



Exploratory Study on the Key Characteristics of Secondary Ports Categorisation: An Analysis from the Perspectives of Malaysian Experts

Mohammad Khairuddin Othman¹, Noorul Shaiful Fitri Abdul Rahman², Alisha Ismail³, Noor Apandi Osnin⁴ and Rudiah Md Hanafiah⁵

¹ Faculty of Maritime Studies, Universiti Malaysia Terengganu, 20130, Kuala Nerus, Terengganu, Malaysia. m.khairuddin@umt.edu.my *Corresponding Author

² Faculty of Business, Higher College of Technology, 25035, Abu Dhabi, United Arab Emirates. nsfitri2107@gmail.com

³ School of International Studies, College of Law, Government and International Studies, Universiti Utara Malaysia, 06010, Sintok, Kedah, Malaysia. alisha@uum.edu.my

⁴ Faculty of Maritime Studies, Universiti Malaysia Terengganu, 20130, Kuala Nerus, Terengganu, Malaysia. apandi@umt.edu.my

⁵ Faculty of Maritime Studies, Universiti Malaysia Terengganu, 20130, Kuala Nerus, Terengganu, Malaysia. rudiah@umt.edu.my

Abstract. Secondary ports in Malaysia are categorized in an ambiguous state and noted inconsistently throughout the existing literature because there is no clear and conclusive definition that can accurately explain their backgrounds based on specific characteristics. Thus, the purpose of this study is to explore the secondary port operational characteristics to address the current ambiguity and inconsistency of information observed in the literature. This study adopted a systematic qualitative approach to conduct a cross-case analysis and to obtain the necessary information from the field experts and established literature. The results obtained indicate that there are seven key characteristics emphasized to differentiate the background of secondary ports and assist in the port categorizing process. Such results could assist decision-makers and policy-makers to provide better a perspective on the background of maritime ports in Malaysia and highlight the differences of port categories in a systematic way. This study is valuable in that it identifies a set of key characteristics that reconcile local perspectives with the global context related to port categorization initiatives, thereby contributing to a more streamlined and coherent approach to this important issue.

Keywords: Port Characteristics, Secondary Ports, Malaysia, Qualitative Study, Grounded Theory, Social Science.

1 Introduction

Malaysia's major ports such as Port Klang, Port of Tanjung Pelepas (PTP), Johor Port, Penang Port and Kuantan Port have contributed almost USD 373.44 million to the national economy in 2010 [1]. It is achieved with strong assistance and support from the secondary ports of the country which involved in feedering the goods and providing critical connections between the major ports, hinterland areas and industrial markets [2]. In the meantime, as a critical component in the maritime transport and trade system, these maritime cargo ports are also dependent on the trade activity and port-related services to generate revenues and support their competitive and sustainable operations [3].

Amidst the era of globalization, there existed a multitude of port infrastructures and facilities of varying sizes and types, each competing to secure a slice of the sea freight market [4]. These ports are distinct from one another due to the diverse cargo operations and organizational structures employed. Given the differences in port systems, including diverse operational, organizational, and strategic management approaches employed to optimize cargo movement, categorizing ports could provide insight into their ability to meet the demands of the trading industry, as well as their strengths and limitations [5].

With regard to the port categorization, the global maritime transport industry has witnessed the emergence of various port classification models and terminologies, with each country or region utilizing distinct approaches to differentiate and classify their ports [6], [7]. Moreover, these countries or regions may have varying views regarding the port classification models or terminologies, which could impact their practical application.

Nevertheless, the limited availability of literature on secondary ports in Malaysia has resulted in the identification of a related issue such as the inadequate development of secondary ports in the country. Upon initial examination, it was discovered that the state of secondary ports in Malaysia is uncertain because there is no clear and definitive definition that accurately describes their origins and attributes [8], [9].

In addition, their origins have been inconsistently and haphazardly described from different viewpoints, lacking concrete information. Consequently, the actual group of secondary ports in Malaysia has been inconsistently defined across different studies (i.e., [2], [10], [8]), and the available information in such existing studies pertaining to Malaysian secondary ports are still insufficient as they do not provide a comprehensive overview of the general background and features of secondary port operations in Malaysia.

Therefore, this study focuses on exploring the operational characteristics of Malaysian secondary ports to address the current ambiguity and inconsistency of information observed in the literature.

2 Literature Review

According to the literature surveys, Malaysia has practiced specific terminologies and classification systems to coordinate and categorize the country's ports. Generally, Malaysian ports are classified into several categories using a variety of terminologies, including federal ports, state ports, private ports, major ports, minor ports, primary ports, and secondary ports [9].

Despite various terminologies used to classify ports in Malaysia, there is no standardized concept as they are classified differently. For example, federal, state, and private ports/ terminals/ jetties are classified based on ownership and governance/management models, segregated according to the jurisdiction of the respective governments or institutions that administered or owned the ports [11], [12], [13]. In contrast, major and minor ports are segregated based on their size, capacity, and annual volume of port throughput [14], [10], [15]. Meanwhile, the classification measures for primary and secondary ports in Malaysia are extending on the role of the ports rather than using only specific measures such as size, capacity, and annual volume of port throughput to segregate ports in each group [2], [17], [16], [15]. However, the backgrounds of the primary and secondary ports in Malaysia are still ambiguous as they are subjectively defined based on different perspectives. For instance, [17] defined secondary ports in Malaysia as ports which are not as big in size, capacity and throughput volumes as compared to the country's major ports. They function to facilitate trade and providing a link between producers located in the areas served by the ports with their markets. Meanwhile, according to other perspectives from Ministry of Transport Malaysia [18] and Marine Department of Malaysia [15], the secondary ports are ports other than major ports that had been declared by the federal government, which may consist of the medium and small sized ports. Nevertheless, the list of major ports in Malaysia noted by the Ministry of Transport Malaysia [18] and Marine Department of Malaysia [15] is questionable as some ports listed as major ports of the country are relatively smaller in size, capacity and throughput volume than the other major ports, such as Teluk Ewa Port and Labuan Port. Hence, it creates a little confusion on how the port classification process is conducted in Malaysia.

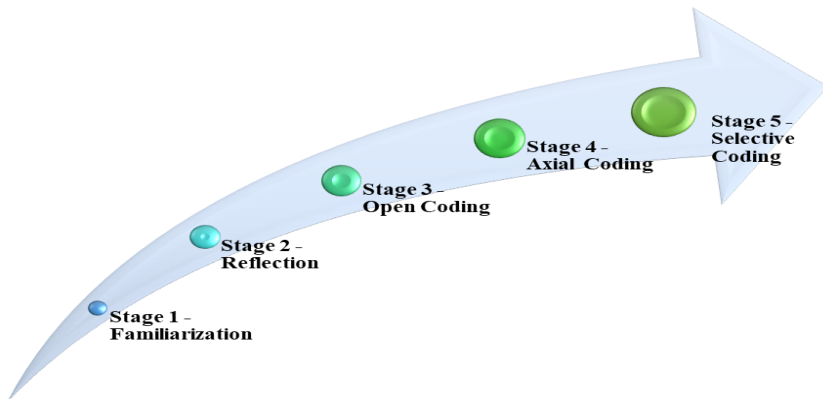
While the various port classification concepts used in Malaysia may have been designed for specific purposes, their application for classifying ports in the country is inconsistent and does not provide a clear understanding of the operational characteristics of ports within their respective categories. No clear definition, guideline or comprehensive studies provided to facilitate the classification process for each group of ports in Malaysia exacerbated the situation even more, which led to further misunderstanding in this area [8], [9].

If the shortcomings in the classification system are not addressed, it could lead to a negative impact on the reputation of ports and their operational capabilities and capacities. This is because some of the terminologies used to classify ports are associated with the level of business prosperity and identity of the ports. Therefore, it is crucial to address these gaps to ensure the proper identification and promotion of the ports [19], [10].

3 Methodology

A qualitative approach was adopted in this study to gather multiple perspectives on the concept of secondary ports under investigation, which involved conducting semi-structured interviews with field experts and cross-comparison analysis with global literatures. The qualitative data obtained from the reviews of global literature were used to analyse the experts' viewpoints and enhance the findings of this study. A total of five field experts were involved in the interview sessions. The field experts came with highly experienced backgrounds related to secondary ports industry that consist of one senior marine officer, two operation managers, one assistant operation manager, and one marine superintendent. They have been involved in planning, managing or coordinating the operations of several secondary ports in Malaysia, respectively. The evolved grounded theory method, founded by Strauss, Corbin and Clarke [20], [21], [22], has been applied in the analysis part of this study to analyse the qualitative data collected from the interviews. Further descriptions of grounded theory analysis process conducted in this study are provided in Section 3.1.

3.1 Analysis Using the Evolved Grounded Theory Method



Sources. Creswell and Clark [21]; Creswell [23]; Jeevan [22]

Fig. 1. Analysis stages using Grounded Theory Method.

The detailed explanations on the systematic process of grounded theory analysis conducted in this study are as follows:

Stage 1 – Familiarization. At this stage, the data transcribed from the interviews should be properly familiarized as quickly as possible to capture any pertinent observations or input provided during each session. This process should begin with the first interview, where the inputs from that session should be transcribed and understood promptly after it has concluded. To familiarize oneself with the data, we should repeatedly read the qualitative feedback received from each respondent. This process helps

in understanding the content of the interviews and identifying concepts or categories that are relevant to the scope of the inquiry [24]. Additionally, this step can be beneficial to develop additional questions and revise existing questions for further interview sessions, which will be guided by a theoretical sampling approach [25], [26].

Stage 2 – Reflection. In the stage of reflection, it is necessary to conduct a repeated cross-comparison analysis. This analysis involves comparing the initial findings from the interviews with the previous literature or with other cases both locally and globally. The aim of this process is to differentiate between existing perspectives from the literature and the current findings obtained from the interviews. This process can help to identify the emergence of new ideas [27] and avoid bias in the research [28]. Additionally, it helps to ensure the achievement of precise and consistent findings [28], [22].

Stage 3 – Open coding. This stage involves the process of categorizing the data, which requires breaking down the transcript into smaller parts and analysing them closely to identify similarities and differences related to the research topic. This involves identifying key words, phrases, and concepts relevant to the scope of inquiry and labeling them with relevant code notes [29]. Once the data are labeled, similar codes are grouped together, and the content within each group is transferred to a code form on a card [23], [22]. In this code form, details on the respondents and important notes are also included for identification and reflection purposes. The groups of key words or phrases created are constantly compared to avoid duplication of information and ensure consistent findings. The theoretical sampling approach may also be employed to gather additional data through further interviews to refine the ongoing theory or develop new categories [30].

Stage 4 – Axial coding. After the categories have been established, the next stage is axial coding, which involves identifying connections between the outcomes obtained from the familiarization, reflection, and open coding processes [31]. The goal of this stage is to reorganize the data in innovative ways by linking the categories that have been generated [32]. This includes developing the causal conditions, strategies, and consequences. The categories and their related data are read and compared several times to establish their connectivity, enabling the creation of a more complete picture [24], [33].

Stage 5 – Selective coding. This stage involves the process of identifying the relationship between categories to provide abstract explanations for the scope of study [23]. All the information gathered throughout the five steps is used to create a narrative that links the categories and identifies specific answers to the research question [30]. The core category or theme is developed to represent the cohesive theory or concept that relates to the scope of question [29]. The process of theoretical sampling stops when the research question has reached theoretical saturation, and the theory or concept related to the research question is satisfied [26].

4 Results and Discussions

Based on the analysis conducted on the data obtained, seven key characteristics have been highlighted by the industrial experts as they described the backgrounds of secondary ports in Malaysia from their personal perspectives and experiences when involved the secondary port operations.

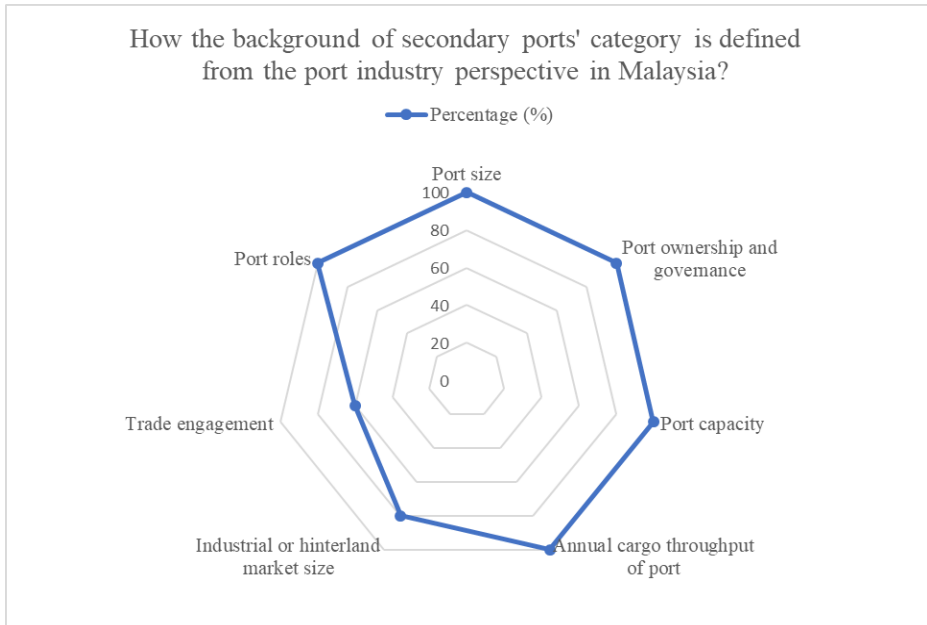


Fig. 2. Key characteristics of secondary port categorization.

Referring to the responses summarized in Figure 2, the size of port was emphasized by majority (100%) of the experts when describing the background of secondary ports in Malaysia. According to the experts, the secondary ports in Malaysia can be divided into two size ranges, namely medium-sized ports, which have a medium-scaled port area, and small-sized ports, which have a small-scaled port area. The majority of the experts (100%) also stated that most secondary ports in the country are owned by the State governments and governed by the State Port Authorities, but private ports, single operating terminals, and jetties also exist. These types of ports are regulated by different jurisdictions and regulatory systems compared to primary ports. The regulatory bodies overseeing the operations of these ports include the Marine Department of Malaysia, Fishing Development Authority, and State Port Authorities. The State governments may appoint private port operators to operate these ports, or certain development authorities may operate them on behalf of the State Port Authorities.

Meanwhile, in terms of capacity, the experts unanimously agreed that secondary ports in Malaysia have cargo handling and storage capacity that range from low to moderate. The capacity of these ports depends on their operating size. According to them,

small capacity secondary ports usually can handle less than or equal to 1 million tonnes of cargo annually, while medium capacity secondary ports can handle more than 1 million tonnes of cargo annually under normal conditions.

With regard to the roles of secondary ports in Malaysia, the majority of the experts (100%) agreed that the secondary ports have different roles compared to primary ports. They operate to generate maritime trade and commercial activity for their respective regions and states, serving as specialized maritime gateways for economic activities by sea. From a national perspective, these ports are considered as the secondary nodes in the national maritime logistics chains and second contributors to the country's maritime economy.

However, from the majority, 80% of the experts expressed the view that secondary ports in Malaysia are typically connected to limited hinterland market networks and primarily serve small or medium-sized industrial activities. In addition, 60% of the participants noted that these ports have limited involvement in international trade, although some are able to handle intra-regional and inter-regional trades. Despite this, secondary ports are actively serving the demand of domestic trades.

Not limited to the seven key characteristics emphasized, additional characteristics can also be considered by the decision-makers or policymakers when certain aspects of differentiation are relevant to be included such as in terms of development of infrastructure and facilities as well as port capability in handling different sizes of vessels.

5 Conclusions

To sum up, this study has successfully achieved its objective of investigating the operational characteristics of Malaysia's secondary ports through an empirical qualitative approach. A number of seven key operational characteristics of Malaysia's secondary ports have been identified to describe the background of secondary port operations in Malaysian and its dissimilarity from other port category.

This paper contributes to fill a gap in the literature by providing an empirical review of secondary ports in Malaysia and proposes a new set of port categorization criteria in the Malaysian context. The results of this research can serve as a reference for policy-makers to re-examine the current national port classification and streamline the functions of all ports and jetties, as well as improving port coordination efficiency by the governments. With improved categorization characteristics, ports have the potential to capture the attention of investors for future planning and development.

As for further research, more attentions are needed to comprehensively assess the overall port operational background in Malaysia and define different port categories which could enhance their identity.

Acknowledgement

UMT Scholarship Scheme supported this work. The authors would like to extend huge gratitude to the anonymous Malaysian experts from the Marine Department of Malaysia, Konsortium Pelabuhan Kemaman Sdn. Bhd., TLP Terminal Sdn. Bhd., and

Langkawi Port Sdn. Bhd. for their involvement and contributions to this study. Appreciation is also addressed to the Universiti Malaysia Terengganu (UMT) for providing financial support under the UMT Scholarship Scheme.

References

1. Jeevan, J., Ghaderi, H., Bandara, Y., Saharuddin, A. H., Othman, M. R.: The Implications of the Growth of Port Throughput on the Port Capacity: The Case of Malaysian Major Container Seaports. *International Journal of e-Navigation and Maritime Economy* 3(8), 84-98 (2015).
2. Khalid, N., Ang, M., Abu Hasan, E. C.: Assessing the Issues, Challenges and Prospects of Selected Secondary Ports in Peninsular Malaysia (Final Report). Centre for Maritime Economics & Industries (MEI), Maritime Institute of Malaysia (MIMA), Kuala Lumpur (2011a). http://www.mima.gov.my/mima/wp-content/uploads/fr_secondaryports.pdf (last accessed 8/3/2017).
3. Notteboom, T.: Trade and Transport Modes: The Search for Global Connectivity Through Transport Networks, Part VI: Transport Networks in International Trade. In Blonigen, B. A. & Wilson, W.W. (Eds.), *Handbook of International Trade and Transportation* (p. 541). Edward Elgar Publishing Limited, Cheltenham (2018).
4. Roa, I., Peña, Y., Amante, B., Goretti, M.: Ports: Definition and Study of Types, Sizes and Business Models. *Journal of Industrial Engineering and Management* 6(4), 1055-1064, (2013). <http://dx.doi.org/10.3926/jiem.770>.
5. Sahu, P. K., Sharma, S., Patil, G. R.: Classification of Indian Seaports Using Hierarchical Grouping Method. *Journal of Maritime Research* XI(III), 51-57 (2014).
6. Bichou, K., Gray, R.: A Critical Review of Conventional Terminology for Classifying Seaports. *Transportation Research Part A: Policy and Practice* 39(1), 75-92 (2005). <https://doi.org/10.1016/j.tra.2004.11.003>
7. Ding, Z.-Y., Jo, G.-S., Wang, Y., Yeo, G.-T.: The Relative Efficiency of Container Terminals in Small and Medium-Sized Ports in China. *The Asian Journal of Shipping and Logistics* 31(2), 231-251 (2015). <https://doi.org/10.1016/j.ajsl.2015.06.004>
8. Abdul Rahman, N. S. F., Ismail, A., Othman, M. K., Mohd Roslin, R. A., Lun, V. Y. H.: Decision Making Technique for Analysing Performance of Malaysian Secondary Ports. *International Journal of Shipping and Transport Logistics* 10(4), 468-496 (2018). <https://doi.org/10.1504/IJSTL.2018.093459>
9. Othman, M. K., Abdul Rahman, N. S. F., Ismail, A., Saharuddin, A. H.: The Sustainable Port Classification Framework for Enhancing the Port Coordination System. *The Asian Journal of Shipping and Logistics* 35(1), 13-23 (2019). <https://doi.org/10.1016/j.ajsl.2019.03.003>
10. Khalid, N., Ang, M., Abu Hasan, E. C.: Promoting minor ports to complement major ports in Malaysia (SEAVIEWS, Mima's Online Commentary on Maritime Issues). Maritime Institute of Malaysia (MIMA), Kuala Lumpur (2011b). <http://www.mima.gov.my/phocadownloadpap/seaviews/34.5-2011-1.pdf> (last accessed 8/3/2017).
11. Ministry of Transport Malaysia: Ports in Malaysia. Official Portal of Ministry of Transport Malaysia (2016). <http://www.mot.gov.my/en/maritime/ports-in-malaysia> (last accessed 25/12/2017).
12. Labuan Liberty Port Management.: Malaysian Ports. Official Portal of Labuan Liberty Port Management Sdn. Bhd (2016). <http://www.llpm.com.my/v2/index.php/2013-02-28-07-17-26/2013-02-28-07-33-18> (last accessed 26/12/2017).

13. Vieira, G. B. B., Kliemann-Neto, F. J.: Taxonomy for The Classification of Container Ports: A Contribution to Port Governance. *Espacios* 37(3), 23 (2016). <http://www.revis-taespacios.com/a16v37n03/16370323.html> (last accessed 25/12/2017).
14. Alkan, G. B. & Barla, M. C.: Regional Development and Port Planning: The Port of Mersin as a Feeder Terminal in the Eastern Mediterranean. In: Barla, M. C., Sag, O. K., Roe, M., Gray, R. (Eds.), *Developments in Maritime Transport and Logistics in Turkey*. Routledge, New York (2001).
15. Marine Department of Malaysia.: Primary (Major) and Secondary (Minor) Ports in Malaysia (Unpublished information). Barter Trade, Cargo and Port Management Unit, Marine Department of Malaysia, Port Klang (2017).
16. Economic Planning Unit of Malaysia.: Chapter 7: Strengthening infrastructure to support economic expansion, Strategy A3: Expanding port capacity, access, and operations - Secondary ports. Eleventh Malaysia Plan (2015-2020). Economic Planning Unit of Malaysia, Putrajaya (2015). https://www.talentcorp.com.my/clients/TalentCorp_2016_7A6571AE-D9D0-4175-B35D-99EC514F2D24/contentms/img/publication/RMKe-11%20Book.pdf (last accessed 2/4/2017).
17. Khalid, N., Ang, M., Abu Hasan, E. C.: Secondary ports in Malaysia: Unsung heroes. Center for Maritime Economics & Industries (MEI), Maritime Institute of Malaysia (MIMA), Kuala Lumpur (2012). <http://www.mima.gov.my/mima/wp-content/uploads/secondaryportsinmalaysia.pdf> (last accessed 8/3/2017).
18. Ministry of Transport Malaysia.: Primary (Major) Ports in Malaysia (Unpublished information). Maritime Division, Ministry of Transport Malaysia, Putrajaya (2017).
19. Khalid, N.: The Development of Ports and Shipping Sector in Malaysia. Maritime Institute of Malaysia (MIMA), Kuala Lumpur (2005). <http://www.mima.gov.my/mima/wp-content/uploads/nazery-lpj%20article.pdf> (last accessed 7/3/2017).
20. Clarke, A.: *Situational Analysis: Grounded Theory After the Postmodern Turn*. SAGE, Thousand Oaks, CA (2005).
21. Creswell, J. W., Clark, L.P.: *Designing and conducting mixed methods research* (2nd Edition). SAGE, Thousand Oaks, California (2011).
22. Jeevan, J.: *The Role of Malaysian Dry Ports in The Container Seaport System*, PhD thesis, University of Tasmania, Australia (2017). https://eprints.utas.edu.au/23852/1/Jeevan_whole_thesis_ex_pub_mat.pdf (last accessed 8/3/2018).
23. Creswell, J. W.: *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*. Pearson, Boston, MA (2012).
24. Strauss, A. L., Corbin, J. M.: *Basic of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (2nd Edition). SAGE, Thousand Oaks, California (1998).
25. Glaser, B. G.: *Basics of Grounded Theory Analysis*. Sociology Press, Mill Valley, California (1992).
26. Corbin, J. M., Strauss, A.: *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (4th Edition). SAGE, Newbury Park (2015).
27. Strauss, A. L., Corbin, J.: *Grounded Theory Methodology*. SAGE, Thousand Oaks, California (1997).
28. Goulding, C.: Grounded Theory, Ethnography and Phenomenology: A Comparative Analysis of Three Qualitative Strategies for Marketing Research. *European Journal of Marketing* 3(4), 294-308 (2005).
29. Vollstedt, M., Rezat, S.: An Introduction to Grounded Theory with a Special Focus on Axial Coding and the Coding Paradigm. In: Kaiser, G. and Presmeg, N. (Eds.),

- Compendium for Early Career Researchers in Mathematics Education (pp. 81-100). Springer, Cham, Switzerland (2019).
30. Tie, Y. C., Birks, M., Francis, K.: Grounded Theory Research: A Design Framework for Novice Researchers. *SAGE Open Medicine* 7, 1-8 (2019).
 31. Kendall, J., Judy, K.: Axial Coding and The Grounded Theory Controversy, *Western Journal of Nursing Research* 21(6), 743-757 (1999).
 32. Corbin, J. M., Strauss, A.: Grounded Theory Research: Procedures, Canons, and Evaluative Criteria. *Journal of Qualitative Sociology* 13(1), 3-21 (1990).
 33. Eaves, Y. D.: A Synthesis Technique for Grounded Theory Data Analysis. *Journal of Advanced Nursing* 35(5), 654-663 (2001).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

