on H1 and on H2 are significant. The results are shown in Table 4.4.

5.4 Common Method Bias (CMB)

The study results were dependent on survey data. Hence, the possibility of having common method bias (CMB) cannot be overruled. As such, for mitigating the chance of CMB, we initially adopted some procedural measures. In the survey process and preparing the questionnaire, we conducted a pretest and pilot test to enhance the readability, understandability, and comprehensiveness of the questions so that the respondents would be able to understand them and respond without any bias. Additionally, potential respondents were assured that their identity would not be known, and their answers were completely confidential. Even then, to assess the severity of CMB, Harman's single factor test (SFT) was conducted. The results demonstrated that the first factor was 20.03%, being less than the recommended highest value of 50% (Podsakoff et al., 2003). Another study observed that Harman's SFT is not robust to be a conclusive test for the CMB (Ketokivi & Schroeder, 2004). Therefore, the marker correlation test was also conducted (Lindell & Whitney, 2001), and the results of this test did not highlight any distinct evidence of CMB either. So, it can be safely inferred that CMB could not pose a threat in this study.

5.5 Hypotheses Testing

To test the hypotheses, structural equation modelling technique (SEM) was followed by the bootstrapping procedure to consider 5000 resamples. By considering an omission distance 7, the cross-validated redundancy was assessed, and the Q^2 value emerged as 0.059, which is positive. Thus, the result indicates that the proposed theoretical model has accurate predictive relevance (Mishra et al., 2018). Again, to estimate the model fit, recommendations laid down by Henseler et al. (2014) were followed. Here the standardized root mean square residual (SRMR) is considered as a standard index. The SRMR values were duly estimated, and they are 0.061 for PLS and 0.033 for PLSc. Both values are found to be less than the highest recommended value of 0.08 (Hu & Bentler, 1999). The results highlight that the proposed theoretical model is in order.

The path coefficients of all the linkages, along with the corresponding *p*-values and other parameters, have duly been computed. The results are presented in Table 4.5 (Fig. 4.2).

Table 4.5 Structural equation modelling (SEM)

Linkages	Hypotheses	Path coefficients	*p*-values	Remarks
MPC→SCP	H1	0.23	$p < 0.001$(***)	Supported
INC→SCP	H2	0.31	$p < 0.01$(**)	Supported
(MPC→SCP) × GS	H3	0.17	$p < 0.05$(*)	Supported
(INC→SCP) × GS	H4	0.24	$p < 0.01$(**)	Supported

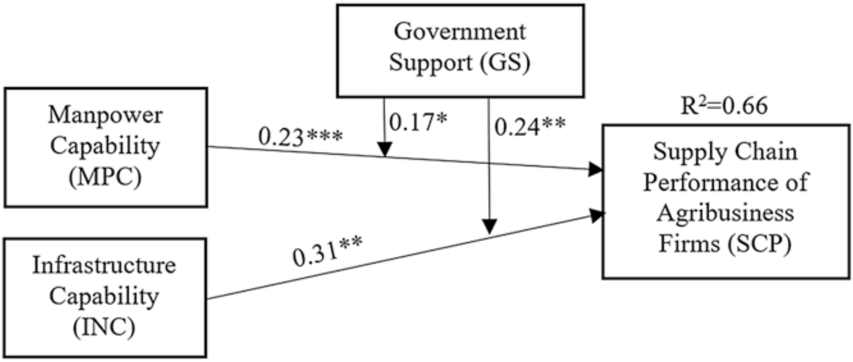

Fig. 4.2 Validated model (SEM)

6 Results and Discussion

The present study has formulated four hypotheses out of which two are concerned with the moderating effects of government support (GS) on the linkages H1 and H2. The study demonstrates that MPC and INC significantly and positively impact SCP, as the concerned path coefficients are 0.23 and 0.31 and the respective levels of significance are $p < 0.001$(***) and $p < 0.01$(**). The moderator GS significantly and positively impacts the linkages H1 and H2, since the path coefficients are 0.17 and 0.24, respectively, with levels of significance as $p < 0.05$(*) and $p < 0.01$(**). In terms of the coefficient of determination (R^2), it appears that MPC and INC could simultaneously predict SCP to the extent of 66% ($R^2 = 0.66$), which is the explanatory power of the proposed theoretical model.

The present study shows that MPC and INC are the two salient factors of IT capability and have a significant impact on SCP. This finding was also supported by Zeng and Lu (2021). The relationship between IT capability and supply chain performance of agribusiness firms was investigated through the lenses of RBV and DCV. This study highlights that IT capability stems from the personnel capability and infrastructural ability of agribusiness firms. Therefore, their employees must possess appropriate competencies to use modern technologies and the firms must have adequate infrastructure so that the employees have opportunities to use modern technologies to strengthen the firms' supply chain management system. This study has highlighted that government support acts as a moderator facilitating the relationships between MPC→SCP and INC→SCP. This has been verified by multigroup analysis.

Here the effects of this moderator GS on H1 and H2 are discussed through graphical presentation. Figures 4.3 and 4.4 present the effects of Strong GS (continuous lines) and Weak GS (dotted lines), respectively, on H1 and H2.

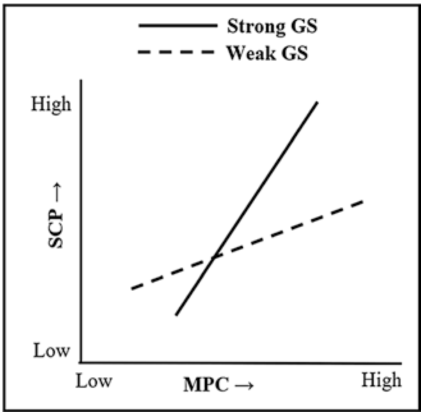

Fig. 4.3 Effects of GS on H1

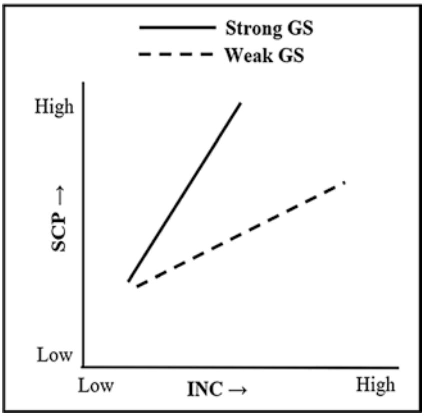

Fig. 4.4 Effects of GS on H2

In the two graphs, it appears that as MPC (Fig. 4.3) increases and INC (Fig. 4.4) increases, the rates of increase in SCP are effected more by Strong GS than by Weak GS, since the gradients of the continuous lines in both graphs are greater than the gradients of the dotted lines, which supplement the results of multigroup analysis (MGA).

7 Implications

Several theoretical contributions have been made by the present study. It is a fact that the role of IT capability in supply chain management is not a new topic of research. However, there are studies which have demonstrated that there are still many critical issues which need to be addressed (Zeng & Lu, 2021; Chatterjee et al., 2021b). From this perspective, we claim that, compared to the earlier studies, the present study is able to contribute precious theoretical implications to various key areas to advance the scope for future research.

Extant literature reveals that previous studies have considered the application of IT as the principal explanatory variable, though a limited number of studies have focused on the contributions of IT capability to the supply chain flow of agribusiness firms, especially as concerns developing countries (Sun & Bao, 2011; Zhou & Wan, 2017). Thus, the present study has supplemented the suggestions of Cai et al. (2016) by investigating the importance of IT capability in the supply chain management of agribusiness firms.

Various studies have demonstrated the direct correlation between IT capability and the performance of the firms in the context of industrial supply chain activities (Hwang et al., 2015; Peng et al., 2016). The present study has extended the concept of those previous studies and explored that IT capability, comprising workforce ability and infrastructure ability, could create value by improving the supply chain process of agribusiness firms. This has added knowledge to the extant literature.

The present study has used RBV (Barney, 1991) and DCV (Teece et al., 1997) and extended the ideas of these two views. With the concept of RBV, we have successfully demonstrated that IT capability, including personnel and infrastructure ability of agribusiness firms, is an in-house

VRIN capability. Similarly, we applied the concept of DCV to show that IT capability can also function as a dynamic ability to integrate the in-house capabilities with the externally sensed and seized opportunities to address the dynamic needs of agribusiness firms.

This study also provides some implications to practitioners, leaders, and policy makers of agribusiness firms. The primary implication is that agricultural firms must improve their IT capability to improve their overall supply chain performance. However, the leaders of these firms, especially in developing countries, should realize that merely investing in IT systems will not sufficiently improve their supply chain management process. They should also emphasize improving their employees' technological skillsets by arranging training sessions to develop their knowledge and efficiency in using modern technologies, which will ultimately improve the supply chain process of their firms. If the leaders and managers of the agribusiness firms also make efforts to modernize the IT infrastructure of their firms, which the skillful and trained employees can use efficiently, their businesses will succeed. Agribusiness firms need to design and execute appropriate strategies helpful for maximizing the returns from IT investment. In the context of improving a supply chain management system, the leader should focus on developing long-term partnerships with upstream and downstream firms of the entire supply chain management system.

Finally, the study has demonstrated that government support will improve the supply chain performance of agribusiness firms. This implies that the relevant government ministries and departments should come forward to help agribusiness firms by granting them adequate incentives, like loans from financial institutions that are easily processed with simple terms and conditions. In this respect, firms will benefit more if the government can act as a facilitator in the disbursement of such loans.

8 Limitations and Future Scope

The results of the present study depended on cross-sectional data, which invites defects of causality among the relationships between the constructs, such as endogeneity errors. To avoid this problem, future researchers should undertake longitudinal studies. The results are based on the analysis of the inputs from respondents in India. This invites external validity issues. Future researchers should consider including respondents in countries around the world so that the results could be more universal in nature. Also, the sample of 312 respondents does not represent the entire population. It is suggested that future researchers should consider including more respondents in the sample size to arrive at a result which has more generalizability.

The study has used DCV, which is criticized for being context insensitive (Ling-Yee, 2007). DCV is unable to identify the accurate conditions under which an agribusiness firm could derive the best supply chain performance from its IT capability (Dubey et al., 2019). It is suggested that future researchers should explore which conditions would be best for agribusiness firms to use their IT capability to improve their supply chain performance. The explanatory power of the proposed theoretical model is 66%. It is suggested that future researchers should consider other constructs and other boundary conditions, for example leadership support and technological turbulence, to verify if their inclusion could enhance the explanatory power of the proposed theoretical model.

References

Agrawal, T. (2012). Vocational education and training in India: Challenges, status, and labour market outcomes. *Journal of Vocational Education and Training, 64*(4), 453–474.

Ali, J. (2016). Performance of small and medium-sized food and agribusiness enterprises: Evidence from Indian firms. *International Food and Agribusiness Management Review, 19*(4), 53–64.

Amit, R., & Schoemaker, P. J. H. (1993). Strategic assets and organizational rent. *Strategic Management Journal, 14*(1), 33–46.

Ansari, S. A., & Khan, W. (2018). Relevance of declining agriculture in economic development of South Asian countries: An empirical analysis. *AGRIS on-Line Papers in Economics and Informatics, 10*(2), 3–14.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management, 17*(1), 99–120.

Barney, J., Wright, M., & Ketchen, D. J. (2001). The resource-based view of the firm: Ten years after 1991. *Journal of Management, 27*(6), 625–641.

Basile, G., Chaudhuri, R., & Vrontis, D. (2021). Digital transformation and entrepreneurship process in SMEs of India: A moderating role of adoption of AI-CRM capability and strategic planning. *Journal of Strategy and Management, 15*(3), 416–433.

Bhattacharjee, K. K., Tsai, C. W., & Agrawal, A. K. (2021). Impact of peer influence and government support for successful adoption of technology for vocational education: A quantitative study using PLS-SEM technique. *Journal of Quality and Quantity, 55*(1), 2041–2064.

Cai, Z., Huang, Q., Liu, H. F., & Liang, L. (2016). The moderating role of information technology capability in the relationship between supply chain collaboration and organizational responsiveness evidence from China. *International Journal of Operations and Production Management, 36*(10), 1247–1271.

Camanzi, L., & Troiano, S. (2021). The evolutionary transformation of modern agri-food systems: Emerging trends in consumption, production, and in the provision of public goods. *Agricultural and Food Economics, 9*(24), 1–14.

Chatterjee, S., Chaudhuri, R., Galati, A., & Vrontis, D. (2021a). Adoption of ubiquitous CRM for operational sustainability of the firms: Moderating role of technology turbulence. *Sustainability, 13*(18), 1–18.

Chatterjee, S., Rana, N., & Dwivedi, Y. K. (2021b). How does business analytics contribute to organizational performance and business value? A resource-based view. *Information Technology & People*. In Press. https://doi.org/10.1108/ITP-08-2020-0603.

Chaudhuri, R. (2022). Supply chain sustainability during turbulent environment: Examining the role of firm capabilities and government regulation. *Operations Management Research, 15*(1), 1081–1095.

Chaudhuri, R., Chatterjee, S., & Vrontis, D. (2022). Digital transformation of the organisations using AI integrated partner relationship management. In A. Thrassou, D. Vrontis, L. Efthymiou, Y. Weber, S. M. R. Shams, & E. Tsoukatos (Eds.), *Business advancement through technology volume I* (Palgrave Studies in Cross-disciplinary Business Research, in Association with EuroMed Academy of Business). Palgrave Macmillan. https://doi.org/10.1007/978-3-031-07769-2_2

Chege, S. M., & Wang, D. (2020). The impact of technology transfer on agribusiness performance in Kenya. *Technology Analysis & Strategic Management, 32*(3), 332–348.

Ding, M. J., Jie, F., Parton, K. A., & Matanda, M. J. (2014). Relationships between quality of information sharing and supply chain food quality in the Australian beef processing industry. *International Journal of Logistics Management, 25*(1), 85–108.

Dubey, R., Gunasekaran, A., Childe, S. J., Blome, C., & Papadopoulos, T. (2019). Big data and predictive analytics and manufacturing performance: Integrating institutional theory and resource based view. *British Journal of Management, 30*(2), 341–361.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39–50.

Fu, S. L., Han, Z. J., & Huo, B. F. (2017). Relational enablers of information sharing: Evidence from Chinese food supply chains. *Industrial Management and Data Systems, 117*(5), 838–852.

Gaitan-Cremaschi, D., Klerkx, L., Duncan, J., Trienekens, J. H., Huenchuleo, C., Dogliotti, S., Contesse, M. E., & Rossing, W. A. H. (2019). Characterizing diversity of food systems in view of sustainability transitions. A review. *Agronomy for Sustainable Development, 39*(1), 1–22.

Gao, Y. Y. (2018). How does Internet information technology promote rural social and economic development. *Modern Economic Research, 4*, 94–100.

Hair, J. F., Jr., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.

Hart, S. L., & Dowell, G. (2011). A natural-resource-based view of the firm: Fifteen years after. *Journal of Management, 37*(5), 1464–1479.

Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., & Calantone, R. J. (2014). Common beliefs and reality about PLS: Comments on Rönkkö and Evermann. *Organizational Research Methods, 17*(2), 182–209.

Hu, L., & Bentler, P. M. (1999). Fit indices in covariance structure modeling: Sensitivity to under parameterized model misspecification. *Psychological Methods, 3*(4), 424–453.

Huggins, C., & Valverde, A. (2018). Information technology approaches to agriculture and nutrition in the developing world: A systems theory analysis of the mNutrition program in Malawi. *Food Security, 10*(1), 151–168.

Hwang, D., Yang, M. G., & Hong, P. (2015). Mediating effect of IT-enabled capabilities on competitive performance outcomes: An empirical investigation of ERP implementation. *Journal of Engineering and Technology Management, 36*, 1–23.

Iqbal, M. A., Iqbal, A., Afzal, S., Akbar, N., Abbas, R. N., & Khan, H. Z. (2015). In Pakistan, agricultural mechanization status and future prospects. *American-Eurasian Journal of Agricultural and Environmental Sciences, 15*(1), 122–128.

Irani, Z., & Sharif, A. M. (2016). Sustainable food security futures perspectives on food waste and information across the food supply chain. *Journal of Enterprise Information Management, 29*(2), 171–178.

Jin, Y., Vonderembse, M., Ragu-Nathan, T. S., & Smith, J. T. (2014). Exploring relationships among IT-enabled sharing capability, supply chain flexibility, and competitive performance. *International Journal of Production Economics, 153*, 24–34.

Katkalo, V. S., Pitelis, C. N., & Teece, D. J. (2010). Introduction: On the nature and scope of dynamic capabilities. *Industrial and Corporate Change, 19*(4), 1175–1186.

Ketokivi, M. A., & Schroeder, R. G. (2004). Perceptual measures of performance: Fact or fiction? *Journal of Operations Management, 22*(3), 247–264.

Kim, H. J. (2017). Information technology and firm performance: The role of supply chain integration. *Operations Management Research, 10*(1/2), 1–9.

Kirwan, J., Maye, D., & Brunori, G. (2017). Acknowledging complexity in food supply chains when assessing their performance and sustainability. *Journal of Rural Studies, 52*, 21–32.

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology, 86*(1), 114–121.

Ling-Yee, L. (2007). Marketing resources and performance of exhibitor firms in trade shows: A contingent resource perspective. *Industrial Marketing Management, 36*(3), 360–370.

Lyapina, I., Sotnikova, E., Lebedeva, O., Makarova, T., & Skvortsova, N. (2019). Smart technologies: Perspectives of usage in higher education. *Interna tional Journal of Educational Management, 33*(3), 454–461.

Malorgio, G., & Marangon, F. (2021). Agricultural business economics: The challenge of sustainability. *Agricultural and Food Economics, 9*(6), 1–4.

Mariyono, J. (2020). Improvement of economic and sustainability performance of agribusiness management using ecological technologies in Indonesia. *International Journal of Productivity and Performance Management, 69*(5), 989–1008.

Mehta, R., Dubinsky, A., & Anderson, R. (2003). Leadership style, motivation and performance in international marketing channels. *European Journal of Marketing, 37*(1/2), 50–85.

Mendoza-Fong, J. R., Garcia-Alcaraz, J. L., Macias, E. J., Ibarra Hernandez, N. L., Diaz-Reza, J. R., & Fernandez, J. B. (2018). Role of information and communication technology in green supply chain implementation and companies' performance. *Sustainability, 10*(6), e1793.

Mesic, Z., Molnar, A., & Cerjak, M. (2018). Assessment of traditional food supply chain performance using triadic approach: The role of relationships quality. *Supply Chain Management—an. International Journal, 23*(5), 396–411.

Migliore, G., Thrassou, A., Crescimanno, M., Schifani, G., & Galati, A. (2020). Factors affecting consumer preferences for "natural wine": An exploratory study in the Italian market. *British Food Journal, 122*(8), 2463–2479.

Mishra, A., Maheswarappa, S. S., Maity, M., & Samu, S. (2018). Adolescent's eWOM intentions: An investigation into the roles of peers, the Internet and gender. *Journal of Business Research, 86*, 394–405.

Nguyen, B. (2021). Value co-creation and social media at bottom of pyramid (BOP). *The Bottom Line, 34*(2), 101–123.

Ngwenyama, O., & Morawczynski, O. (2009). Factors affecting ICT expansion in emerging economies: An analysis of ICT infrastructure expansion in five Latin American countries. *Information Technology for Development, 15*(4), 237–258.

Odongo, W., Dora, M., Molnar, A., Ongeng, D., & Gellynck, X. (2016). Performance perceptions among food supply chain members: A triadic assessment of the influence of supply chain relationship quality on supply chain performance. *British Food Journal, 118*(7), 1783–1799.

Oh, S., Ryu, Y. U., & Yang, H. (2016). Supply chain capabilities and information technology characteristics: Interaction effects on firm performance. In *Proceedings of the 49th annual Hawaii international conference on system sciences* (pp. 1417–1425).

Ojha, D., Sahin, F., Shockley, J., & Sridharan, S. V. (2019). Is there a performance tradeoff in managing order fulfillment and the bullwhip effect in supply chains? The role of information sharing and information type. *International Journal of Production Economics, 208*, 529–543.

Panahifar, F., Byrne, P. J., Salam, M. A., & Heavey, C. (2018). Supply chain collaboration and firm's performance the critical role of information sharing and trust. *Journal of Enterprise Information Management, 31*(3), 358–379.

Patel, P. K., Patel, C. R., Chaitra, G. B., & Patil, C. (2020). Performance of agriclinics and agribusiness centers progra in India–a case of Gujarat. *International Journal of Current Microbiology and Applied Sciences, 9*(2), 1541–1549.

Peng, J., Quan, J., Zhang, G., & Dubinsky, A. J. (2016). Mediation effect of business process and supply chain management capabilities on the impact of IT on firm performance: Evidence from Chinese firms. *International Journal of Information Management, 36*(1), 89–96.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–883.

Rambe, P., & Khaola, P. (2022). The impact of innovation on agribusiness competitiveness: The mediating role of technology transfer and productivity. *European Journal of Innovation Management, 25*(3), 741–773.

Saitone, T. L., & Sexton, R. J. (2017). Agri-food supply chain: Evolution and performance with conflicting consumer and societal demands. *European Review of Agricultural Economics, 44*(4), 634–657.

Sargani, G. R., Deyi, Z., Magsi, H., Noonari, S., Joyo, A., Muhammad, S., & Kazmi, M. (2018). An empirical study of attitude towards entrepreneurial intention among Pakistan and China agricultural graduates in agribusiness. *The International Journal of Business Management and Technology, 2*(5), 21–34.

Shu, C., De Clercq, D., Zhou, Y., & Liu, C. (2019). Government institutional support, entrepreneurial orientation, strategic renewal, and firm performance in transitional China. *International Journal of Entrepreneurial Behavior & Research, 25*(3), 433–456.

Singh, S. (2019). Examining global competitiveness of Indian agribusiness in the twenty-first-century Asian context: Opportunities and challenges. *Millennial Asia, 10*(3), 299–321.

Sun, X. W., & Bao, J. L. (2011). Study on e-commerce development model of modern agriculture-take Suzhou as an example. In *Tenth Wuhan international conference on E-Business*, Wuhan, I(II), 276–280.

Teece, D. J. (2012). Dynamic capabilities: Routines versus entrepreneurial action. *Journal of Management Studies, 49*(8), 1395–1401.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509–533.

Thrassou, A., Vrontis, D., Efthymiou, L., & Uzunboylu, N. (2022a). An Overview of Business Advancement through technology: Markets and marketing in transition. In A. Thrassou, D. Vrontis, L. Efthymiou, Y. Weber, S. M. R. Shams, & E. Tsoukatos (Eds.), *Business Advancement through technology volume I* (Palgrave Studies in Cross-disciplinary Business Research, in Association with EuroMed Academy of Business). Palgrave Macmillan. https://doi.org/10.1007/978-3-031-07769-2_1

Thrassou, A., Vrontis, D., Efthymiou, L., & Uzunboylu, N. (2022b). An Overview of Business Advancement through technology: The changing landscape of work and employment. In A. Thrassou, D. Vrontis, L. Efthymiou, Y. Weber, S. M. R. Shams, & E. Tsoukatos (Eds.), *Business advancement through technology volume II* (Palgrave Studies in Cross-disciplinary Business Research, in Association with EuroMed Academy of Business). Palgrave Macmillan. https://doi.org/10.1007/978-3-031-07765-4_1

Wamba, S. F., Gunasekaran, A., Akter, S., & Dubey, R. (2019). The performance effects of big data analytics and supply chain ambidexterity: The moderating effect of environmental dynamism. *International Journal of Production Economics, 222*(4), 107498.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal, 5*(2), 171–180.

Wu, J. H., Zhang, X. F., & Lu, J. J. (2018). Empirical research on influencing factors of sustainable supply chain management—evidence from Beijing. *China. Sustainability, 10*(5), 1595–1605.

Yan, B., Yan, C., Ke, C. X., & Tan, X. C. (2016). Information sharing in supply chain of agricultural products based on the Internet of Things. *Industrial Management and Data Systems, 116*(7), 1397–1416.

Zeng, M., & Lu, J. (2021). The impact of information technology capabilities on agri-food supply chain performance: The mediating effects of interorganizational relationships. *Journal of Enterprise Information Management, 34*(6), 1699–1721.

Zeren, F., & Akkus, H. T. (2020). The relationship between renewable energy consumption and trade openness: New evidence from emerging economies. *Renewable Energy, 147*, 322–329.

Zhou, S. H., & Wan, G. H. (2017). The impact of E-Business on supply chain performance of manufacturing enterprises: An empirical study from information integration perspective. *Management Review, 29*(1), 199–210.