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Review of the doctoral dissertation by Mr. Khalil Bayramov entitled Improving Waste Management Operations in the Oil and Gas Industry through Reverse Logistics

1. Formal information

- 1.1. The subject of this review is the doctoral dissertation by Mr. Khalil Bayramov, entitled *Improving Waste Management Operations in the Oil and Gas Industry through Reverse Logistics*.
- 1.2. The documentation was sent by e-mail on 17 February 2026 from the following address: monika.mysiakowska@uni.lodz.pl. The e-mail included attachments that made it possible to prepare this review.
- 1.3. This review was prepared following my appointment as a reviewer by Professor Ewa Walińska, Chair of the University of Lodz Committee for Academic Degrees in the discipline of Management and Quality Sciences. The letter stated that the Committee meeting had been held on 26 January 2026. It also specified that the review should be prepared in English, in either paper or electronic form, signed with a qualified electronic signature or a trusted profile, and should contain a detailed and well-reasoned assessment of the doctoral dissertation together with an unambiguous conclusion as to whether the evaluation is positive or negative.
- 1.4. The legal basis for this review is Article 187 of the Act of 20 July 2018 – Law on Higher Education and Science (art. 187 ustawy z 20 lipca 2018 r. Prawo o szkolnictwie wyższym i nauce).
- 1.5. The dissertation under review was submitted electronically and signed using a trusted profile. It is entitled *Improving Waste Management Operations in the Oil and Gas Industry through Reverse Logistics*. The supervisor is dr. hab. T. Bartosz Kalinowski, Professor of the University of Lodz.
- 1.6. The attached dissertation is 270 pages long and includes a title page, table of contents, seven sections, conclusions, references divided into literature and web references, a list of tables, a list of figures, acknowledgements, and Appendix A. According to the source file, the references section contains 218 literature items and 11 web references. The list of tables comprises 54 tables, while the list of figures contains 13 items. Appendix A contains 9 questions.

2. Assessment of the Doctoral Dissertation

At the outset, it should be emphasized that the topic addressed in the reviewed dissertation is scientifically and practically relevant. The subject matter of the dissertation clearly falls within the discipline of management and quality sciences. It is also worth highlighting the well-developed introduction, in which the Author explains the motivation for undertaking the study, presents the research process illustrated with a diagram (Fig. 1, p. 8), and describes the adopted research methodology. Subsequently, and this deserves particular recognition, the Author conducts a theoretical study in the form of a systematic literature review (SLR). The research method applied in the empirical part of the dissertation is then presented. With regard to the selection of research units, it should be noted that the Author explicitly states that purposive, non-random sampling was used. The successive phases of the implementation of this method are also described. Further on, the dissertation presents the identified research gaps. This set of identified gaps should be assessed positively, as it covers the key

dimensions of the analyzed problem, namely the theoretical, empirical, and methodological ones, and correctly demonstrates that the area of reverse logistics in waste management within the oil and gas sector remains insufficiently explored. At the same time, not all gaps classified as theoretical are, in fact, fully theoretical in nature. For example, RG4, concerning outsourcing, is to a large extent managerial and decision-oriented, while RG5, related to Industry 4.0, is more conceptual and application-oriented than purely theoretical. Similarly, RG7, classified among the empirical gaps, largely concerns a design- and model-related issue rather than merely a shortage of empirical data. As a consequence of the identified research gaps, the Author presents the structure of the research problem (RP1–RP8). The Author clearly demonstrates awareness of several important dimensions of the studied phenomenon: the low level of reverse logistics adoption, weak integration with supply chain management, the importance of supply chain stakeholders, outsourcing, implementation barriers, and the potential of Industry 4.0. This means that the dissertation topic has been framed broadly and with practical relevance. The research problem has been outlined appropriately and is generally consistent with the identified research gaps. From a cognitive and scientific perspective, RP6, RP7, and RP8 appear to be the most interesting. The structure of the research questions presented in the following part of the dissertation further refines the research problems and outlines the research background more precisely, as these questions already have a more operational and orderly character, showing a logical transition from the identified gaps and research problems to the stage of empirical investigation. A particularly positive assessment should be given to the juxtaposition of Research Gaps and Research Questions presented in Table 2 (pp. 18–19).

Chapter 2 should be assessed positively, as it provides a broad and logically structured theoretical background for the subsequent analyses. It covers the definitions of reverse logistics, its role in supply chain management, the determinants and barriers of its implementation, the specificity of waste in the oil and gas sector, outsourcing, performance measurement, and the significance of Industry 4.0 technologies. The broad scope of the literature reviewed, the effort to systematize the key concepts, and the attempt to link the general perspective with the specific conditions of the oil and gas industry deserve recognition. Overall, the chapter provides a solid conceptual foundation for the empirical part of the dissertation. At the same time, several minor reservations should be noted. First, the chapter is at times overly descriptive, as the Author presents numerous positions from the literature but engages less frequently in their critical comparison, synthesis, or in clearly articulating his own standpoint. Second, some subsections contain repetitions, particularly with regard to the drivers, barriers, and general benefits of reverse logistics. Third, although the title of the chapter refers directly to the oil and gas sector, part of the discussion remains rather general and is only later linked to this industry. In summary, Chapter 2 constitutes a valuable and substantively important part of the dissertation, demonstrating sound knowledge of the relevant literature. Its scholarly value would, however, have been even greater if the Author had strengthened the critical-analytical layer, reduced repetition, and more clearly emphasized the specificity of the oil and gas sector. At the same time, I am fully aware that this is a doctoral dissertation; therefore, I treat this remark primarily as an indication of a possible direction for the Author's further academic development.

Chapter 3 is the outcome of a theoretical study conducted using the systematic literature review (SLR) method, the application of which was appropriately signalled in the introduction to the dissertation. It deserves recognition that, at the very beginning of the chapter, the Author emphasizes the importance of the methodological rigor inherent in SLR and refers to the relevant literature on the subject. The selection of two reputable scholarly databases, Scopus and Web of Science, should also be assessed positively, as it strengthens the quality of the review sources. The Author correctly identifies and justifies the key concepts used in the search process and presents, in Table 4, the main elements of the review protocol, including the keywords, time frame, inclusion and exclusion criteria, source types, language, and databases. This part of the chapter provides a solid foundation for the subsequent analyses. At the same time, the documentation of the SLR procedure could have been presented in greater detail. The study covers the years 2001–2022; however, the Author does not explain more fully the

rationale for selecting this approximately twenty-year period. In addition, the upper limit of the review is 2022, although several years passed before the dissertation was finalized, which means that the most recent publications may not have been included. Another shortcoming is the lack of an exact date for the retrieval of records from the databases, which makes it more difficult to assess fully the timeliness and replicability of the review. Although the Author refers to the PRISMA framework and includes a figure illustrating the screening process, the description of the individual stages remains somewhat too general. It would have been worthwhile to indicate more precisely, among other things, the number of records excluded after abstract screening, the number of publications unavailable in full text, the way duplicates were handled, and whether any additional items were included beyond the original search results. It would also have been useful to comment more clearly on the reasons for excluding items at the stages of abstract screening and full-text analysis. From this perspective, the chapter would have gained in clarity had the selection procedure been described in details, preferably in the form of a supplementary methodological appendix. A clear strength of the chapter is the attempt to move beyond a simple listing of publications toward a more in-depth synthesis. The Author presents not only the descriptive results of the review, but also the methodological and geographical profile of the literature. The application of the 4W1H principle as the Author's own coding framework also deserves appreciation, as it demonstrates an ambition to organize the research material according to a common analytical structure. At the same time, however, the very extensive presentation of the results in the form of 35 separate tables creates an impression of excessive detail and, in places, weakens the synthetic nature of the chapter. It may be worth considering whether these tables should be moved to an appendix, particularly if the Author intends to publish the dissertation in the future as a monograph. From a research perspective, greater aggregation of the findings and a clearer emphasis on patterns, trends, and differences between studies would be more valuable than such a broad, individual description of each publication. An important strength of the chapter is that the SLR is not treated merely as a literature review, but also as a basis for justifying the empirical part of the dissertation. On the basis of the literature analysis, the Author attempts to identify the limitations of previous studies and then synthesizes them in the form of theoretical, empirical, and methodological gaps. As a result, the chapter performs an important integrative function between the conceptual part and the Author's own empirical research. In summary, Chapter 3 should be assessed positively, as it demonstrates that the Author made an effort to conduct a systematic literature review based on recognized methodological principles and international publications.

Chapter 4 presents a logically structured account of the qualitative research process, covering the selection of respondents, the course of the interviews, data preparation, the stages of coding, and the derivation of the main themes and analytical categories. Particular recognition should be given to the fact that the Author does not limit himself to a general statement that interviews were conducted, but describes the research procedure in considerable detail, including the method of respondent recruitment, the time frame of the study, the tools used for transcription and data analysis, and the coding logic based on the grounded theory approach. This strengthens the methodological transparency of the chapter and shows that the Author made a conscious effort to organize the empirical part of the dissertation. The purposive sampling of respondents should also be assessed positively, because in qualitative research on such specialized issues as reverse logistics and waste management in the oil and gas sector, this strategy is justified and makes it possible to obtain statements from individuals with relevant expert knowledge. Another strength of the chapter is the presentation of participant diversity in terms of professional roles, companies, and geographical contexts. Additional value lies in the attempt to present the entire research process, from recruitment via LinkedIn, through the conduct of the interviews, transcription, data cleaning, and finally analysis using Taguette. This increases the transparency of the research procedure. The chapter is highly descriptive, and some parts are more instructional or textbook-like than strictly analytical. This applies in particular to those fragments explaining what semi-structured interviews, open coding, axial coding, and selective coding are. In a doctoral dissertation, one might expect slightly greater conciseness in these parts and a stronger focus on

how exactly the Author applied these procedures in the study, what analytical decisions were made, and how the credibility of the interpretation was ensured. It is also worth noting that the Author identifies the limitations of the research process, such as difficulties in arranging interviews, variation in the quality of responses, technological problems, and the limited possibility of generalization. This is a strong point of the chapter, as it demonstrates awareness of the limitations inherent in qualitative research. At the same time, one might have expected a stronger discussion of quality assurance in the analysis, for example whether any form of coding validation, code comparison, analytical memos, or verification of interpretations was applied. It should also be emphasized that the coding results presented, from open coding to selective coding are logical and consistent with the subject matter of the dissertation. Categories such as Waste Diversity and Handling, Operational Waste Management Strategies, Compliance and Performance, and Influencing Factors form a meaningful analytical structure. Similarly, the derived core category is consistent with the overall research problem of the dissertation. Chapter 4 constitutes a strong and necessary part of the empirical section of the dissertation, as it demonstrates that the Author conducted an actual qualitative study and sought to describe it in a methodologically structured manner. Its main strengths are the transparency of the procedure, the respondent selection appropriate to the research objective, the detailed description of the data analysis process, and the logical construction of the analytical categories.

Chapter 5, which presents the case studies, should be assessed positively, as it constitutes an extensive and ambitious empirical attempt to demonstrate how reverse logistics and waste management operate in organizational practice across different organizations in the oil and gas sector. Particular recognition should be given to the research design itself, especially the juxtaposition of several large, internationally recognized entities with SOCAR. Such a selection of organizations makes it possible to capture both common elements and differences resulting from organizational maturity, the regulatory environment, and the availability of infrastructure. Another strength of the chapter lies in the richness of its empirical material. The Author draws both on interview data and on secondary sources, mainly sustainability reports and corporate documents. As a result, each case is grounded not only in respondents' narratives, but also in numerical data and formal corporate declarations. This enhances the credibility of the description and makes it easier to see how declared environmental strategies relate to actual organizational practices. It is worth noting, however, that in Table 44, Figure 12, Figure 13, and similar items, access dates are missing for the cited web sources. Another positive aspect is the uniform structure of the case descriptions. In each case, the Author discusses similar areas: the level of organizational awareness, waste management strategies, waste classification and types, recycling and reuse activities, transport and logistics issues, KPIs, challenges, and opportunities for further improvement. Such compositional consistency facilitates comparison between the cases and shows that the Author seeks to conduct the analysis according to a common framework. At the same time, the chapter raises several reservations. First, it is highly descriptive and, in places, excessively narrative. The individual case studies contain a large number of details, but these are not always accompanied by sufficiently analytical synthesis. In other words, the reader receives a great deal of information about each company, but it is not always immediately clear which elements are most important from the perspective of the research problem and what comparative conclusions follow from them. Second, part of the material is based on corporate and declarative data which, by their nature, may have an image-building function. In several passages, the descriptions of the practices of the analyzed companies take a highly positive form, closer to the language of sustainability reports than to that of critical scientific analysis. It would therefore have been advisable to indicate more clearly where declarative data end and research interpretation begins. This remark should, however, be treated primarily as a suggestion for the Author's future research. Particular emphasis should nevertheless be placed on the SOCAR case, which brings important cognitive value to the dissertation, as it makes it possible to compare the practices of an organization operating in a different institutional, infrastructural, and regulatory context with those of the largest international companies. The Author correctly demonstrates that

differences in waste logistics, outsourcing, access to technology, and infrastructural constraints are not merely matters of managerial decision-making, but also result from the broader operational environment. In summary, the chapter devoted to the case studies should be assessed positively, both in empirical terms and in terms of its cognitive value, as it provides extensive material on actual reverse logistics and waste management practices in the oil and gas sector. Its main strengths are the well-chosen cases, the richness of the data, the consistent structure, and the attempt to combine organizational and comparative perspectives. The main reservations concern the excessive descriptiveness, the limited level of comparative synthesis, and the need for greater critical distance toward corporate data. Despite these remarks, the chapter constitutes an important and substantively valuable part of the dissertation.

The Results and Discussion section should be assessed positively, as it provides an extensive and substantively well-grounded attempt to synthesize the findings of the Author's own research in connection with the earlier literature review and the research questions. Particular recognition should be given to the logical structure of the subsections, the consistent linking of the findings to the individual research questions, and the use of empirical material derived both from interviews and from the case study analysis. Another strength of this section is that the Author does not limit himself to a simple presentation of results, but also seeks to interpret them in the broader context of reverse logistics, stakeholder collaboration, outsourcing, and the role of technology in the oil and gas sector. The recommendation-oriented part concerning the design of a reverse logistics network is also a valuable element, as it enhances the practical value of the dissertation. At the same time, several shortcomings should be noted. First, the section is at times overly extensive and repetitive, especially in the concluding parts of particular subsections, where similar conclusions are reformulated several times. Second, the Author refers very frequently to the research questions and research gaps in an almost report-like manner, which strengthens the orderliness of the argument but weakens its academic fluency. Despite these remarks, this section remains a strong part of the dissertation, clearly demonstrating the Author's ability to connect empirical material with the existing literature and to derive conclusions of both scientific and practical relevance. The section devoted to limitations and future research should also be assessed positively, as it demonstrates the Author's research maturity and methodological awareness. It is particularly commendable that the Author openly identifies the main limitations of the study, including the selective character of the sample, the predominance of large organizations in the research, limited access to sensitive data, the time-bound nature of the findings, and limited geographic representativeness. This strengthens the credibility of the dissertation as a whole and shows that the Author does not overstate the scope of the conclusions. At the same time, some reservations may be raised regarding the future research section, which is rather broad and at times resembles a catalogue of possible directions, not all of which are equally closely connected to the key findings of the dissertation. As a result, this part would have gained in value if the directions for further research had been more clearly organized, profiled, and hierarchized. Nevertheless, the section fulfills its purpose well and constitutes an important complement to the dissertation.

The Conclusions section should also be assessed positively, as it provides an orderly synthesis of the most important findings of the dissertation and clearly relates them to the research questions and the identified research gaps. It deserves recognition that the Author seeks to demonstrate both the theoretical contribution and the practical relevance of the study, while also emphasizing the sectoral context and the specificity of the oil and gas industry. The conclusion effectively closes the logic of the dissertation and confirms that the Author consistently pursued the adopted research objectives. At the same time, similarly to the previous section, one may gain the impression that the conclusion is somewhat too extensive and partly repetitive, as it reiterates issues already discussed at length in the Results and Discussion section. In several places, greater conciseness and a stronger emphasis on the most original findings of the dissertation would have been beneficial. This does not change the fact, however, that the concluding section has been prepared reliably and meets the standards expected of a doctoral dissertation.

In conclusion, I provide clear answers to the questions indicated in the request for this review submitted by Professor Ewa Walińska, Chair of the University of Lodz Committee for Academic Degrees in the discipline of Management and Quality Sciences.

- **Does the doctoral dissertation demonstrate the general theoretical knowledge required of a candidate applying for the doctoral degree in the relevant discipline or disciplines?**
A detailed assessment and its justification have been presented in Section 2 of this review. In the reviewer's opinion, the dissertation under review demonstrates the general theoretical knowledge required of a candidate applying for the doctoral degree in the discipline of Management and Quality Sciences.
- **Does the doctoral dissertation demonstrate the candidate's ability to conduct independent scientific research?**
In the reviewer's opinion, the dissertation under review demonstrates Mr. Khalil Bayramov's ability to conduct independent scientific research, both in the theoretical and empirical dimensions. The justification for this assessment has been presented in Section 2 of this review.
- **Does the doctoral dissertation constitute an original solution to a scientific problem, an original application of the candidate's own research results in the economic or social sphere, or an original artistic achievement?**
In the reviewer's opinion, the dissertation under review constitutes an original solution to the formulated research problem within the discipline of Management and Quality Sciences.

Based on my detailed review of the dissertation by Mr. Khalil Bayramov, entitled *Improving Waste Management Operations in the Oil and Gas Industry through Reverse Logistics*, I conclude that it falls within the field of social sciences and the discipline of Management and Quality Sciences. The research problem undertaken, as well as the theoretical and empirical studies conducted, made it possible to achieve the adopted objectives and answer the formulated research questions. Therefore, I conclude that the dissertation fulfills the requirements set forth in Article 187 of the Act of 20 July 2018 – Law on Higher Education and Science, and I recommend that Mr. Khalil Bayramov be admitted to the public defense of his doctoral dissertation.

Taking into account the detailed assessment presented in this review, and in particular the strong points of the dissertation, I would also like to recommend that it be awarded a distinction. This motion is justified, above all, by the well-conceived and methodologically consistent formulation of the research problem and research objectives, the Author's analytical approach and academic insight, as well as the overall coherence of the dissertation. Particular recognition should be given to the strong integration between the theoretical study based on the systematic literature review and the empirical part of the dissertation, which was developed on a solid conceptual foundation. The empirical part deserves special appreciation not only because of the difficulty of obtaining access to data in the studied area, but also because it demonstrates research maturity at the doctoral level, a clear awareness of the study's limitations, and a conscious effort to ensure the transparency and reliability of the scientific research process

Below, I present several questions to the doctoral candidate concerning the dissertation, to which I would kindly ask him to respond during the public defense:

- In what way does the Author justify that reverse logistics in the oil and gas sector should be treated not only as an operational function of waste management, but also as an element strategically integrated with supply chain management?

- To what extent are the recommendations proposed in the dissertation concerning the design of a reverse logistics network universal in nature, and to what extent are they specific to large organizations in the oil and gas sector operating under particular regulatory and infrastructural conditions?
- Which of the identified barriers to reverse logistics implementation does the Author consider the most difficult to overcome: technological, organizational, infrastructural, or stakeholder-related barriers?



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