CrossMark

The Impact of Power on the Relationships and Customer Satisfaction in a Logistics Triad: A Meta-Analysis

Ja Yeon LEE[a], Su Han WOO[b]

[a] Graduate School of Trade and Logistics, Chung-Ang University, Korea, E-mail: jylee@kmi.re.kr
[b] Graduate School of Trade and Logistics, Chung-Ang University, Korea, E-mail: shwoo@cau.ac.kr(Corresponding Author)

A R T I C L E   I N F O

A B S T R A C T

It is necessary for TPL firms to understand the source of power and the relationship between buyers and suppliers so that they can improve logistics performance and customer satisfaction. This paper uses a meta-analysis to assess the effect of power on the relationships and customer satisfaction in a logistics triadic relationship. A meta-analysis is useful to systemically synthesize the research findings from the existing literature. The causal relationships between power, relationship and customer satisfaction from the SCM and logistics literature are statistically assessed. Based on the review and analysis, the framework may provide significant implications for supply chain relationships in logistics. This may be the first attempt to analyse the impact of power on the relationship and customer satisfaction in a logistics triad through a meta-analysis. The results of this study will provide useful research information that other researchers can use.

1. Introduction

Multinational production network systems have been established as a strategy to secure and maintain corporate competitive advantages to respond to increased global market competition, diversified consumer demand and continued uncertainty. In addition, it has become the norm for manufacturing companies to focus on their core business and outsource other functions. These changes increase dependence on companies in supply chains and recognise the importance of managing supply chains effectively (Woo et al., 2013). Relationships among firms in a supply chain form an important dimension in understanding a supply chain since its essential characteristics may be its organizational relationships (Skjott et al., 2007). Various forms of relationships can emerge in the supply chain, ranging from traditional arm's-length relationships to strategic partnerships (Ellram and Cooper, 1990). Strategic partnerships have been suggested for effective supply chain management recognizing interdependence among supply chain partners, whereas traditional arm's-length relationships limit long-term relationship

in the supply chain (Ellram and Cooer, 1990). It is suggested that power source has influence on relationship development in the supply chain which has been well studied (Maloni and Benton, 2000; Benton and Maloni, 2005).

When logistics services are outsourced to third-party logistics (TPL) firms, services are provided to meet the demand of logistical functions within or between firms in supply chains. An argument is that logistics services should be provided depending on the relationship with customers (Bask, 2001). While standardized general services have advantages for moderate relationships, customized TPL services are suggested for close partnership settings (Makelin and Vepsalainen, 1990; Bask, 2001). However, the existing literature is in the contextual setting of a dyadic relationship, which considers the relationship between either supplier and TPL provider or buyer and TPL, whereas it is suggested that the minimum unit of analysis in TPL studies should be the logistics triad that considers buyer, supplier, and TPL firms (Sohn et al., 2017). In the logistics triad, relationships not only between supplier or buyer and TPL firms but also between supplier and buyer are considered, as shown in Figure 1. Therefore, the relationship between supplier and buyer is considered in the discussion of matching logistics services and customer relationships in the logistics triadic setting. From the TPL firms' perspective, it is important to understand the causal relationships between power and relationship and customer satisfaction so that they can develop appropriate logistics services for supply chains with different types of relationships.
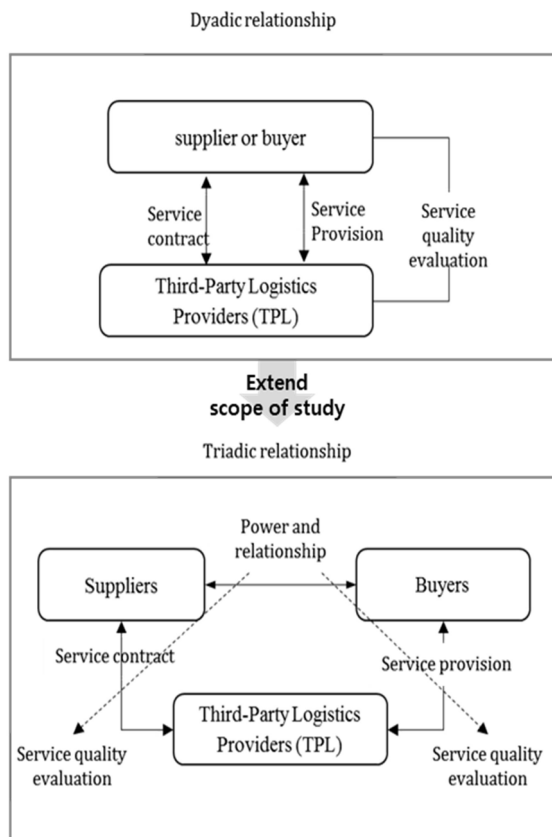

Fig. 1. Relationships in a logistics triad
Source: Authors' drawing using Selviaridis and Spring (2007)

Meta-analysis is a useful quantitative approach to synthesize the result of a series of studies (Brockwell and Gordon, 2000; Orlitzky et al., 2003). The method focuses on the effect size of causal links by combining the estimates of effect size from each study to obtain the average effect size (Glass, 1976). This approach is also related with the generalizability of research findings by examining the relationship regarding variations in research outcomes. There have been studies on the examination of the impact of power source on relationship development and performance in the supply chain. Reviewing and synthesizing the causal relationship by combining the effect size of such studies is essential to assess the generalizability of the findings with confidence. On the other hand, it is also important to investigate the influence of the study characteristics on the research outcome, for example studies in different industries, countries, and research time (Hunter and Schmidt, 2000). Therefore, this study conducts meta-analysis on the existing studies that empirically examined the causal relationships. To this end, the relevant studies in the supply chain literature are identified through searching research databases and the information necessary for meta-analysis is collected. The result of the meta-analysis will be the theoretical foundation for setting the research model in follow-up research and will serve as useful research information for other researchers.

2. Theoretical backgrounds and research framework

2.1. *Power concepts and causal link*

Understanding the supply chain relationship from the perspective of 'power regime' has been well studied in the early 2000s (Cox, 1999; Cox, 2001; Cox et al., 2001). These studies provide a conceptual framework suggesting that the perspective of power regimes should be adopted because values are variably allocated in the extended dyadic exchange networks, which is the supply chain depending on properties of power in the networks (Cox et al., 2001). Based on the analytical framework, various case studies are conducted in multiple-industries (Cox et al., 2004); the fashion industry (Hines and McGowan, 2005), the food industry (Hingley, 2005a; 2005b; 2005c; Kähkönen, 2014) and the smartphone industry (Chen and Wang, 2015). These studies generally explore the origins and features of power and it influence on supply chain practices such as integration and collaboration (Kähkönen, 2014; Meehan and Wright, 2011; 2012).

Accordingly, empirical examination of the impact of power on relationship development and performance has drawn attention from SCM researchers (Maloni and Benton, 2000; Benton and Maloni, 2005). As shown in Table 1, the literature classified power into five types depending on its sources (Weiling et al., 2009; Chang, 2009). It is suggested that the relationship between the companies in supply chains stems from a disparity of power and partner companies' ability (Hart and Saunders, 1998). Companies need to be aware of the sources, imbalances and consequences of supply chain partners' power. In order to exercise the proper power, cooperation among members of the supply chain should be established. Several scholars have tried to study the various types of power, relationships and performance.

Table 1
Definition of Power

Classification	Power Base	Definition
Mediated	Reward	'Reward power depends on the ability of the power holder to administer positive valences and to remove or decrease negative valence' (French & Raven, 1959: 156). "Source retains ability to mediate rewards to target" (Maloni &Benton, 2000).
	Coercive	'Coercive power stems from the expectation on the part of the power recipient that he will be punished by the power holder if he fails to conform to the influence attempt' (French & Raven, 1959: 157). 'Source holds ability to mediate punishment to target' (Maloni &Benton, 2000).
	Legitimate	'Target values identification with source' (Maloni & Benton, 2000). 'Legitimate power is defined as that power which stems from internalized values in the power recipient which dictate that the power holder has a legitimate right to influence the power recipient and that the power recipient has an obligation to accept this influence' (French & Raven, 1959: 159). 'Target believes source retains natural right to influence' (Maloni & Benton, 2000).
Non-mediated	Expert	'The strength of expert power varies with the extent of the knowledge or perception which the power recipient attributes to the power holder within a given area' (French & Raven, 1959: 163). 'Source has access to knowledge and skills desired by target' (Maloni &Benton, 2000).
	Referent	'Referent power has its basis in the identification of the power recipient with the power holder' (French & Raven, 1959: 161).

Since companies can't compete as independent entities, intercompany partnerships are important for successful supply chain management and internal and external relationship management is important (Lambert and Cooper, 2000). As shown in Figure 2, the relationship can be developed in the form of trust, cooperation, and conflict and the relationship has influence on firm and supply chain performance. There has been an increasing number of empirical studies examining the causal relationships.
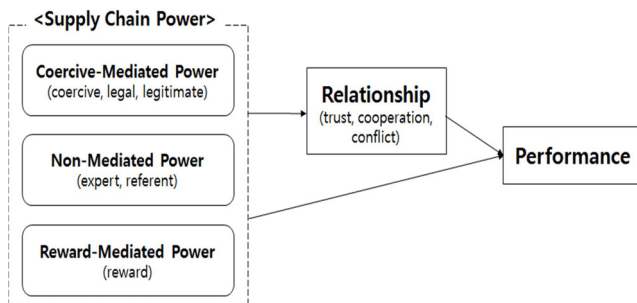

Fig. 2. Research framework

2.2. *Mata-analysis literature in SCM research*

Over the last two decades, several papers have reviewed the SCM research (e.g., Skjoett-Larsen, 1999; Chen and Paulraj, 2004; Sachan and

Datta, 2005; Burgess et al., 2006; Ballou, 2007; Srivastava, 2007; Seuring and Gold, 2012; Carter and Liane Easton, 2011). These studies review research themes, approaches and methodologies used in the SCM literature and suggest a general future research agenda (e.g., Skjoett-Larsen, 1999; Chen and Paulraj, 2004; Ballou, 2007). Some studies used a more systemic review approach by categorising the sample literature by research philosophy, topics, methods, and so on (e.g., Sachan and Datta, 2005; Burgess et al., 2006). Srivastava (2007) and Carter and Liane Easton (2011) focus on particular research areas such green and sustainable supply chain management. Furthermore, some review studies address methodological issues such as validity assessment and its criteria in structural equation modelling (Kaynak and Hartley, 2008) and common method variance in survey studies (Craighead et al., 2011).

On the other hand, Goldsby and Autry (2011) suggest that meta-analytic techniques should be used in SCM research so that findings can be synthesized and applied by researchers and practitioners with more confidence. Meta-analysis has been used in various research areas where findings from the individual studies are inconsistent or conflicting (Damanpour 1991; Datta et al. 1992; Hunter and Schmidt, 1990). Subsequently meta-analyses are conducted in SCM research: sustainable SCM and firm performance (Golicic and Smith, 2013), inter-organisational trust and supply chain relationships (Delbufalo, 2012), and supply chain integration and firm performance (Leuschner et al., 2013). With the increase of the empirical examination of power-relationship-performance links, it is worthwhile synthesizing the research findings from the literature.

3. Research methodorogy

In this section, we first describe sample selection and explain the coding of the studies. We then detail the meta-analytic procedures that were used to test the hypotheses.

3.1. *Sample selection*

This study searched Google Scholar, Emerald Management Xtra (EMX), Wiley Online Library (WOL), and JSTOR to collect the existing studies on power and relationship in the supply chain research. We used keywords such as supply chain, power, logistics, relationship, and performance and identified 41 papers. The studies that did not include empirical hypotheses testing were subsequently excluded and those that used power as independent variables in the causation remained in the dataset, as shown in Figure 3. The earliest paper was published in 1995 and the latest in 2017.
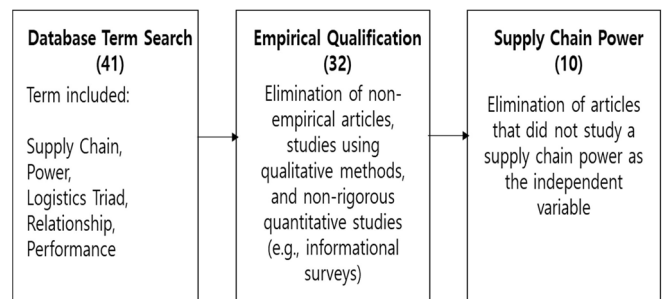

Fig. 3. Review process for supply chain power

Table 2
Green Summary of sample data

Authors	Independent Variable	Dependent Variable	n	No. of r's
Benton and Maloni (2005)	coercive-mediated non-mediated reward-mediated	relationship	180	3
Chae et al. (2017)	coercive-mediated non-mediated reward-mediated	relationship	1229	5
Rawwas et al. (1997)	coercive-mediated non-mediated reward-mediated	relationship	551	5
Zhuang et al. (2010)	coercive-mediated non-mediated	relationship	225	4
Ke et al. (2009)	coercive-mediated non-mediated reward-mediated	relationship	134	10
Terpend and Ashenbaum (2012)	coercive-mediated non-mediated reward-mediated	relationship	225	5
Nyaga et al. (2013)	coercive-mediated non-mediated reward-mediated	relationship performance	242	15
Pulles et al. (2014)	coercive-mediated reward-mediated	relationship	185	4
Brown et al. (1995)	coercive-mediated non-mediated reward-mediated	relationship performance	203	20
Bandara et al. (2017)	coercive-mediated non-mediated	relationship performance	284	4

3.2. *Effect size evaluation*

The formula for the estimating the effect size of causal links are presented in this section. In this study, correlation effect size between power, relationship and performance was used to calculate the effect size. The correlation effect size was calculated using Fisher's Z transformation because this follows normal distribution (Lipsey and Wilson, 2003). The formula for converting the simple correlation coefficient into Fisher's Z set is as follows:

$$Z = .5 \times \log(\frac{1+r}{1-r})$$

where, *r* is simple correlation coefficient.

The formula for calculating the variance of Z is as follows:

$$V = \frac{1}{n-3}$$

Where, *n* is number of samples of used in the study.
The standard error of the measured effect size can be obtained by the square root of the variance as follows:

$$SE_z = \sqrt{V}z$$

4. Results of analysis

The literature search uncovered 10 studies that examined the correlations between power type, relationship, and performance. These studies reported total 75 separate correlations. R version 3.3.2 (2016-10-31) statistical software was used to analyse the Fisher's Z transformed correlation effect size. A homogeneity test was performed to determine whether the studies were homogenous testing the effects of the full data. The effect size of the research disposition was heterogeneous with Q=3054.86 (p<0.001). Therefore, the overall effect size was measured using the random effects model. Effect sizes were also compared using the characteristics of each study.

Table 3.
Homogeneity of Meta-analysis results

K	Q	p-value	-95%CI	ES	+95%CI	SE
75	3054.86	<.0001	0.177	0.190	0.203	0.118

Note: k=number of effect size; Q=homogeneity statistics; p-value: the alpha to homogeneity statistics value; 95%CI: 95% Confidence Interval; ES=effect size; SE=standard error.

According to Cooper (2010), ES=0.1 is defined as a small effect in personality, social, and clinical psychology research, and ES=0.5 is a large effect in sociology, economics, and experimental or physiological psychology, and ES=0.3 as a medium effect. Therefore, this study presents a small effect size in correlational meta-analysis (Ellis, 2010). All meta-analysis results are summarized in Table 4. Looking at the effect size by power type, the effect size of non-mediated power (0.424) is greater than coercive-mediated power (-0.083) and, reward-mediated Power (-0.0005). It was shown that non-mediated power (expert and referent) has a higher relationship with relationships than coercive-mediated power (coercive, legal, and legitimate) and reward-mediated power.

Table 4.
Summary of Meta-analysis results

Random effect model						
K	Q	p-value	-95%CI	ES	+95%CI	SE
75	3054.86	<.0031	.043	.129	.214	.118

Key constructs	K	Q	p-value	-95%CI	ES	+95%CI	SE
Non-mediated power	29	470.42	.0001	.336	.424	0.512	.196
Coercive-mediated power	31	893.03	.0001	-.198	-.083	.031	.189
Reward-mediated power	15	334.44	.0001	-.152	-.0005	.151	.289

5. Conclusions

With the empirical analysis testing SCM theories increasing recently, a meta-analytic approach is being adopted in SCM research more than before. Meta-analysis was conducted on the power-relationship links in this study to synthesize and generalize the findings from the empirical analysis on the examination. Homogeneity test using all the correlation coefficients indicated that the sample studies were heterogeneous. Therefore, this study used the random effects model to calculate the size of the correlation coefficient effects according to the types of power.
The results indicate that non-mediated power has a higher contribution to relationship development than coercive and reward-mediated power do. Coercive, legal, legitimate and rewards powers are perceived to have a strong impact on conflicts in the supply chain. The effect of reward power is relatively low. Expertise and value is more important in the relationship formation than the meaning of reward transaction relationship. It is the

expert and reference power that has a positive effect on relationships and performance. In practical relationships, expert power can seek know-how and advice on knowledge, experience and work. Reference power is also a more important factor in relations within the supply chain, providing corporate governance and value.

Contribution to the literature is that this study combined the research findings from the relevant literature. However, the relatively small number of sample papers included in this study is an inevitable limitation.

Acknowledgement

References

Ballou, R. H. (2007). The evolution and future of logistics and supply chain management. European Business Review, 19(4), 332-348.

Bask, A. H. (2001), "Relationships among TPL providers and members of supply chains-a strategic perspective", Journal of Business & Industrial Marketing, 16(6), pp. 470-486.

Benton, W. C., & Maloni, M. (2005). The influence of power driven buyer/seller relationships on supply chain satisfaction. Journal of Operations Management, 23(1), 1-22.

Brockwell, S. E., & Gordon, I. R. (2001). A comparison of statistical methods for meta-analysis. Statistics in medicine, 20(6), 825-840.

Bryman, A. (2008). Why do researchers integrate /combine/ mesh/ blend/ mix/merge/fuse quantitative and qualitative research. Advances in mixed methods research, 87-100.

Carter, C. R., & Liane Easton, P. (2011). Sustainable supply chain management: evolution and future directions. International journal of physical distribution & logistics management, 41(1), 46-62.

Chang, S. K., (2009), "The Influence of the Buyer/Seller Relationship Driven by Power on Supplier Performance", The Korean Small Business Review, 31(1), pp.15-34.

Chen, I. J., & Paulraj, A. (2004). Understanding supply chain management: critical research and a theoretical framework. International Journal of Production Research, 42(1), 131-163.

Chen, X., & Wang, X. (2015). Free or bundled: channel selection decisions under different power structures. Omega, 53, 11-20.

Cox, A. (1999). Power, value and supply chain management. Supply chain management: An international journal, 4(4), 167-175.

Cox, A. (2001). Managing with power: strategies for improving value appropriation from supply relationships. Journal of Supply Chain Management, 37(1), 42-47.

Cox, A. (2004). The art of the possible: relationship management in power regimes and supply chains. Supply Chain Management: An International Journal, 9(5), 346-356.

Cox, A., Sanderson, J., & Watson, G. (2001). Supply chains and power regimes: toward an analytic framework for managing extended networks of buyer and supplier relationships. Journal of Supply Chain Management, 37(1), 28-35.

Cox, A., Watson, G., Lonsdale, C., & Sanderson, J. (2004). Managing appropriately in power regimes: relationship and performance management in 12 supply chain cases. Supply Chain Management: An

International Journal, 9(5), 357-371.

Craighead, C. W., Ketchen, D. J., Dunn, K. S., & Hult, G. T. M. (2011). Addressing common method variance: guidelines for survey research on information technology, operations, and supply chain management. IEEE Transactions on Engineering Management, 58(3), 578-588.

Damanpour, F. (1991) Organizational innovation: A meta-analysis of effects of determinants and moderators. Academy of Management Journal 34: 555–590.

Datta, D. K., Pinches, G.E. and Narayanan, V.K. (1992) Factors influencing wealth creation from mergers and acquisitions: A meta-analysis. Strategic Management Journal 13: 67–84.

Delbufalo, E. (2012). Outcomes of inter-organizational trust in supply chain relationships: a systematic literature review and a meta-analysis of the empirical evidence. Supply Chain Management: An International Journal, 17(4), 377-402.

Glass, G.V. (1976) Primary, secondary and meta-analysis of research, Educational Researcher, 5(10), 3-8.

Goldsby, T. J., & Autry, C. W. (2011). Toward greater validation of supply chain management theory and concepts: The roles of research replication and meta-analysis. Journal of Business Logistics, 32(4), 324-331.

Golicic, S. L., & Smith, C. D. (2013). A meta-analysis of environmentally sustainable supply chain management practices and firm performance. Journal of supply chain management, 49(2), 78-95.

Hines, T., & McGowan, P. (2005). Supply chain strategies in the UK fashion industry—the rhetoric of partnership and realities of power. International Entrepreneurship and Management Journal, 1(4), 519-537.

Hingley, M. K. (2005a). Power to all our friends? Living with imbalance in supplier–retailer relationships. Industrial Marketing Management, 34(8), 848-858.

Hingley, M. K. (2005b). Power imbalanced relationships: cases from UK fresh food supply. International Journal of Retail & Distribution Management, 33(8), 551-569.

Hingley, M. K. (2005c). Power imbalance in UK agri-food supply channels: Learning to live with the supermarkets?. Journal of Marketing Management, 21(1-2), 63-88.

Hunter, J. E., & Schmidt, F. L. (2000). Fixed effects vs. random effects meta-analysis models: implications for cumulative research knowledge. International Journal of Selection and Assessment, 8(4), 275-292.

Hunter, J.E. and Schmidt, F.L. (1990) Methods of meta-analysis: Correcting errors and bias in research findings. Newbury Park, CA: Sage.

Kähkönen, A. K. (2014). The influence of power position on the depth of collaboration. Supply Chain Management: An International Journal, 19(1), 17-30.

Kaynak, H., & Hartley, J. L. (2008). A replication and extension of quality management into the supply chain. Journal of Operations Management, 26(4), 468-489.

Lambert, D. M. and Cooper, M. C., (2000), Issues in Supply Chain Management, Industrial Marketing Management, 29(1), pp.65-85.

Leuschner, R., Rogers, D. S., & Charvet, F. F. (2013). A meta-analysis of supply chain integration and firm performance. Journal of Supply Chain Management, 49(2), 34-57.

Maloni, M., & Benton, W. C. (2000). Power influences in the supply chain. Journal of business logistics, 21(1), 49.

Meehan, J., & Wright, G. H. (2011). Power priorities: A buyer–seller comparison of areas of influence. Journal of Purchasing and Supply Management, 17(1), 32-41.

Meehan, J., & Wright, G. H. (2012). The origins of power in buyer–seller

relationships. Industrial Marketing Management, 41(4), 669-679.

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. Organization studies, 24(3), 403-441.

Rawwas, M. Y., Vitell, S. J., & Barnes, J. H. (1997). Management of conflict using individual power sources: A retailers' perspective. Journal of Business Research, 40(1), 49-64.

Seuring, S., & Gold, S. (2012). Conducting content-analysis based literature reviews in supply chain management. Supply Chain Management: An International Journal, 17(5), 544-555.

Skjoett-Larsen, T. (1999). Supply chain management: a new challenge for researchers and managers in logistics. The International Journal of Logistics Management, 10(2), 41-54.

Sohn, J. I., Woo, S. H., & Kim, T. W. (2017). Assessment of logistics service quality using the Kano model in a logistics triadic relationship. International Journal of Logistics Management, 28(2) 680-698.

Srivastava, S. K. (2007). Green supply-chain management: a state-of-the-art literature review. International journal of management reviews, 9(1), 53-80.

Woo, S. H., Pettit, S. J., & Beresford, A. K. (2013). An assessment of the integration of seaports into supply chains using a structural equation model. Supply Chain Management: An International Journal, 18(3), 235-252.

APPENDIX A. List of Samples and Articles (Supply Chain Power)

Sample	No	Authors	Year	Journal	Sample size
1	1	Benton, W. C. and Maloni, M.	2005	JOM	180
2	2	Chae, S., Choi, T. Y. and Hur, D.	2017	JSCM	1229
	3	Huo, B., Flynn, B. B. and Zhao, X.	2017	JSCM	
	4	Maloni, M. and Benton, W. C.	2000	JBL	
3	5	Rawwas, M. Y. ., Vitell, S. J. and Barnes, J. H.	1997	JBR	551
	6	Yeung, J. H. Y., Selen, W., Zhang, M. and Huo, B.	2009	IJPE	
	7	Zhao, X., Huo, B., Flynn, B. B. and Yeung, J. H. Y.	2008	JOM	
4	8	Zhuang, G., Xi, Y. and Tsang, A. S. L.	2010	IMM	225
5	9	Ke, W., Liu, H., Wei, K. K., Gu, J. and Chen, H.	2009	DSS	134
6	10	Terpend, R. &Ashenbaum B.,	2012	JSCM	225
7	11	Nyaga, G. N., Lynch, D. F., Marshall, D. and Ambrose, E.	2013	JSCM	242
8	12	Pulles, N. J., Veldman, J., Schiele, H. and Sierksma, H.	2014	JSCM	185
9	13	Brown, J. R., Lusch, R. F. and Nicholson, C. Y.	1995	JR	203
	14	Andrew Cox	1999	SCMIJ	
	15	Reimann, E. and David J.ketchen, JR	2017	JSCM	
	16	Brito, R.P. and Miguel. P.L.S	2017	JSCM	
	17	Crook,T.R., Craighead, C.E. and Autry,C.W.	2017	JSCM	
	18	Webster, J.	1995	JSIS	
	19	heng, J., Li, B., Gong, B.,Cheng, M. and Xu, L.	2017	JCP	
	20	Yu, D. Z., Cheong, T. S. and Sun, D. W.	2017	EJOR	
	21	Simson, D., Power, D. and Samson, D.	2007	IJOPM	
	22	Byne, R. and Power, D.	2013	SCMIJ	
	23	Gligor, D. M. and Holcomb, M.	2013	IJLM	
	24	Odongo, W., Dora, M., Molnar, A., Ongeng, D and Gellynck, X.	2016	BFJ	
10	25	Bandara, S., Leckie, C., Lobo, A. and Hewege, C.	2017	APJML	284