



## **JOURNAL OF TECHNOLOGY AND OPERATIONS MANAGEMENT**

<http://e-journal.uum.edu.my/index.php/jtom>

How to cite this article:

Idris, S., Weli, A. N., Lasuin, C. A., Samsu, S. H., & Lajuni, N. (2021). Thinking About Integrated Supply Chain Technology As An Enabler For Local Businesses? *Journal of Technology and Operations Management*, 16(2), 23–33.  
<https://doi.org/10.32890/jtom2021.16.2.3>

### **THINKING ABOUT INTEGRATED SUPPLY CHAIN TECHNOLOGY AS AN ENABLER FOR LOCAL BUSINESSES?**

**<sup>1</sup>Sidah Idris, <sup>2</sup>Al Nasrie Weli, <sup>3</sup>Charlie Albert Lasuin, <sup>4</sup>Siti Hajar Samsu, & <sup>5</sup>Nelson Lajuni**

<sup>1,2,3,4,5</sup> Universiti Malaysia Sabah (UMS), Kota Kinabalu Sabah, Malaysia

*Corresponding author:* [syaidah@ums.edu.my](mailto:syaidah@ums.edu.my)

Received: 24/08/2021 Revised: 20/10/2021 Accepted: 19/11/2021 Published: 29/12/2021

#### **ABSTRACT**

Business activities were significantly hampered when the Movement Control Order (MCO) was issued in response to the COVID-19 epidemic. The ramifications of these MCO series have a direct and indirect impact on the bulk of company activities. As a result of the economic crisis, it triggered a severe depression. As a result, they looked for additional ways to maintain and extend their activities, including using the Internet as a means of conducting business. The goal of this research is to determine the value of the innovative value chain as well as the role of integrated supply chain technology in improving the efficiency of enterprises' supply chains. Standardized questionnaires were provided to local business owners in three major divisions of Sabah, namely Kota Kinabalu, Sandakan, and Tawau in order to achieve this purpose. The survey got 125 usable replies from large, medium, and small enterprises that have been in existence for more than ten years. The main findings of three variables, namely idea generation, concept conversion, and diffusion of innovation, encouraged SCT adoption among Sabah's small businesses. The interaction effect revealed that Integrated SCT does, in fact, act as a mediating component in the financial performance relationship. As a result, COVID-19 is a game changer for everyone particularly local businesses and governments because the outbreak pushed the implementation of information technology, such as supply chain integration.

**Keywords:** Supply chain, local business, MCO

## **INTRODUCTION**

Without a doubt, the Coronavirus disease, also known as COVID-19, has flipped the world on its head, causing global upheavals in human civilisation and its domains. The COVID-19 pandemic is unprecedented in terms of the volume and scope of the infection's impact on worldwide activities, particularly on industry, business, and commerce, resulting in a catastrophic global economic slump (World Bank Report, 2020). Furthermore, the Asian region entered a lethal pandemic scenario when it enacted a plethora of new rules and regulations that had a significant impact on both the micro and macro settings, notably in terms of political, economic, social, technological, and legal contexts.

The pandemic has accelerated the adoption of new lifestyle norms in Malaysia, such as keeping a safe distance from others, avoiding crowds, wearing face masks, using hand sanitizer, and wearing gloves when purchasing certain products. Before entering any commercial or non-commercial location, visitors must check their body temperature, scan the MySejahtera App, wear a face mask, and sanitise their hands. These are included in the Malaysian government's new standard operating procedure for containing the COVID-19 epidemic. Indeed, the movement control orders enforcement affects five critical business areas: finance, customer service, technology, supply chain, and human resources. Local distribution channels, particularly those of significant and publicly traded enterprises as well as SMEs, ran into problems with fulfilment and delivery, receiving supplies, and inventory management, prohibiting them from carrying out their responsibilities during the lockdown (Grigsby and Leffew, 2016).

Malaysia has experienced a significant economic impact as a result of COVID-19. In a horror film, the virus is presented as a vigilante killer. The pandemic has become a global health crisis, hindering economic progress in several nations and killing a large number of people, particularly the elderly. Malaysia adopted MCO as a tactic to limit human access to their daily routines and homes in order to combat COVID-19. The impact of the COVID-19 and MCO on small business owners and self-employed individuals is projected to be significant in Malaysia, particularly in Sabah. Entrepreneurs were forced to take extraordinary measures in order to preserve their existing and future business possibilities (Idris et al., 2020). Despite the global epidemic, Malaysians, particularly Sabahans, can retain their economic livelihoods thanks to the most recent technology revolution, dubbed digitalization. However, because of Sabah's limited Internet development (Lee, 2021), this will become a barrier to successful commercial activity and its long-term viability.

Managers had plenty of reason to distrust their ability to effectively predict probable technological, economic, and sociological advancements, as well as potential changes in corporate competitiveness, throughout the epidemic (Idris, et al, 2020). In order for local firms to stay in business, Internet access must be stable, affordable, and secure so that they may do online business and e-commerce. Furthermore, both internet business and e-commerce provide a competitive advantage to local enterprises, particularly small farmers. This study intends to explore the impact of innovative value chains and the mediating roles of integrated supply chain technology in increasing business performance in Sabah, based on a scenario of economic slowdown due to the Covid-19 epidemic. An integrated supply chain technology (SCT) is an alternative media in this era of the Covid19 epidemic and digitalization economics. Furthermore, both internet business and e-commerce provide a competitive advantage to local enterprises, particularly small farmers (Lim, 2020). The impact of this innovation value chain study on the performance of local firms in Sabah, particularly during the MCO and Covid-19 pandemics has a lot of potential to help establish policies and regulations for Sabah and Malaysia.

## **LITERATURE REVIEW**

Information technology (IT) is the point of entry into a supply chain's operations. IT enables providers to communicate with customers throughout the supply chain. Traditional supply chains have transformed into end-to-end technology-based delivery networks with a focus on customer satisfaction (Chopra and Meindl, 2006). From back office to operational, operational to strategic, and

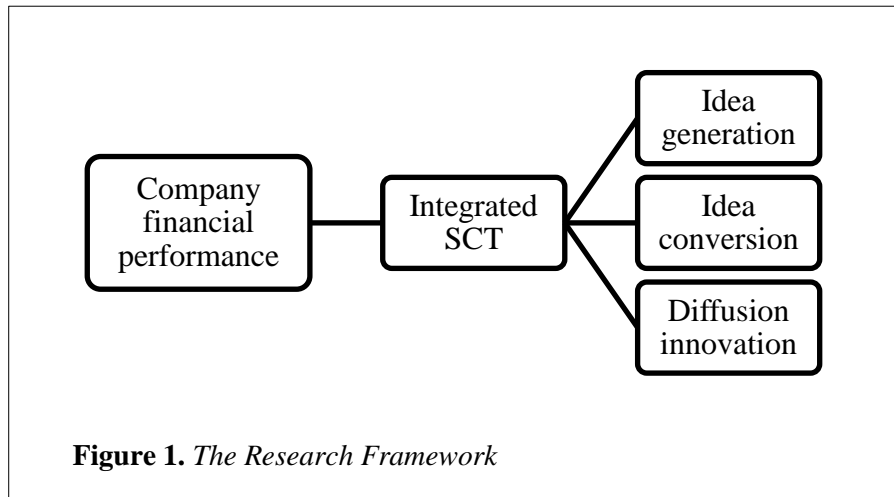
strategic to infrastructure functions, IT has developed. Organizations rely on the use of IT throughout the supply chain to govern processes (Omar et al., 2020). IT enables businesses to collaborate internally as well as with suppliers, customers, and other stakeholders (Modgil and Sharma, 2017).

When supply chains for local companies, particularly SMEs in Malaysia, have been affected by the COVID-19 pandemic, it is critical for local companies to build innovative supply chain strategies in order to win prevention against COVID-19. Managers should aim to integrate the supply chain with Internet technology to ensure that all tasks and activities in the chain are synchronised (Ben-Daya et al., 2019). Supply chain management tries to bring together the supplier, distributor, and customer into a unified process through the use of Internet technologies.

The importance of sharing information, ideas, expertise, and technology is specified as part of the supply chain input-output process paradigm (Modgil and Sharma, 2017). A supplier gives a company with a lot of data, which helps the company take the right steps to increase profits even more (Lettice et al., 2010). The impact of information quality on supply chain management (SCM) is determined by what information is exchanged, where, when, and how it is transmitted, as well as with whom it is exchanged (Holmberg, 2000). The convergence of various production and distribution phases in a way that adds value to the product at each stage by attaining process specialisation and quality improvement is referred to as a value chain. When the innovation process is combined with the value chain, a "innovative industrial chain and value chain model" emerges, allowing creativity to be expressed in three stages: inspiration, conversion, and execution, or idea creation, conversion, and diffusion (Bai et al., 2020).

Firstly, idea generation is a self-explanatory term that refers to the process of discovering or developing innovative ideas. New ideas can be developed internally (inside groups or organisations), through cross-unit collaboration, or externally, according to Hansen and Birkenshaw (2007). To gain a company's competitive edge in the market, idea generation emphasises the proactive development and acquisition of fresh ideas from both the internal and external surroundings. Idea generation or collaborative knowledge sourcing for innovation development might take place within a firm unit, between units, or from an external source (Roper et al., 2018). The process of converting new ideas into innovations is known as idea conversion as a second value chain innovation. According to Hansen and Birkenshaw (2007), organization should coordinate the selection and funding of these ideas for further development. This is referred to as the selection process. The process of developing ideas into new products or services, known as development.

It is critical for managers to adequately handle innovative ideas after they have been developed. Identifying and screening the greatest idea and putting it into practise, including budget needs, is a part of conversion (Hansen and Birkinshaw, 2007). To generate innovation, conversion typically necessitates knowledge transformation, which might include new procedures, services, or organisational types. During this phase, multi-skill groups and various forms of external collaborators may be used to develop inventions (Roper and associates, 2008). Thirdly, diffusion is the process of spreading developed ideas inside and outside of an organisation. To promote and provide new products, services, processes, and activities across geographic areas, consumer groups, and platforms, companies must first understand their distinctive networks (Hansen and Birkinshaw, 2007). Client engagement, branding, and intellectual property management are all common activities. Figure 1 showed the research framework in this study.



## METHODOLOGY

Purposive sampling was used in a cross-sectional study, with structured questionnaires aimed at local businesses in three (3) major districts in Sabah. In this study, the innovation context refers to the company's relevant technologies. This encompasses both present and emerging technologies that are useful to the company (Idris et al., 2020). A pilot study with 30 respondents was conducted in Kota Kinabalu, Sabah to improve the questionnaire and eliminate bias and prejudice. Before the actual sampling was done to the target population, the comments received were regarded useful insights. Local companies from diverse fields of activities, whether macro, medium or micro, in three major districts in Sabah, were the study's target population. Kota Kinabalu, Sandakan and Tawau were chosen as the three major districts of Sabah because of their significant economic contributions to the state in general (Statistics of Sabah, 2020).

A list of sample responders was compiled using information from the Kota Kinabalu City Hall (DBKK), Sandakan Municipal Council, Tawau Municipal Council, trade agencies, local business associations, and on-site visits. The information was acquired in two ways: an on-site survey and a Google form, with the results being analysed using SPSS and SmartPLS. The possibility of common method variance was investigated in this study (Podsakoff, MacKenzie, Lee and Podsakoff, 2012). This study employed two approaches to assess common method variance. The first test involved doing a factor analysis without rotation in SPSS to perform a Harman single factor. The result showed only 46.651 percent of the variance makeup in the first construct was less than the cut-off value of 50 percent, indicating that common method variance did not exist in this study (Hair et al., 2016). In this analysis, four direct relationships and three indirect relationships developed. Based on the hypothesis development it is suggested as follows:

- H1: Idea generation has a positive influence on financial performance.
- H2: Idea conversion has a positive influence on financial performance.
- H3: Idea diffusion has a positive influence on financial performance.
- H4: Integrated SCT has a positive influence on financial performance.
- H5: Idea generation has a positive influence on financial performance mediated by Integrated SCT.
- H6: Idea conversion has a positive influence on financial performance mediated by Integrated SCT.
- H7: Idea diffusion has a positive influence on financial performance mediated by Integrated SCT.

## RESULTS AND DISCUSSION

### *Respondent's Profile*

In this study, 125 usable respondents used feedback. This study's respondent profile is shown in Table 1. Most businesses have been classified as Macro, medium or micro for more than ten years.

Table 1

Respondent's Profile

Item	Frequency	Percentage
<b>Position</b>		
Owner	25	20.0
Manager	27	21.6
Employee	70	56.0
Others	3	2.4
Total	125	100.0
<b>Years Holding the Position</b>		
Less than 5 years	62	49.6
6 - 10 years	39	31.2
11 - 15 years	20	16.0
More than 15 years	4	3.2
Total	125	100.0
<b>Period in Operation</b>		
Less than 1 year	11	8.8
1 - 5 years	34	27.2
6 - 10 years	14	11.2
More than 10 years	66	52.8
Total	125	100.0
<b>Type of Business</b>		
Services	46	36.8
Credit	2	1.6
Consumer	37	29.6
Agriculture (including Fishery and Livestock)	12	9.6
Transport	3	2.4
Construction	2	1.6
Manufacturing	11	8.8
Others	12	9.6
Total	125	100.0

### *Assessment of Measurement Model*

This study examined the construct reliability (CR) and convergent validity testing as demonstrated in Table 2. The findings reveal that the variables under study have high internal consistency (Roldán and Sánchez-Franco, 2012) and an acceptable average variance extracted (AVE) to corroborate the convergent validity. Nearly all indicators show satisfactory loadings' values that are consistent with the threshold value of 0.708, as suggested by Hair et al. (2017). To avoid AVE violating the minimum value of 0.500, seven indicators (IG5 and IG6) were deleted (Hair et al., 2017). This implies the average variance extracted (AVE) for each construct was more than 0.5. As a result, both constructs have adequate convergent validity, as the indicators can explain more than 50% of the variance in the constructs. Financial Performance (FP) was 0.952 (CA), and 0.960 (CR), Idea Conversion (IC) was

0.858 (CA), and 0.903, Idea Generation (IG) was 0.834 (CA), and 0.879, Innovation Diffusion (ID) was 0.865 (CA), and 0.917, (CR), and Integrated SCT (IT) was 0.925 (CA), and 0.942 (CR), respectively.

Table 2

Measurement Model Assessment

Construct	Item	Loadings	CA	CR	AVE	CV (Ave > 0.5)
Financial Performance	FP1	0.749	0.952	0.960	0.752	Yes
	FP2	0.718				
	FP3	0.775				
	FP4	0.939				
	FP5	0.936				
	FP6	0.927				
	FP7	0.939				
	FP8	0.914				
Idea Conversion	IC1	0.835	0.858	0.903	0.701	Yes
	IC2	0.842				
	IC3	0.868				
	IC4	0.801				
Idea Generation	IG1	0.747	0.834	0.879	0.551	Yes
	IG2	0.826				
	IG3	0.824				
	IG4	0.769				
	IG5	0.614				
	IG6	0.646				
Innovation Diffusion	ID1	0.899	0.865	0.917	0.787	Yes
	ID2	0.903				
	ID3	0.858				
Integrated SCT	IT1	0.879	0.925	0.942	0.766	Yes
	IT2	0.890				
	IT3	0.851				
	IT4	0.860				
	IT5	0.896				

*\*No item was deleted as loading Composite Reliability > .708 (Hair et al., 2017)*

The HTMT criterion is used to evaluate discriminant validity, as indicated in Table 3. Using Henseler's (2015) heterotrait-monotrait ratio of correlations criterion, the results suggest that the discriminant validity was well-specified at HTMT0.85 (Diamantopoulos and Siguaw, 2006). Because the findings imply that the correlation values for the various constructs follow the most conservative criterion, the discriminant validity issue is unimportant (HTMT.85). It is appropriate to proceed with the structural model evaluation to analyse the study's hypotheses because there is no issue of multicollinearity between items loaded on different constructs in the outer model.

Table 3

HTMT Criterion

	Financial Performance	Idea Conversion	Idea Generation	Innovation Diffusion	Integrated SCT
Financial Performance					
Idea Conversion	0.392				
Idea Generation	0.386	0.731			
Innovation Diffusion	0.521	0.550	0.472		
Integrated SCT	0.523	0.367	0.276	0.450	

**Assessment of Structural Model**

The structural model is then evaluated by performing a 5000-bootstrap resampling of data to test the hypotheses (Hair et al., 2017). The Beta values for the route coefficients H1 and H2 in Table 4 reveal that idea generation ( $\beta = 0.122$ ,  $p = 0.108$ , LLCI = -0.056, ULCI = 0.268) and idea conversion ( $\beta = 0.047$ ,  $p = 0.294$ , LLCI = -0.099, ULCI = 0.188) did not support the relationship to financial performance. H3 the innovation diffusion, on the other hand, has a positive relationship on financial performance ( $\beta = 0.240$ ,  $p = 0.004$ , LLCI = 0.089, ULCI = 0.390). Finally, H4 the integrated SCT ( $\beta = 0.387$ ,  $p = 0.000$ , LLCI = 0.266, ULCI = 0.517) has a positive impact on the organization's financial performance.

Table 4

Path Coefficients

Direct Effects	Beta	S.E.	t-value	P-value	LLCI	ULCI	Result
H1: Idea Generation -> Financial Performance	0.122	0.098	1.238	0.108	-0.056	0.268	Not Supported
H2: Idea Conversion -> Financial Performance	0.047	0.087	0.541	0.294	-0.099	0.188	Not Supported
H3: Innovation Diffusion -> Financial Performance	0.240	0.091	2.627	0.004	0.089	0.390	Supported
H4: Integrated SCT -> Financial Performance	0.387	0.077	5.015	0.000	0.266	0.517	Supported

*Path Coefficient 0.01, 0.05 (Hair et al., 2017)*

Table 5 displays the model quality assessment. The effect size ( $f^2$ ) on the coefficient of determination ( $R^2$ ) in this study was tested. As evidenced by  $f^2 = 0.121$ , Innovation Diffusion has a medium effect size  $f^2$  on Financial Performance (Cohen, 1988). As a result, Innovation Diffusion appears to be a significant factor influencing Financial Performance. As evidenced by  $f^2 = 0.192$ , Integrated SCT has

a medium effect size  $f^2$  on Financial Performance (Cohen, 1988), showing that it is a major construct to influence Financial Performance.  $R^2$  is a coefficient of determination that explains if Idea generation, Idea conversion, and Innovation Diffusion can all be used to describe Integrated SCT. Financial performance had an  $R^2$  value of 0.203, indicating that these constructs moderately explain Financial Performance (Chin, 1998).  $R^2$  represents the coefficient of determination, which demonstrates if Idea production, Idea conversion, and Innovation Diffusion can reveal Financial Performance. Financial performance has an  $R^2$  value of 0.379, indicating that these constructs significantly explain Financial Performance (Chin, 1998).

Multicollinearity between indicators was measured as well. The indicators satisfied the VIF value, and there were consistently below the threshold value of 5.0 (Hair et al., 2014) and 3.3 (Diamantopoulos and Siguaw, 2006). As a result, collinearity issues for both variables did not reach the threshold values, and hence are not an issue for the estimation of the PLS path model. The predictive relevance values for the dependent variable are moderate, with values of 0.129 and 272, indicating that Idea generation, Idea conversion, and Innovation Diffusion are powerful predictors of Integrated SCT and Financial Performance among SMEs in Malaysia, as presented by Q2 using the blindfolding procedure (Hair et al., 2017).

Table 5

Model Quality Assessment

Direct Effects	$f^2$	$R^2$	VIF	Q2
H1: Idea Generation -> Financial Performance	0.000	<b>0.379</b>	1.628	<b>0.273</b>
H2: Idea Conversion -> Financial Performance	0.034		1.805	
H3: Innovation Diffusion -> Financial Performance	0.061		1.449	
H4: Integrated SCT -> Financial Performance	0.192		1.254	

$f^2 \geq 0.35$  consider Substantial (Cohen, 1988)

$R^2 \geq 0.26$  consider Substantial (Cohen, 1989)

Lateral Collinearity:  $VIF \leq 3.3$  (Diamantopoulos and Siguaw, 2006) or  $\leq 5.0$  (Hair et al., 2017)

$Q^2 > 0.00$  consider large (Hair, 2017)

$0.02 \leq Q^2 < 0.15$ : weak predictive power

$0.15 \leq Q^2 < 0.35$ : moderate predictive power

$Q^2 \geq 0.35$ : strong predictive power

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , Bias Corrected, LL=Lower Limit, UL=Upper Limit

**Assessment of Mediation Effect of Integrated SCT**

Table 6 shows the result of the mediating effect of Integrated SCT assessment. The result of interaction effect as can be seen indicating that H5 ( $\beta = 0.006$ ,  $t = 0.151$ ,  $p = 0.880$ ) suggesting that the mediating effect of Integrated SCT towards Financial Performance relationship is not supported. The H6 ( $\beta = 0.073$ ,  $t = 1.649$ ,  $p = 0.099$ ) of mediating effect between integrated SCT in idea conversion towards financial performance relationship is also not supported. This finding supported Smit's (2015) research on product marketing based on unique ideas created both inside and outside the organisation. As a result, businesses can discover appropriate communities within the organisation to promote and spread new goods, services, processes, and practises across regions, client groups, and distribution channels (Hansen and Birkinshaw, 2007). This phase includes numerous aspects of customer involvement, as well as internal branding expenditures and the use of intellectual property rights as a reputation management tool (Roper, Du, and Love, 2006). However, H7 ( $\beta = 0.123$ ,  $t = 2.783$ ,  $p = 0.005$ ) supported the hypothesis that integration SCT mediated the innovation diffusion and financial performance of the organization. This is an evidence how integrated SCT can help the organization on how good they are



in diffusing generated ideas inside or outside the organization to the relevant communities (Idris et al., 2020; Taghizadeh, 2014).

Table 6

Mediation Assessment

Mediating Effects	Beta	S.E.	t-value	p-value	LLCI	ULCI	Result
H5: Idea Generation -> Integrated SCT -> Financial Performance	0.006	0.042	0.151	0.880	-0.099	0.078	Not Supported
H6: Idea Conversion -> Integrated SCT -> Financial Performance	0.073	0.044	1.649	0.099	0.004	0.186	Not Supported
H7: Innovation Diffusion -> Integrated SCT -> Financial Performance	0.123	0.044	2.783	0.005	0.052	0.231	Supported

*Path Coefficient 0.01, 0.05 (Hair et al., 2017)*

**CONCLUSION**

COVID-19 is a global pandemic that has killed millions of people. The pandemic, on the other hand, is seen as a glimpse into the future of human society. Optimistically, COVID-19 is a game changer for everyone, especially local businesses, because the pandemic pushed the essential function of information technology to the forefront of assisting commercial activities like supply chain integration. Indeed, the traditional brick-and-mortar model has been supplanted by a click-and-mortar model that engages customers or stakeholders through online platforms. Even while the epidemic prevents individuals from meeting in person, local businesses can reach out to potential customers through online supply chain integration. Local firms in Sabah were using supply chain management integration with the goal of sustaining and revitalising their business and achieving business performance.

Surprisingly, the findings also reveal that these local businesses in Sabah are sticking to their plans to integrate technology into supply management in order to reach clients who are staying at home during the pandemic. Furthermore, this study supports the DoI theory in understanding the dissemination of innovation among local enterprises during the Covid-19 epidemic and the Movement Control Order (MCO) in Sabah from a theoretical standpoint. The practical value of this study is that it demonstrates the importance of training corporate managers to be creative and original in order for the company to survive in any situation. However, the findings of this study are limited to a single state and cannot be applied to other Malaysian states. Future research could look on the differences and similarities in the determinants of SCT adoption in Sabah across various industries. In addition, this study's practical importance is that it highlights how important it is to encourage managers to be creative and innovative in order to ensure the company's survival in any circumstance. However, because this research was conducted in a single state, it cannot be applied to other Malaysian states. Future research should be carried out in a variety of industries across Sabah to determine the similarities and differences in the factors that influence SCT adoption. Therefore, from this study the pandemic is a wake-up call to the government to uphold the Internet development in Sabah as to encourage the usage of digitalization, online marketing, social media platform and integrated supply chain SCT to local enterprises for their business sustainability in competing into the bloody red ocean market.

## ACKNOWLEDGMENT

This study funded under SDK0211/2020 The Impact of Innovative Value Chain in Facing The COVID-19 Pandemic: Enhancing Local Businesses Performance in Sabah. Thank you to Centre of Research and Innovation, UMS.

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