A Grounded Theory Approach Focused on a Holistic Supply Chain Integration Management Approach

Ronald Cuschieri
ronald.cuschieri@um.edu.mt

Abstract: This research sustains the current dialogue and latest literature on supply chain management (SCM), triple bottom line sustainability, and technology deployment, by highlighting the importance for SMEs to undertake supply chain integration (SCI) initiatives to achieve competitive advantage. Nowadays, it is pivotal for all actors within the manufacturing sector, to deploy a SC strategic approach, together with its business and manufacturing strategies, to compete effectively across the globe instead of working alone. The inductively generated theory, based on a grounded theory methodology, highlights that an integrated management and leadership approach, based on a set of strategic measures and a set of best practices, as referred by the conceptual framework, is the way forward, since such a stance is needed to serve as a driver and as a binding force of all SC actors to form up a SCI holistic approach to achieve outstanding competitive performance.

Keywords: Supply chain management, technology, leadership, management and grounded theory

Maltese SMEs (Small and Medium Enterprises), like other SMEs worldwide, are the engine of the economy for their contribution to innovation, employment provision, and the GDP.[1] In spite of such SMEs potential, a thorough literature review

1 J. Curran & R.A. Blackburn, *Researching the small enterprise* (London, 2001); M. Demirbag, S.C.L. Koh, E. Tatoglu, & S. Zaim, 'TQM and market orientation's impact on SMEs' performance', *Industrial Management & Data Systems*, 106(8) (2006), 1206–28; Ernst & Young, 'Market gaps in access to finance and the feasibility of new financing

shows there are few studies covering research based on the supply chain operations within SMEs,[2] especially in Malta.

Practitioners and academics from different disciplines are interested to pursue a holistic SCI management approach to compete around the globe,[3] since the current businesses environment is no longer being based on autonomous entities but as supply chains.[4]

This paper is organized in various sections in the following order: the research objective, question and significance; a review of the past literature to contextualize the research; the presentation of various literature gaps; the research methodology; the research process and findings' highlights; the research discussion; and the research summary and conclusions, which also includes the contributions, propositions, limitations and suggestions for future research.

Research objective, significance, and question through a Grounded Theory Methodology (GTM)

This research aims to explore the role of SCI for SMEs as SC actors within the Maltese manufacturing. The scope is to generate a substantive theory to represent the reality of this phenomenon from practice. The **research significance** is based on addressing the various

instruments in the EU addressing the credit needs of Maltese businesses', *Malta Business Bureau* (Malta, 2013).

2 Curran & Blackburn; E. Bayraktar, M.S.C. Demirbag, K.S.C. Lenny, E. Tatoglu, & H. Zaim, 'A causal analysis of the impact of information systems and supply chain management practices on operational performance: Evidence from manufacturing SMEs in Turkey', *International Journal of Production Economics*, 122 (2009), 133–49.

3 Bayraktar; B.B. Flynn, B. Huo, & X. Zhao, 'The impact of supply chain integration on performance: A contingency and configuration approach', *Journal of Operations Management*, 28 (2010), 58–71; C.F. Cheung, C.M. Cheung, & S.K. Kwok, 'A Knowledge-based Customization System for Supply Chain Integration', *Expert Systems with Applications*, 39 (2012), 3906–24.

4 M. Binder & B.T. Clegg, 'A conceptual framework for enterprise management', *International. Journal of Production Research*, 44 (18/19) (2006), 3813–29; Id., 'Enterprise management: a new frontier for organisations', *International Journal of Production Economics*, 106(2) (2007), 409–30; D. Ketchen & G.T. Hult, 'Bridging organization theory and supply chain management: The case of best value supply chains', *Journal of Operations Management*, 25(2) (2007), 573−80; B.T. Clegg & Y. Wan, 'ERP Systems and Enterprise Management Trends: a Contingency Model for the Enterprization of Operations', *International Journal of Operations and Production Management*, 33(11/12) (2013), 1458–89.

literature gaps associated with the phenomenon and also to employ a GT research strategy to meet the gaps referred by Binder & Edwards[5] in particular, to establish solid and rigorous research using the GTM within operations management (OM) focused on SCM.

The **research question** that guides the study and supporting objectives is the following two-part question. First, which are the **characteristics** needed to achieve SCI within SMEs in Maltese manufacturing? Second, which are the **key factors** that constitute SCI that promotes competitive performance within SMEs in Maltese manufacturing?

A priori literature review: The manufacturing SC principles based on SCI

A manufacturing SC is not about production but covers all the value-chain activities of the focal firm within a context to meet the high-value manufacturing (HVM) sustainability challenges,[6] such as R&D, innovation, production, distribution, advertising, and customer support. Such a management approach is referred to as the virtual enterprise (VE) concept[7] or the enterprise management concept.[8] The term HVM refers to the application of leading-edge technical knowledge and expertise for the creation of products, production processes, and associated services, to bring sustainable growth and high economic value.[9] Malta is also focussing on value-added manufacturing, in line with HVM practices, being a knowledge-based economy.[10]

5 M. Binder & J.S. Edwards, 'Using grounded theory method for theory building in operations management research. A study on inter-firm relationship governance', *International Journal of Operations & Production Management,* 30(3), (2010), 232–59.

6 F. Livesey, *Defining High Value Manufacturing* (Cambridge, 2006); Bayraktar.

7 Livesey; V. Martinez, A. Neely, R. Guanjie, & A. Smart, 'HVM – Delivering on Promise', *Advanced Institute of Management Research* (London, 2008).

8 Binder & Clegg, 'A conceptual framework'; Binder & Clegg, 'Enterprise management'; B. Clegg, S. Chandler, M. Binder, & J. Edwards, 'Governing inter-organizational R&D supplier collaborations: a study at Jaguar Land Rover', *Production Planning & Control* (2012), 1–19, iFirst; Clegg & Wan.

9 Technology Strategy Board, *Progressive for future manufacturing*, http://www.ifm.eng.cam.ac.uk/uploads/News/2012/23Feb (accessed 23 February 2012)

10 Ernst & Young (2013); WEF, *The Global Competitiveness Report 2014–2015*, http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf (accessed 11 September 2014).

From a SCM perspective, this VE paradigm shift has been referred to as a move from vertical integration to virtual integration,[11] based on unity of efforts of all SC actors up to the end customer, to optimize the use of all core and distributed organizational resources to form a single holistic SC, based on SCI initiatives, with a continuum of variation from short-term adversarial to long-term relationships.[12]

To achieve SCM, there is the need of SCI both within and outside the focal firm.[13]

The SCI effectiveness is dependent on the context of the supply chain.[14]

Such a strategic stance within HVM is attributed to lean and agile manufacturing, to focus on improvement and cost-effective mechanisms, not only to eliminate waste but to promote agility, flexibility, adaptability, responsiveness, and quality in all operations and linkages between SC actors, such as JIT practices.[15] Such an agile paradigm is enabled by agile information systems for improved lead times at a minimum total cost.[16]

11 C.K. Prahalad & G. Hamel, 'Strategy as a field of study: why search for a new paradigm', *Strategic Management Journal*, 15, special issue (1994), 5–16; D. Power, Supply chain management integration and implementation: a literature review, *Supply Chain Management: An International Journal,* 10(4), (2005), 252–63; A. Gunasekaran, K. Lai, & T.C.E. Cheng, 'Responsive supply chain: A competitive strategy in a networked economy', *Omega*, 36, (2008), 549–64.

12 J.F. Kros, M. Falasca, & S.S. Nadler, 'Impact of just-in-time inventory systems on OEM suppliers', Industrial Management & Data Systems, 106(2) (2006), 224–41; K.W. Green, & R.A. Inman, 'The impact of JIT-II-selling on organizational performance', *Industrial Management & Data Systems,* 107(7) (2007) 1018–35; D. Lambert, *University of Auckland Business Review*, Spring 2008, http://www.shortcourses.ac.nz/_docs/AGlobalViewOfSupplyChainManagement2008.pdf (accessed 20 July 2012).

13 Ketchen & Hult; M. Swink, R. Narasimhan, & C. Wang, 'Managing beyond the factory walls: Effects of four types of strategic integration on manufacturing plant performance', *Journal of Operations Management*, 25, (2007) 148–64; D.J. Jr. Ketchen, W. Rebarick, G.T.M. Hult, & D. Meyer, *Business Horizons*, 51, 235–43; A.W. Kim, 'An investigation on the direct and indirect effect of supply chain integration on firm performance', *International Journal of Production Economics*, 119 (2008), 328–46.

14 C. Gimenez, V. Sierra, & J. Rodon, 'Sustainable operations: Their impact on triple bottom line', *International Journal of Production Economics*, 140(1) (2012), 149–59.

15 A. White, E.M. Daniel, & M. Mohdzain, 'The role of emergent information technologies and systems in enabling supply chain agility', *International Journal of Information Management*, 25 (2005) 396–410; B. Sherehiy, W. Karwowski, & J.K. Layer, 'A review of enterprise agility: Concepts, frameworks, and attributes', *International Journal of Industrial Ergonomics*, 37 (2007), 445–460; Gunasekaran *et al*.

16 M. Christopher, & D. Towill, Developing market specific supply chain strategies*, International Journal of Logistics Management*, 13(1), (2002), 1–21; White *et al*.; Gunasekaran *et al*.

Furthermore, nowadays, managing effectively within the SC context is not only considered from both a social and an economic perspective in line with the classical management approach, but also needs to cater for an environmental perspective, to promote environmental sustainability in line with the triple bottom line (3BL) sustainability.[17]

Literature gaps associated with the research objective: SCI gaps from a SCM, manufacturing and leadership perspective

From the **supply chain management literature,** research is quite limited: in the key factors to achieve SCI;[18] in established holistic SCI frameworks;[19] and in forming of relationships.[20]

From the **manufacturing literature**, the manufacturing sector needs further research in the area of 'holistic research approach ... with the perspective of a more sustainable manufacturing for the production of more sustainable products and services'.[21]

From the **leadership literature**, it was asserted that the 'management of integrated supply chain' is a 'largely ignored area'.[22] There are few scholarly works which explicitly consider network based **leadership** in

17 A. Ashby, M. Leat, & M. Hudson-Smith, 'Making connections: a review of supply chain management and sustainability literature', *Supply Chain Management: An International Journal*, 17(5) (2012), 497–516; Gimenez *et al*.; S.M. Lee, S.T. Kim, & D. Choi, Green supply chain management and organizational performance, *Industrial Management & Data Systems*, 112(8), (2012), 1148–80; M.C.J. Caniels, M.H. Gehrsitz, & J. Semeijn, 'Participation of suppliers in greening supply chains: An empirical analysis of German automotive suppliers', *Journal of Purchasing & Supply Management*, 19 (2013), 134–43.

18 X. Zhao, B. Huo, B.B. Flynn, & J.H.Y. Yeung, The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain, *Journal of Operations Management*, 26, (2008), 368–88; Flynn *et al.*; T. Schoenherr, & M. Swink, Revisiting the arcs of integration: cross-validation and extensions, *Journal of Operations Management*, 30 (2012), 99–115.

19 Flynn *et al*.; M. Pero, T. Rossi, C. Noe, & A. Sianesi, 'An exploratory study of the relation between supply chain topological features and supply chain performance', *International Journal of Production Economics*, 123, (2010) 266–78; M. Garetti & M. Taisch, 'Sustainable manufacturing: trends and research challenges', *Production Planning & Control*, 23(2–3) (2012), 83–104.

20 Ashby *et al*.

21 Garetti & Taisch, 88.

22 C.C. Defee, T.P.T. Stank, & T. Esper, 'Performance implications of transformational supply chain leadership and followership', *International Journal of Physical Distribution & Logistics Management*, 40(10) (2010), 764.

the macro context of inter-organizational networks.[23] There is also lack of research on the integration between the HRM and SCM disciplines.[24]

Sustainability literature gaps within the supply chain context

Most of the research within the SCM literature with respect to **sustainable practices** has been fragmented and considered single activities in isolation;[25] as a result scholarly studies need to consider the 3BL measures from a holistic perspective. Scholarly work vis-a-vis SC actors, such as suppliers, engagement in green SC initiatives in-conjunction with the focal firm, is lacking.[26]

Information technology (IT) literature gaps within the supply chain context

Some firms have successfully integrated eBusiness technologies but others still struggle to implement and justify eBusiness initiatives.[27] The payoff on SCM from IT investment has been referred as the 'IT paradox' or 'productivity paradox'.[28] Currently SCs are treating both the information management and the IT infrastructure capabilities as resources to promote a competitive edge through the Internet of Things (IoT).[29]

23 J. Sydow, F. Lerch, C. Huxham, & P. Hibbert, 'A silent cry for leadership: Organizing for leading (in) clusters', *The Leadership Quarterly*, 22 (2011), 328–43.

24 M.L. Lengnick-Hall, C.A. Lengnick-Hall, & C.M. Rigsbee, 'Strategic human resource management and supply chain orientation', *Human Resource Management Review*, 23(4) (2013), 366–77.

25 S. Gold, S. Seuring, & P. Beske, P, Sustainable supply chain management and inter-organizational resources: a literature review, *Corporate Social Responsibility and Environmental Management*, 17(4), (2010) 230–45; Caniels *et al*.; J.L. Glover, D. Champion, K.J. Daniels, & A.J.D. Dainty, 'An Institutional Theory perspective on sustainable practices across the dairy supply chain', *International Journal of Production Economics* (2014).

26 Caniels *et al*.

27 S. Devaraj, L. Krajewski, & C.W. Wei, 'Impact of eBusiness technologies on operational performance: The role of production information integration in the supply chain', *Journal of Operations Management*, 25 (2007), 1199–216.

28 C. Freeman, & L. Soete, Fast structural change and slow productivity change: some paradoxes in the economics of information technology, *Structural Change and Economics Dynamics*, 1(2) (1990); E. Brynjolfsson, & S. Yang, Information technology and productivity: a review of literature, *Advances in Computers,* 43, (1996) 179–214; J.H. Lim, V.J. Richardson, & T.L. Roberts, 'Information technology investment and firm performance: a meta-analysis', *Proceedings of the 37th Hawaii International Conference on Systems Sciences*,(2004), 1–11.

29 L. Atzori, A. Iera, & G. Morabito, The Internet of Things: A Survey, *Computer Networks,*

Research Methodology

Research scope and its methodology with its assumptions to promote scientific rigour

The objective of this research is to establish the theoretical insights for academics and practical implications to practitioners from a comprehensive conceptualization of SCI with all its antecedents within manufacturing-based SMEs to achieve competitiveness. The facts presented in this paper formed part of a more comprehensive study based on the author's Ph.D. thesis submission in 2015. The research methodology used is based on the Straussian GTM (i.e. developed by Anselm Strauss and Juliet Corbin) with data generated from 22 in-depth interviews with professionals engaged with SMEs across the SC.

The research methodology outline with its justification

The SCI concept is a multidimensional construct[30] and with exploratory properties.[31] The GTM with a **qualitative approach** was found as a suitable research strategy to answer such a research question due to the exploratory nature of the method[32] and the wealth of quality data needed within the data-collection process.[33]

Furthermore, the GTM has the capability to generate dense theory with a level of complex variation based on the induction and deduction process through the constant comparison of the data.[34] Although

54(15), (2010), 2787–805; D. Prajogo, & J. Olhager, 'Supply chain integration and performance: the effects of long-term relationships, information technology and sharing, and logistics integration', *International Journal of Production Economics*, 135(1), (2012), 514–22; Schoenherr & Swink; M.E. Porter, & J. Heppelmann, 'How Smart Connected Devices are Transforming Competition', *Harvard Business Review*, Nov. 2014, 64–88.

30 P.W. Stonebraker & R. Afifi, 'Toward a contingency theory of supply chains', *Management Decision*, 42(9) (2004), 1131–44.

31 J. Storey, C. Emberson, J. Godsell, & A. Harrison, 'A supply chain management: theory, practice and future challenges', *International Journal of Operations & Production Management*, 26(7) (2006) 754–74; Zhao *et al*.; Schoenherr & Swink.

32 T.J. Bouchard, 'Field research methods: Interviewing, questionnaires, participant observation, systematic observation, unobtrusive measures' in M.D. Dunette (ed.), *Handbook of industrial and organizational psychology* (Chicago, 1976), 363–413.

33 P.N. Stern, 'On solid ground: Essential properties for growing grounded theory' in: A. Bryant & K. Charmaz (eds.), *The Sage handbook of grounded theory* (Los Angeles, 2007).

34 B.G. Glaser & A.L. Strauss, The Discovery of Grounded Theory: *Strategies for Qualitative Research*. (Chicago, 1967), IL: Aldine Publishing Company; A.L. Strauss, *Qualitative Analysis for Social Scientists* (Cambridge CA, 1987); A.L. Strauss, & J. Corbin, *Basics of*

qualitative data was used, it is to be noted that the GTM can also be associated with quantitative research.[35] Furthermore, the philosophical world view adopted by the researcher is that reality is subjective and that the objective truth does not exist and his belief is based on the fact that theory is constructed by the participants' and by the researcher's interpretations, both being informed by their ideals, values and beliefs, within a context. Such a world scenario made the researcher to use a constructivist approach to knowledge generation from the data.[36] It is to be noted that although Straussian GTM principles were used, the researcher kept an informed mind on the fact that GTM is heavily rooted in both the Glaserian and Straussian approaches to promote scholarly work.

The data collection was based on two sampling techniques to generate the data, namely as open sampling and theoretical sampling. The researcher deployed the three Straussian GTM analytic coding techniques, referred as Open, Axial, and Selective Coding respectively. The GTM data management and analytic tools were based on both the Computer-Assisted Qualitative Data Analysis Software (CAQDAS) and the storyline techniques, supported by memos and visual aids all along the research process, in particular, logic diagrams as tables, code matrices as tree diagrams, and conceptual frameworks as mind maps, to promote an audit trail of all the data analysis.[37]

The research quality was based on the validation of the emerged theory which was performed continuously throughout the data collection and analysis stages based on the constant comparison process.[38] All ethical considerations adopted in all data collection and analysis procedures, such as anonymous approach to participants, as referred to in Figure 1 coded reference, data retention, and confidentiality were all in line with ESRC framework.[39]

Qualitative Research: Techniques and Procedures for Developing Grounded Theory, 2nd edn. (California, 1998).

35 B.G. Glaser, *Doing Grounded Theory: Issues and Discussions* (USA, 1998).

36 K. Charmaz, 'Constructivist and objectivist grounded theory', in N.K. Denzin & Y. Lincoln (eds.), *Handbook of Qualitative Research*, 2nd edn. (Thousand Oaks, 2000) 509–35; J. Corbin & A. Strauss, *Basics of Qualitative Research, Techniques and Procedures for Developing Grounded Theory,* 3rd edn. (Canada, 2008).

37 M.B. Miles, & A.M. Huberman, *Qualitative Data Analysis: An Expanded Sourcebook*, 2nd edn. (Thousand Oaks, 1994); A.L. Strauss, & J. Corbin, *Basics of Grounded Theory Methods* (Beverly Hills, CA, 1990).

38 Strauss & Corbin. *Basics of Qualitative Research.*

39 ESRC (*Economic and social research council), FRE (framework for research ethics*), http://

The research design was based on a cross-sectional type of design,[40] where the objective was to capture a snapshot of what was happening in the field and not to undergo a temporal assessment attributed to longitudinal research. All the participants, under both targeted samples, were based on different types of manufacturing sectors, selected randomly from the *Malta Enterprise Directory 2012*[41] to promote variation and richness in the data.

The initial interview guide was derived from the *a priori* literature review, with the objective to capture open ended data due to the exploratory nature of the research. The second interview guide was derived from tentative emerged theory, with the objective to capture further in-depth data within the emerged concepts and fill the gaps within such research themes to achieve theoretical saturation.[42] Initially pilot studies were carried out to test the content validity of both the interview guides and included the relevant refinements.

The primary data from the two sampling phases were obtained from 17 SC actors based on 22 interviews (i.e. with multiple interview sessions with participants in some firms included in the two sampling phases) with the additional provision of secondary data by some participants. The sample size dimension could not be determined before the data collection and analysis was started, since the GTM is an inductive process with evolving theory as new data is collected and analysed. The overall number of interviews of this research amounted to 22, which is in line with Stern's[43] estimated number of interviews to reach theoretical saturation. The GTM analysis needed to aggregate the participants' meanings and interpretation to understand the organization strategies or actions, outcomes, and contextual conditions in line with the Coding Paradigm or the Conditional/Consequential matrix[44] which was used to guide both the CAQDAS and the storyline data analytic techniques. Every interview with the participants was digitally recorded. The overall data collection consisted from transcriptions which were

www.esrcsocietytoday.ac.uk/ESRCInfoCentre/opportunities/research_ethics_framework/ (Accessed 3 March 2010.

40 A. Bryman, *Social Research Methods*, 3rd edn. (Oxford, 2008).

41 *Malta Enterprise*, http://www.maltaenterprise.com/en/support (accessed 21 February 2012).

42 Strauss & Corbin, *Basics of Grounded Theory Methods*.

43 Stern.

44 Strauss & Corbin, *Basics of qualitative research*.

undertaken for each interview, together with the field notes taken for each interview and the secondary data. The duration of the research data collection and analysis process took almost two years to complete, with several gaps dedicated to the analysis processes in between interviews to deploy the constant comparison process through various memos and summary memos within the data analysis.

The analytic stages: open, axial, and selective coding

The **Open Coding** analytic approach was used to open the statements (as text or voice) outlined by the participants so as to expose the meaning contained through **potentially and provisional concepts in terms of the emerged codes** grounded in the data.[45]

Such a theorizing process was mainly initiated on the CAQDAS MAXQDA 2007, with the relevant code memos for each open code. It was resumed through the storyline approach, in the next **Axial Coding** stage, with the relevant memos and overall memos for all emerged tentative categories to develop a more holistic understanding of what the data are saying,[46] with a selection of in vivo quotes from the data to bring participants back to life, and in a systematic and prescriptive approach[47] with the establishment of all conceptual relationships.[48] These two different analytic techniques promoted triangulation of data analytic methods to address the research validity.[49]

At the theoretical sampling stage, the theory became dense with concepts and was also enriched and was finally refined by relevant extant literature, by integrating the emerged theory with the literature, referred as theoretical integration,[50] to discover the substantive theory.[51] With this **Selective**

45 Corbin & Strauss.

46 Glaser; M.Q. Patton, *Qualitative Research & Evaluation Methods*, 3rd edn. (Saint Paul, USA, 2002).

47 Strauss & Corbin, *Basics of Qualitative Research*.

48 Strauss.

49 Miles & Huberman; Strauss & Corbin. *Basics of Qualitative Research*; N.K. Denzin, & Y.S. Lincoln, *The Sage Handbook of Qualitative Research,* 3rd edn. (London, 2005); Bryman; Corbin & Strauss.

50 Strauss; Glaser; Strauss & Corbin. *Basics of Qualitative Research*.

51 Glaser & Strauss.

Coding analytic approach, the categories were integrated and refined, with the selection of a core category, together with other key categories and sub-categories, to represent the substantive theory, as referred in Table 1. The core category is said to cut across all other categories.[52]

The generated substantive theory was compared with the relevant literature so as to establish the contribution to the extant literature. Such a contribution was determined by identifying the commonalities, the differences and the new, between the current literature and the generated substantive grounded theory.[53] Henceforth, the literature was used as a 'secondary source of data'.[54]

The research process and findings

The Figure 1 shows a mind map depicting the research process with the outcomes from each stage and an audit trail of the emerged theory. Table 1 outlines an audit trail of all the emerged categories based on a code matrix, and Figure 2 shows the conceptual diagram to show the final theoretical framework.

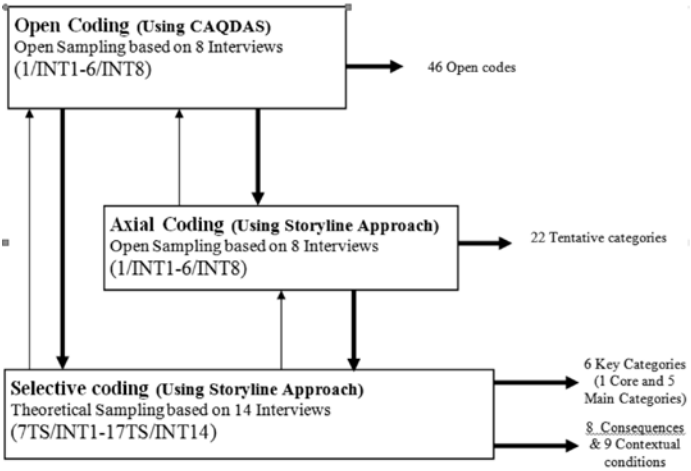

Fig. 1. Outline of the overall GTM coding data analytic approach (author)

52 Strauss & Corbin, *Basics of Qualitative Research.*
53 Glaser.
54 Strauss & Corbin, *Basics of Qualitative Research*, 51.

Phase 1: **46 Open codes** **(Out of which 39 are Action categories and the others are outcomes and contextual conditions)**	**Phase 2:** **22 Tentative categories: 7 key & 15 non-key tentative categories**	**Phase 3:** **6 Key categories (1 Core & 5 main categories) plus 16 sub-categories**
Leadership style; management effectiveness; and priority of works (3)	Leading Effectively (Phase 3 Core Category)	**Core Category**: Integrative Management and Leadership Approach (IMLA)
	Managing business strategy (Phase 3 Main Category 1)	**Main Category (1):** Business Strategy
Sub-contractors & outsourcing (1)	Managing manufacturing strategy (Phase 3 Main Category 2)	**Main Category (2):** Manufacturing strategy
Ownership of operations; SC strategic action and growth (2)	Managing SC Strategy (Phase 3 Main Category 3)	**Main Category (3):** SC strategy
ICT applications (1)	Managing Technology deployment (Phase 3 Main Category 4)	**Main Category (4):** Information and automated technology deployment
Manufacturing process (1)	Managing process within SC and manufacturing (Phase 3 Main Category 5)	**Main Category (5):** Holistic SCI management process approach with **16 sub-categories**: 1. lean management; 2. managing quality and sustainability; 3. managing performance measurements; 4. auditing operations; 5. supply management; 6. managing cash-flow; 7. managing change and innovation; 8. managing collaboration; 9. managing culture; 10. managing knowledge; 11. managing customer service; 12. managing information sharing; 13. managing logistics; 14. planning/forecasting; 15. managing risks; and 16. managing trust.
SC members support; SCI activities; SCI depth; and time management (4)	Managing SCI (Phase 3 Main Category 5)	
Quality of processes; EHS (sustainability); Lean management; and standards implementation (4)	Lean Management, Sustainability and Quality Standards Compliance (1 & 2 sub-categories in phase 3)	
Information sharing; and communication (2)	Managing Information sharing/ communication	
Risk management (1)	Managing Risks	
Collaboration; teamwork; employees' engagement; cross-functional operations; and coordination (5)	Managing Collaboration	
Training & share innovative ideas (1)	Managing Knowledge	
Performance measurements (1)	Managing Performance measurements	
Logistics; delivery actions; and transportation management (3)	Managing Logistics	
Plans and forecasts (1)	Planning & Forecasting	
Inventory management; supply management; and lead time (3)	Supply management	
Change management; flexibility; and innovation (3)	Managing Change & Innovation	
Customer relationship management (1)	Managing Customer Service	
Trust (1)	Managing Trust	
	Managing Culture	
Auditing & traceability of operations (1)	Auditing Operations	
	Managing Cash-flow	
Eight Competitive Capabilities (Outcomes) SC flexibility; SC visibility; business continuity; continuous improvement; lean (optimized) operations; effective and efficient performance; sustainability (3BL); and effective customer service.		
Nine Contextual Conditions **Macro:** EU Free trade zone; Global commerce outside EU needs to pay special tariffs; EU/Government incentives for investment and innovation; Malta small economies of scales makes most of the services relatively expensive (e.g. port charges, transport, electricity); Malta's strategic location for sea transport for EU, North Africa and Asia; Current cut-throat competitive scenario; political, legal and social stability; and Global or EU Economic recessions disrupts the procurement of all imports. **Micro:** Human resources competitive capabilities and professional competences promote good governance of SMEs.		

Table 1. Code Matrix for all categories within the research phases (author)

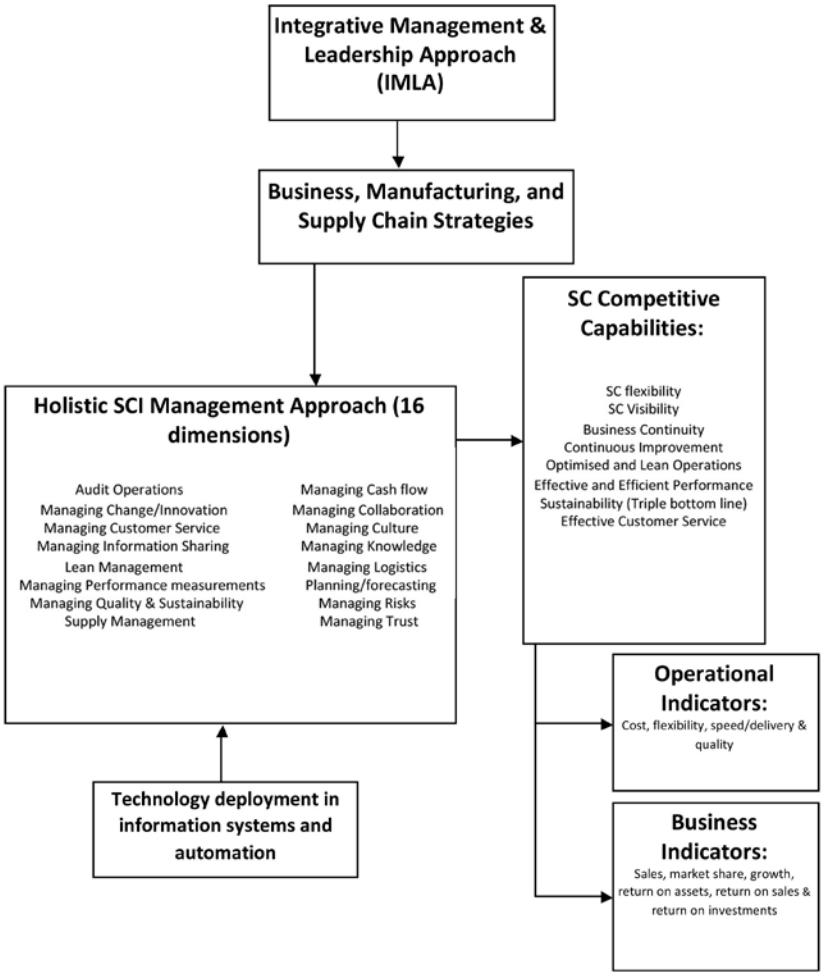

Fig. 2. SCI Theoretical Model

Discussion of the findings within the extant literature: An outline of the generated substantive theory

The study emerged substantive theory from the data, as referred in Figure 2, is based on a core action theme, **Integrative Management and Leadership Approach** (IMLA), together with a set of other five

(5) main themes and sixteen (16) sub-themes. The **operational** and **business indicators** outcome themes emerged by the comparison of the outcomes substantive theory with the final literature review, to serve as the key indicators to measure the achievement of the SC competitive capabilities within the generated theory based on the nine contextual conditions.

The core theme

The IMLA is the core theme behind SCI achievement. The IMLA is considered an original conceptual term compared with the review of the literature within the SCI theory, and it is defined to be both a driver and a binding force of all SC actors, based on a dual concept made up from the integration of the management and leadership approaches.

The generated substantive theory confirms that to achieve SCI an IMLA needs to be deployed at the strategic, tactical and operational management levels, with due consideration of each SC actor contextual conditions. The IMLA establishes and implements the right strategies for the business, manufacturing and SC, within the focal firm and across the SC by involving all SC actors, based on a holistic SCI management approach, based on sixteen conceptual actions, so as to achieve competitive capabilities. Such a holistic SCI management approach is enabled by technology deployment in information systems and in manufacturing.

The management approach within the IMLA integrates all people through the established organisational practices and maintains all the necessary quality standards and sustainable measures in place and at the same time streamlines and optimises all activities, both within and outside the focal firm, to meet a set of competitive capabilities.

The leadership approach within the IMLA is ideally focused on a **shared leadership approach** by transforming and inspiring people, so that the business becomes innovative, empowered and adopts a dynamic approach based on a culture of teamwork, but it is not being excluded that senior management may adopt an **individual leadership approach** and still expects such best practices, so as to create outstanding performance, both within the focal firm together with all SC actors as its stakeholders. The IMLA is rooted within four types of leadership styles: transformational; servant; transactional and situational styles respectively, to meet different needs.

Four participants distinguished and explained the **strategic leadership approach**, through a **shared leadership style**, as follows:

'Workers are involved in all decisions'; '… to empower their responsibilities across all departments' (1/INT2);'…leadership is very effective at all levels' (3/INT 4); 'Leadership style is like the glue to match all management levels together'; '… employing an open door policy, within the focal firm and a controlled open book, with all external entities' (5TS/INT2); and 'I [as CEO] fully involve myself to lead by example' (8TS/INT4).

One participant outlined the **individual leadership approach** as follows:

'… All starts from the top management direction, from the Directors … They decide the direction and create new policies. I start my work from the policy onwards …' (5/INT6).

The IMLA enables the focal firm to meet the SC and manufacturing lean and agile requirements so as to achieve SC flexibility and responsiveness among other competitive capabilities as referred to in Figure 2. One cannot exclude the fact that both management [55] and leadership,[56] as referred to in the extant literature, are not only scientific disciplines but are alsoperforming arts. As a result in practice to achieve SCI with the deployment of the IMLA, all SC actors need a level of creativity and wisdom to establish the common good of the overall SC. SC actors also cannot exclude the fact that a well-organized SC set-up may still stifle or hinder a certain level of change and innovation.[57] On the other hand, one has to consider that with SCI there is more to gain than to lose, as a result of the synergies and teamwork efforts with well committed and non-adversarial relationships with all SC actors.[58]

55 T.J. Watson, *Management, Organisation and Employment Strategy* (Nottingham, 1986).

56 W. Bennis, 'The challenges of leadership in the modern world: Introduction to the special issue', *American Psychologist*, 62(1) (2007), 2–5.

57 J. Neuman, & C. Samuels, 'Supply chain integration: vision or reality?', *Supply Chain Management*, 71(2) (1996), 7; O. Sorenson, 'Interdependence and adaptability: organizational learning and the long-term effect of integration', *Management Science*, 49(4) (2003), 446–63.

58 Gunasekaran *et al.*; Cheung *et al.*; B. Huo, 'The impact of supply chain integration

In summary, the main contribution of the research is that the study inductively derived a theory which extends the current literature, which is mainly based on a dyadic relationship,[59] to a substantive theory that captures all the SC members beyond the dyad to achieve SCI.[60] The emerged theory outlined that for an integrated SC to achieve its competitive capabilities in different criteria (e.g. sustainability and efficient and effective performance), as has been referred to in Figure 2, requires a complex set of concepts which revolves around the IMLA. Any failure of any SC member to meet the established performance targets may have a negative domino effect on the overall SC. This research extends the conceptual term referred to as integrated chain management (ICM) as referred by German and Dutch manufacturing;[61] adds to the leadership and HRM literatures within SCM;[62] and also corroborates with sustainable SCM practices within the extant literature.[63]

Summary and conclusions

Overview of the research outcome

This research study has proposed an inductive derived theory with its theoretical framework on how to achieve a holistic SCI approach within

on company performance: an organizational capability perspective', *Supply Chain Management: An international Journal*, 17(6) (2012), 596–610; Schoenherr & Swink.

59 S. Croom & P. Romano, 'Supply chain management: an analytical framework for critical literature review', *European Journal of Purchasing & Supply Management*, 6 (2000) 67–83; G.P. Cachon, T. Randall, & G.M. Schmidt, 'In search of the bullwhip effect', *Manufacturing & Service Operations Management*, 9(4) (2007), 457–79; T. Xiao, K. Shi, & D. Yang, 'Coordination of a supply chain with consumer return under demand uncertainty, *International Journal of Production Economics*, 124 (2010), 171–80; M.-C. Huang, T.-C. Liu, G-F. Yen, & C-Y. Chiu, 'Supply chain integration as spider-web network through governance mechanisms', *Commerce and Management Quarterly*, 13(4) (2012), 339–75.

60 Flynn *et al.*; Pero *et al.*; Garetti & Taisch.

61 S. Seuring, & M. Muller, Integrated chain management in Germany – identifying schools of thought based on a literature review. *Journal of Cleaner Production*, 15 (2007), 699–710.

62 Defee *et al*.; Lengnick-Hall *et al*.

63 G. Wu, J. Ding, & P. Chen, 'The effects of GSCM drivers and institutional pressures on GSCM practices in Taiwan's textile and apparel industry', *International Journal of Production Economics,* 135(2), (2012), 618–36; Caniels *et al.* (2013); J.L. Glover, D. Champion, K.J. Daniels, & A.J.D. Dainty, 'An Institutional Theory perspective on sustainable practices across the dairy supply chain', *International Journal of Production Economics* (2014); C.F. Hsueh, 'A bilevel programming model for corporate social responsibility collaboration in sustainable supply chain management', *Transportation Research*, Part E 73 (2015), 84–95, http://dx.doi.org/10.1016/j.tre.2014.11.006.

manufacturing, based on Strauss and Corbin[64] and Corbin and Strauss[65] GTM. Furthermore, the literature review played a crucial role at the end of the data analysis process, since the extant literature served as another source of data,[66] which was used to derive the commonalities and the differences between the extant literature and the substantive theory and also refined the final emerged theory with the established business and operational indicators from the eight competitive capabilities.

The theoretical contributions: the main set of propositions that guides SC actors to achieve SCI

First, the research proposes that **SC actors through the IMLA** need to take all the **necessary strategic measures** in both manufacturing and SC sustainability requirements, together with the implementation of all quality management objectives, in line with the 3BL to achieve competitive capabilities.

In particular, the IMLA ideally adopts a strategic leadership approach, based on a shared leadership stance instead of an individual leadership approach, so as to build on the collective effort of all people based on four types of leadership traits to achieve both intra and inter-SCI, where the **transformational leadership style**, needs to meet the change and innovation through people; the **servant leadership style**, needs to be sensitive for people's requirements and at the same time meets the business objectives; the **situational leadership style**, needs to meet contingent situations of all actors; and the **transactional leadership style**, needs to meet the routine flow of transactions in line with the established performance measures.

Second, the research proposes that for all SMEs to achieve SCI, an IMLA needs to be deployed at the strategic, tactical and operational management levels, with due consideration of each **SC actor contextual conditions**, so as to establish and implement the right strategies for the business, manufacturing and SC, based on a holistic SCI management approach, which is enabled by technology, in both automation and information systems, so as to achieve competitive capabilities.

64 Strauss & Corbin, *Basics of Qualitative Research.*

65 Corbin & Strauss.

66 Strauss; Glaser; K. Charmaz, *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis* (London, 2006).

In particular, such a strategic approach needs to implement, assess and revise on an ongoing basis and with a continuous improvement approach their **manufacturing and SC tactical and operational collaborative relationships**, both internally and externally with all the SC stakeholders, through high quality and sustainable processes (i.e. based on the 3BL with ISO-based standards), so as to improve on the overall SC competitive capabilities.

Third, the research proposes that the overall SC, through its IMLA, holistically need to involve the **human element** within all SC actors, through all the necessary dedicated collaborative initiatives (i.e. from an arm's length to a close relationship continuum), depending on the role of each SC actor, to achieve competitive capabilities.

In particular, such a holistic SCI management approach, through the involvement of all the key stakeholders, which is enabled by technology, needs to build on trust and to jointly-derive the necessary business, SC and manufacturing strategies across all management levels from a **social perspective**, which are all needed to achieve the SC competitive capabilities.

Methodological contribution

This research extends the applicability of grounded theory based research within SCM and OM disciplines since it was found as the 'best-fit' methodology since the research objective was after theory verification and generation.[67] Furthermore, such a study answers the call for such a GTM methodology usage, since 'it is not very widespread and rigorously applied in operations management (OM) research'.[68]

Research limitations

The research offered a credible, valid and trustworthy substantive theory based on a GTM. In spite of the scholarly work to respect scientific rigour, this research work is still subjected to different sources of limitations, which in some way or another, could not be avoided, as explained below.

67 R. Suddaby, 'What grounded theory is Not', *Academy of Management Journal*, 49(4) (2006) 633–42; T.J. Watson, *Management, Organisation and Employment Strategy* (Newcastle, 1986).

68 Watson, 232.

First, the research focus on the Maltese SMEs manufacturing sector, limits the research generalization due to the contextual uniqueness of the sample. Second, the sample understudy is limited, since not all SC members could be included for every focal firm understudy so as to cover the whole SC. Third, the research did not identify the theoretical effect of each particular leadership style from the four established traits but considered the overall competitive capabilities from a holistic perspective. Fourth, in some cases data collection was limited due to the controlled and limited access given, since for some firms, the data obtained had to rely on a single informant, who may have added a level of subjectivity and bias to the research response. Fifth, this study theoretical richness may have been limited by the use of a cross-sectional research design, which only captured a snapshot of what the data were saying at one moment in time. Because SCI is a long-term strategic commitment and not a quick fix approach between all SC actors, a longitudinal study would have rendered more rich data based on more variations. Sixth, the research has produced a parsimonious model of a set of antecedents and outcomes of inter-organizational conceptual elements which include a theory based on substantial breadth but lacks the depth. Seventh, the research with the deployment of the systematic approach, in line with the GTM techniques and procedures,[69] may have stifled the theory emerging process.

Suggestions for future research

The substantive theory with its theoretical model is very comprehensive and consists from a multiplicity of factors, which have a varying degree of impact on SCI, which were not quantified. Hence future research may study such concepts, to derive their receptive weighted significance to the SCI initiatives to achieve competitive capabilities.

The proposed framework shall be used to direct future researchers to investigate the role of all conceptual elements relationship, through a large scale study from a quantitative approach, to enhance its validity and generalizability to other contextual conditions and also to sustain or invalidate such a substantive theory with its theoretical framework. The sample under such research shall incorporate other contexts or adopt a

69 Strauss & Corbin, *Basics of Qualitative Research*; Glaser.

cross-cultural study within EU or across different countries worldwide to ensure a broader context.

It will be fruitful for future research to examine the evolution of SCI patterns across time by undertaking a longitudinal type of research design to capture the nature of the SCI phenomenon being a process approach which varies across time with all SC actors.

The GTM structured approach used within such a research shall serve as a guideline to promote to other scholars on how to deploy such a systematic approach to generate new theories based on the GTM.

Ronald Cuschieri, B.Elec. Eng. (Hons.), MBA (Henley, UK), Ph.D. (Aston University, UK) joined the University of Malta after the previous experience in one of Malta's leading telco operator. He is currently Senior Lecturer II in the department of computing/ information technology department at the University of Malta Junior College. He has also lectured in other local institutions in management at undergraduate level, business management at diploma level, strategy and change management modules at MBA level and information technology at diploma level. He also attended various training programmes in software and hardware in Sweden, Japan, and Italy. He also presented various scholarly work of his research locally, in India and in UK. His research interests are in business processes operations and optimization in networked organizations from both an operations management and information technology theoretical perspective.