Szczecin, 06.04.2026

dr hab. Blanka Tundys, Prof. US
Department of Logistics
Institute of Management
Faculty of Economics, Finance and Management
University of Szczecin

DOCTORAL DISSERTATION REVIEW

Mr. Khalil Bayramov, MSc

„Improving Waste Management Operations in the Oil and Gas Industry through Reverse Logistics"

Supervisor: dr hab. T. Bartosz Kalinowski, Prof. UŁ

The formal basis for preparing the review of the doctoral dissertation of Mr. **Khalil Bayramov**, MSc, is the decision of the UŁ Committee for Academic Degrees in the discipline of management and quality sciences dated 26.01.2026, and the Chair of Committee for academic degrees in the discipline of management and quality sciences at the University of Lodz Prof. dr hab. Ewa Walińska informing of the Committee's decision appointing me as the reviewer of the indicated dissertation.

I. General characteristics of the dissertation, assessment of the choice of topic, aims and research questions adopted in the dissertation, and the research procedure

In evaluating the dissertation submitted for review, the significance and importance of the problem undertaken by the Doctoral Candidate must be emphasised. The work addresses the issue of improving waste management operations in the oil and gas industry using the instruments of reverse logistics, thereby fitting into the stream of research on sustainable supply chain management. The subject matter related to waste management and the implementation of reverse logistics in the oil and gas industry corresponds to current and significant research directions in management sciences, referring to both challenges of operational efficiency and growing requirements regarding sustainable development and corporate environmental responsibility. The doctoral dissertation is devoted to the issues of waste management in the oil and gas industry, with particular emphasis on the role of reverse logistics as a tool supporting operational efficiency and sustainable development of enterprises operating in this sector. The topic of the dissertation should be considered cognitively significant and applicatively current, as the extractive industry generates significant volumes of hazardous and non-hazardous waste, the improper management of which carries serious environmental, legal and reputational consequences for sector entities. The Author analyses the processes related to the flow of waste,

its classification, transport, processing and recovery, indicating the importance of appropriate design and organisation of reverse logistics systems in supply chains. The subject scope of the work covers the analysis of reverse logistics as a strategic component of supply chain management in the oil & gas sector, with particular emphasis on the design, structuring and optimisation of reverse material flow systems from the point of generation to processing or disposal points. The work includes both a theoretical approach, encompassing a systematic review of literature on reverse logistics and waste management, and an empirical part based on semi-structured interviews and case study analysis of enterprises operating in the oil and gas industry. Particular attention was devoted to identifying the factors conditioning the efficiency of reverse logistics processes, including regulatory, technological and organisational conditions, as well as analysis of the barriers and challenges related to their implementation in practice. The dissertation also covers issues related to performance measurement, the role of stakeholder cooperation, and the use of technological innovations in improving waste management systems. The work also includes a comparison of practices applied in various enterprises and economic contexts, which allowed for capturing the diversity of approaches to the implementation of reverse logistics. The entire dissertation is oriented towards an in-depth examination of ways to integrate reverse logistics with waste management and towards formulating conclusions and recommendations regarding the improvement of these processes in the oil and gas sector.

The Doctoral Candidate undertook an attempt to fill a significant research gap concerning the limited scope of reverse logistics analyses in the specific context of the oil and gas sector. In the literature on the subject, reverse logistics issues are broadly discussed mainly in relation to industries such as manufacturing, retail and consumer goods, while their application in the conditions of the extractive industry remains relatively poorly recognised. The Doctoral Candidate correctly identifies the lack of in-depth empirical analyses taking into account the operational, environmental and regulatory specificity of the oil & gas sector.

Based on a systematic review of the literature, the Doctoral Candidate identified a multidimensional research gap classified in three dimensions: theoretical, empirical and methodological, indicating that the existing scientific output in the field of reverse logistics focused on the manufacturing and commercial sectors, overlooking the operational specificity of the oil and gas industry. In the theoretical dimension, a lack of comprehensive coverage of reverse logistics implementation in waste management in the oil & gas sector was identified, along with insufficient examination of the place of reverse logistics in the supply chain structure of this industry and a deficit of research concerning the involvement of supply chain stakeholders in reverse processes, as well as insufficient analysis of outsourcing opportunities and the potential of Industry 4.0 technologies in this context. In the empirical dimension, a critical lack of primary qualitative data and limited sample sizes in existing studies were identified, as well as an almost complete absence of research devoted to the design of reverse logistics networks adapted to the operational specificity of the extractive industry. In the methodological dimension, a lack of structured frameworks for assessing outsourcing decisions in reverse logistics was indicated, encompassing criteria for partner selection, ensuring regulatory compliance and performance monitoring, and a shortage of multi-variable analytical

approaches taking into account the complexity of sector conditions. The Doctoral Candidate undertook an attempt to fill the thus-defined gap by conducting a study combining a systematic literature review, multiple case study and semi-structured interviews with experts from six global oil corporations, constructing an integrated, empirically grounded framework for implementing reverse logistics dedicated to the oil and gas sector. The undertaken research aims to fill the gap by integrating a theoretical approach with an analysis of the actual practices of enterprises operating in the industry. In particular, an important contribution is the inclusion of the complexity of waste management processes, resulting from the diversity of waste streams and the high level of environmental risk. The Doctoral Candidate also undertakes an attempt to capture the relationships between regulatory requirements and the operational efficiency of enterprises, which is an important aspect that has been insufficiently explored to date. The filling of the research gap is also realised through the application of an empirical approach based on interviews with industry experts and case study analysis, which allows for obtaining in-depth, contextual insight into the studied phenomenon. An important element is also the inclusion of the diversity between enterprises operating in developed and developing countries, which broadens the research perspective and increases the usefulness of the conclusions. As a result, the dissertation contributes to the development of knowledge in the area of reverse logistics by providing models and recommendations better suited to the specificity of the sector. It thus constitutes a valuable contribution both to the scientific literature and to management practice in the oil and gas industry.

The Doctoral Candidate formulated the aim of the dissertation as follows:

„This study aims to explore how reverse logistics can be strategically integrated to improve waste management in the oil and gas industry, while also addressing key challenges and identify research gaps that still exist in this area. The central goal of this research is to offer a comprehensive and novel exploration into the significance, challenges, and opportunities linked with reverse logistics and its pivotal role within the supply chain dynamics of the oil and gas sector."

The Doctoral Candidate further specified this aim, indicating that:

„this research seeks to investigate the potential barriers and challenges that enterprises may encounter while implementing reverse logistics strategies and subsequently propose effective strategies to overcome these hurdles successfully"

And that the study also covers:

„the role and significance of emerging Industry 4.0 technologies and software applications in streamlining waste management operations and reverse logistics processes within the supply chain of the oil and gas industry."

The Doctoral Candidate does not formulate classical research hypotheses in the dissertation, basing the construction of the work on research problems and questions. Such an approach should be considered justified and methodologically correct, taking into account the exploratory

character of the work and the use of qualitative research methods, including semi-structured interviews, case study analysis and an approach inspired by grounded theory. The adopted research logic focuses on the identification, analysis and interpretation of phenomena occurring in the area of reverse logistics and waste management, rather than on the verification of previously formulated hypotheses. It should be emphasised that such a construction is consistent with the aim of the dissertation and enables in-depth recognition of the research problem in its actual, complex organisational and industry context.
The Doctoral Dissertation clearly identifies and articulates research gaps and research problems, which are explicitly presented in the introductory part of the study. As indicated in the structure of the thesis, the Author distinguishes dedicated sections entitled "Research Gaps (RG)" and "Research Problems (RP)", demonstrating a structured and methodologically grounded approach to problem formulation. The study emphasizes that "gaps remain in how reverse logistics is implemented across the sector," particularly in balancing regulatory requirements with operational and technological constraints, which justifies the need for further empirical investigation. This explicit identification of research gaps and problems provides a coherent foundation for the formulation of research questions and the overall research design.

The Doctoral Candidate formulated six research questions directly arising from the identified gaps:

RQ1 – What is the importance, role, and main drivers of implementing reverse logistics/waste management in the oil and gas industry as a part of supply chain management?
RQ2 – How should the reverse logistics/waste management processes and activities be designed within supply chain to increase the efficiency of operations in oil and gas industry?
RQ3 – How to improve the quality of processes and activities between stakeholders within supply chain during reverse logistics/waste management activities in oil sector?
RQ4 – How should outsourcing decisions be taken to increase RL efficiency and what are the steps to follow?
RQ5 – What barriers would companies face while implementing reverse logistics and how to overcome them?
RQ6 – What is the role and significance of technology and software in enhancing reverse logistics/waste management within the oil and gas industry's supply chain management?

These questions were constructed in a logically hierarchical manner from the general recognition of the role of reverse logistics (RQ1), through process design (RQ2), stakeholder coordination (RQ3) and outsourcing (RQ4), to implementation barriers (RQ5) and the technological dimension (RQ6) which ensures consistency between the identified gaps and the empirical part of the study.

With regard to the research procedure, it should be indicated that the Doctoral Candidate adopted a *multi-method qualitative research approach*, justifying this choice by the exploratory character of the "how" and "why" research questions, whose complexity eluded operationalisation proper to quantitative methods. The first stage of the research procedure consisted of a systematic literature review (SLR) conducted in accordance with the assumptions

of Tranfield et al. (2003), encompassing a search of the Scopus and Web of Science databases according to predefined inclusion and exclusion criteria, resulting in the selection of 35 scientific articles devoted to reverse logistics in the oil and gas sector, which were subjected to analysis using the 4W1H coding framework. The second stage involved the collection of primary empirical data through semi-structured interviews conducted with managers and specialists from six oil and gas enterprises, selected by *purposive sampling*; the research instrument was developed in accordance with the five-phase model of Kallio et al. (2016), including piloting and verification of the interview guide. The third stage consisted of analysing the collected qualitative material using *grounded-theory-inspired coding*, implemented sequentially through three phases: open coding, axial coding and selective coding, which enabled the emergence of thematic categories and the construction of an empirically grounded model of reverse logistics. The research procedure was completed by data triangulation integrating the results of the SLR, secondary data from corporate reports and primary data from interviews as well as a comparative case analysis of six enterprises, taking into account the diversity of operational contexts in developed and developing countries, which ensured the methodological reliability and credibility of the obtained results.

The theoretical part is constituted by Chapters 1, 2 and 3. Chapter 1 serves a methodological function, in which the Doctoral Candidate presents the aim, research gaps, research questions and a detailed description of the adopted research procedure. Chapter 2 constitutes the proper theoretical foundation of the dissertation, in which the Author characterises the concept of reverse logistics, its place in supply chain management, types of waste in the oil and gas industry, outsourcing, performance measurement and the role of technology. Chapter 3 is the systematic literature review (SLR) encompassing 35 scientific articles, which enabled the mapping of the state of knowledge and formal identification of research gaps.

The empirical part is constituted by Chapters 4, 5 and 6. Chapter 4 describes the process of collecting and analysing qualitative data using grounded-theory-inspired coding. Chapter 5 the most extensive in the dissertation, covering pages 125–215 contains detailed case studies of six enterprises: BP, Equinor, ExxonMobil, Shell, TotalEnergies and SOCAR. Chapter 6 synthesises the results and formulates recommendations for designing reverse logistics networks for the oil and gas sector.

The work concludes with a brief summary, the aim of which was to formulate conclusions in the context of the dissertation's aims and practical implications for sector enterprises. The Author also addressed the limitations of the dissertation, indicating further directions of scientific research in the topic he undertakes.

The reviewed doctoral dissertation of Mr. Khalil Bayramov totals 270 pages, including the introduction comprising Chapter 1 "Introduction" (pp. 6–19), in which the research problem, aim of the work, research gaps, problems and questions, and the general structure of the dissertation are presented.

Chapter 2 (pp. 24–44) is theoretical in nature and covers analysis of issues related to reverse logistics and waste management in the oil and gas industry, including conditions, barriers, waste typology and the significance of technological innovations.

Chapter 3 (pp. 45–109) is devoted to the systematic literature review (SLR), in which an analysis of the scientific output, identification of research gaps and a synthetic presentation of existing research findings were carried out.

Chapter 4 (pp. 110–124) presents the methodology of empirical research, including the process of conducting interviews, selection of the research sample and the method of qualitative data analysis using grounded-theory-inspired coding.

Chapter 5 (pp. 125–214) contains an analysis of case studies of selected oil & gas sector enterprises, including BP, Equinor, ExxonMobil, Shell, TotalEnergies and SOCAR, together with the results of empirical research.

Chapter 6 (pp. 216–243) covers the presentation of research results and their discussion, while Chapter 7 (pp. 244–246) concerns research limitations and directions for further research.

The dissertation concludes with a summary (Conclusions, pp. 247–250) and an extensive bibliography comprising a total of 229 items, including 191 articles in peer-reviewed scientific journals, 11 conference papers, 12 monographs, 4 book chapters, 1 technical report and 10 internet sources and corporate reports. The literature was selected by the Doctoral Candidate correctly, in accordance with the subject matter of the dissertation; it is adequate and current.

The work was written in a communicative and orderly manner, and the language used meets the requirements of scientific style while remaining comprehensible to the reader. It does not raise significant objections, and the argument is conducted in a logical and consistent manner. A positive assessment should also be given to the other elements of the writing craft, including the correct selection of subject literature and its skilful use in building argumentation and justifying the adopted research assumptions. The structure of the work is clear, and the individual parts form a consistently developed whole.

The title of the dissertation clearly defines the subject scope of the research, referring to the issue of improving waste management in the oil and gas industry using the concept of reverse logistics. This scope is reflected in both the theoretical and empirical parts of the work, which attests to the conceptual coherence of the dissertation.

The research and application potential of the undertaken subject matter should be assessed as high. The work fits into current research directions in the area of management sciences, particularly in the context of sustainable development, the circular economy and the efficiency of logistic processes. At the same time, the dissertation fills the identified research gap concerning the limited recognition of reverse logistics in the oil & gas sector, particularly in an empirical and comparative perspective. Consequently, it should be considered that the topic of

the dissertation was chosen appropriately and meets the requirements for doctoral dissertations, both from a scientific and practical standpoint.

The deliberations are subordinated to the realisation of six research questions (RQ1–RQ6), which replaced classical hypotheses in this dissertation, which is fully justified by the adopted qualitative research strategy of an exploratory character. The formulated aim and research questions constitute a logically structured system and are substantively consistent with each other. The structure of the work is subordinated to the realisation of the presented aim and answering the research questions. It does not raise substantive objections. The work was divided into a theoretical and empirical part.

Summarising the general assessment of the work, I can indicate that the structure, layout and content of the work are logically interconnected, simultaneously accompanying the adopted aims and research thesis. The structure of the work constitutes a logical and coherent whole, thereby fulfilling the requirements for doctoral dissertations.

II. Detailed substantive remarks

Justifying the undertaking of research in the chosen area, the Doctoral Candidate undertook an attempt to create an integrated framework for implementing reverse logistics in waste management in the oil and gas industry, with particular emphasis on: the role and significance of reverse logistics as a strategic component of the supply chain; the design and structuring of reverse processes in order to increase operational efficiency; mechanisms of stakeholder coordination and interdepartmental cooperation; the conditions of outsourcing decisions in reverse logistics; implementation barriers and ways of overcoming them; and the role of Industry 4.0 technologies in improving reverse processes.

The dissertation submitted for review is a theoretical-empirical qualitative scientific study, fitting into the discipline of management and quality sciences. The substantive analysis of the work indicates the scientific maturity of the Doctoral Candidate, particularly in the area of empirical research, the ability to use diverse methodological tools and techniques applied in the discipline of management and quality sciences, including systematic literature review, multiple case study and grounded-theory-inspired coding. The Doctoral Candidate demonstrated extensive knowledge in the studied area, as well as the ability to scientifically solve research problems, formulate research questions and seek answers to them, as well as familiarity with research methods and the ability to apply them practically, draw conclusions and interpret collected empirical data. He is also aware of research limitations, which was explicitly stated in Chapter 7, and which will presumably allow him to continue developing his scientific workshop in the studied area. Justifying the undertaking of research in the chosen area, the Doctoral Candidate undertook an attempt to create a coherent conceptual framework integrating the issues of reverse logistics and waste management in the specific context of the oil and gas industry. The dissertation submitted for review constitutes a theoretical-empirical scientific study, fitting into the discipline of management and quality sciences, with a clear orientation towards problems of operational efficiency and sustainable development. Analysis of the

content of the work indicates a relatively high level of substantive preparation of the Doctoral Candidate, particularly in the area of identifying key research problems and the ability to operationalise issues related to reverse logistics. Noteworthy is the correct embedding of the subject matter in the current stream of research on supply chains and waste management, which is reflected in the structure of the work and the selection of literature.

In the theoretical chapters, the Doctoral Candidate undertakes an attempt to systematise knowledge concerning reverse logistics, its determinants, barriers and significance in waste management in the oil & gas sector. The presented approach has a review and synthesising character, which allows for the ordering of basic concepts and relationships occurring in the analysed area. At the same time, it should be noted that the dominant approach is the presentation of the existing body of literature, with a relatively limited level of critical analysis. Less visible are the Author's own attempts at polemicising with the presented concepts, or a clear indication of theoretical gaps requiring further deepening. Despite the correct selection of sources and their adequacy to the undertaken subject matter, one could expect a greater degree of scientific criticism, particularly regarding the assessment of the usefulness of individual concepts in the conditions specific to the oil and gas industry.

An important element of the theoretical part is also the systematic literature review (SLR), which forms the basis for identifying research gaps and justifying the need to undertake empirical research. This review was conducted in an orderly manner, using specified criteria for source selection and analysis of their content. The Doctoral Candidate demonstrated familiarity with the research procedures appropriate for this type of analysis; however, also in this case, one can point to the limited depth of interpretation of the obtained results and insufficient development of critical conclusions. In particular, it would be justified to establish a stronger connection between the results of the literature review and the subsequent stages of the work, including the construction of the research model and the selection of empirical methods.

Proceeding to the assessment of the empirical part, it should be emphasised that the Doctoral Candidate applied a qualitative research approach, encompassing semi-structured interviews and analysis of multiple case studies of enterprises operating in the oil & gas sector. The adopted research procedure was described in an orderly and essentially methodologically correct manner, taking into account sample selection, the method of data collection and their analysis using grounded-theory-inspired coding. The research procedure conducted for the purposes of the dissertation enabled the Author to collect valuable empirical material, reflecting the practices of waste management and reverse logistics in the selected enterprises.

Particularly noteworthy is the use of the multiple case study approach, encompassing both enterprises operating in developed countries and in the conditions of a developing economy. Such an approach enables the capturing of the diversity of practices and the identification of contextual factors influencing the implementation of reverse logistics. The Doctoral Candidate demonstrated the ability to integrate data from various sources and their synthetic presentation in the form of conclusions concerning the functioning of the studied systems. At the same time,

it should be noted that in some fragments of the empirical analysis, a descriptive character is more visible than an analytical one, which limits the degree of deepening of the interpretation of the obtained results.

It is also worth noting that the adopted research approach, based on qualitative methods, is adequate for the exploratory character of the work and the adopted research questions. The absence of research hypotheses is a consequence of this methodological decision and does not constitute a shortcoming; however, it requires particular care in the precise formulation of conclusions and their embedding in a theoretical context. In this regard, the Doctoral Candidate largely achieves the intended aim, although in some cases one could expect a stronger connection between the empirical results and the theoretical concepts presented earlier.

Summarising the assessment of the empirical part, it should be stated that the conducted research procedure enabled the Doctoral Candidate to formulate accurate and valuable conclusions concerning the functioning of reverse logistics in the oil and gas sector. I assess the empirical part positively, while simultaneously recognising space for deepening the analyses and strengthening the interpretive layer. The work as a whole attests to the Doctoral Candidate's competences in the area of conducting scientific research, including the ability to select methods, analyse data and formulate conclusions of a cognitive and applicative character.

With regard to the detailed elements of the work, the following should be indicated. Chapter 1, serving the function of an extended methodological introduction, presents the aim of the research, research gaps, problems and research questions, and a detailed description of the research procedure. I assess this chapter positively. The Doctoral Candidate justifies the choice of a multi-method qualitative approach in a clear and logically consistent manner, referring to recognised methodologists such as Patton (2002), Creswell (2014) and Kallio et al. (2016). The adopted research procedure and the description of the research methodology are conducted in a careful, systematised and methodologically correct manner. Particularly positive is the fact that the Doctoral Candidate describes the five-phase process of constructing the research instrument according to the model of Kallio et al. (2016), including piloting the interview guide, which significantly strengthens the credibility and reliability of the collected empirical material. A certain shortcoming of Chapter 1 is, however, that it contains both methodological elements and the introductory part of the dissertation, which makes its structure somewhat heterogeneous in traditional doctoral dissertations, the description of research methodology usually constitutes a separate, independent chapter.

In assessing the content contained in the theoretical chapters, I state the following. Chapter 2 constitutes the proper theoretical foundation of the work and covers the characterisation of the concept of reverse logistics and its place in supply chain management, analysis of the causal factors and barriers of reverse processes, typology of waste in the oil and gas industry, the issue of outsourcing reverse logistics, performance measurement and the role of technological innovations. The Doctoral Candidate demonstrated good familiarity with the subject literature, referring to classical works in the field of reverse logistics (Rogers and Tibben-Lembke, 1999; De Brito and Dekker, 2004; Pokharel and Mutha, 2009) and more recent industry publications.

The structure of the chapter is logically hierarchised and corresponds to the order of issues undertaken in the empirical part, which attests to the considered conception of the work as a whole. Nevertheless, in Chapter 2 one can notice a certain deficit of critical approach to the analysed literature the Doctoral Candidate predominantly presents and compiles existing views and definitions, without undertaking a sufficient degree of their verification, confrontation or assessment in the context of the specificity of the oil and gas sector. What is missing is a more distinct voice of the Author himself and proposals for an original theoretical approach, which would allow for stronger justification of the work's contribution to the development of theoretical aspects of the discipline of management and quality sciences.

Chapter 3 devoted to the systematic literature review (SLR) I assess as one of the stronger elements of the dissertation. The Doctoral Candidate conducted the review in a methodologically rigorous manner, in accordance with the protocol of Tranfield et al. (2003), applying predefined inclusion and exclusion criteria and analysing material from the Scopus and Web of Science databases. The application of the 4W1H coding framework to the analysis of the selected 35 articles constitutes a valuable tool for the systematisation of knowledge and allows for a clear mapping of the state of research in the area of reverse logistics in the oil and gas sector. Chapter 3 is the most extensive theoretical element of the work and provides solid justification for the formulated research gaps. As a reservation, however, it should be indicated that the sample of 35 articles, while methodologically justified by the thematic specificity, is relatively small and may not fully reflect the entire spectrum of available literature — particularly that published in languages other than English and in industry sources outside the main bibliometric databases. The Doctoral Candidate himself, incidentally, notes this fact as a limitation of the work.

The adopted research procedure allowed the Author to conduct empirical research directed at managers, coordinators and industry specialists from six oil and gas sector enterprises: BP, Equinor, ExxonMobil, Shell, TotalEnergies and SOCAR representing both developed and emerging markets. Chapter 4, describing the process of data collection and analysis, I assess positively. The Doctoral Candidate presents in a clear manner the procedure for recruiting respondents, the course of interviews, the method of data recording, ethical considerations and the three-stage process of coding qualitative material. The application of grounded-theory-inspired coding enabled the inductive emergence of thematic categories directly from empirical data, without imposing predefined theoretical frameworks on them.

Chapter 5 the most extensive in the entire dissertation, covering nearly 90 pages constitutes its empirical heart and contains detailed case studies of each of the six studied enterprises. The structure of each case study is standardised and covers eight analytical dimensions: awareness levels within the organisation, strategies for waste disposal and handling, waste classification, recycling and reuse initiatives, waste transport and logistics, performance monitoring and KPIs, challenges in waste management, and improvement opportunities and future strategies. Such standardisation of the structure of individual cases enables comparative analysis and is at the same time an expression of the Doctoral Candidate's methodological maturity. As a critical remark, however, it should be noted that the descriptions of individual cases are in places

excessively descriptive and reporting in character, without sufficient analytical synthesis within each case a deeper interpretation of the results only appears in Chapter 6, which causes Chapter 5 to give the impression, in certain fragments, of a compilation of raw empirical data, rather than fully processed analytical material.

Chapter 6 presenting the results and discussion I assess as substantively valuable and synthetically presented. The Doctoral Candidate conducts a comparative analysis of reverse logistics practices in the context of developed and developing countries, identifies common patterns and specific contextual conditions, and in sub-chapter 6.8 formulates specific recommendations for designing reverse logistics networks dedicated to the oil and gas sector. These recommendations have an operational character and are directly rooted in the empirical material, which constitutes a real applicative value of the dissertation. I therefore assess the empirical part positively, with the reservation that the connection between the empirical results and their embedding in a theoretical framework could be more clearly and systematically articulated in Chapter 6 that is, the Doctoral Candidate could more explicitly indicate in what way specific empirical findings confirm, extend or challenge the theses formulated in the subject literature discussed in Chapters 2 and 3.

In the work, methodological correctness can be noticed, along with the proper conduct of the procedure for collecting and analysing qualitative data and their proper interpretation, which is reflected in the original framework for implementing reverse logistics in the oil and gas sector. The realisation of the presented aims proceeds in the theoretical-empirical stream of the discipline of management and quality sciences. The Doctoral Candidate in his literary studies included key positions of the existing output in the subject area covered by the dissertation, with the general reservation that despite the broad scope of the conducted review there is sometimes a lack of deeper critical approach to the analysis of the literature and a more distinct marking of the Author's own theoretical position. In the theoretical chapters, one could have attempted more scientific criticism, more of one's own reflections and conceptual proposals, allowing for fuller justification of the contribution to the development of theoretical aspects of the discipline of management and quality sciences in the area studied by the Doctoral Candidate.

Despite the positive assessment of the work, it is necessary to draw attention to certain shortcomings and weaknesses of the dissertation. The dissertation relies exclusively on a qualitative approach, which given the declared ambition to formulate an integrated framework for implementing reverse logistics constitutes a significant methodological limitation; the lack of triangulation with quantitative data, e.g. in the form of analysis of KPI indicators or cost data obtained from the studied enterprises, weakens the possibility of generalising the formulated conclusions and recommendations beyond the narrow circle of studied entities. Furthermore, the research sample encompassing six enterprises, of which five are global oil corporations with a similar organisational profile and a high level of operational advancement, raises a justified question about the representativeness of the collected empirical material and the possibility of drawing conclusions about the entire sector particularly with regard to small and medium oil operators, which constitute a significant part of the global market, and whose perspective is

completely absent from the dissertation. The theoretical chapter (Chapter 2) largely compiles and organises the existing body of literature without a sufficiently distinct conceptual contribution on the part of the Doctoral Candidate; unlike many dissertations in the field of management sciences, the reviewed work does not formulate an original definition, typology or conceptual model of reverse logistics in the oil and gas sector, which would constitute an original theoretical contribution of a distinctive character, clearly distinguishable from the existing literature. The application of *grounded-theory-inspired coding* raises certain methodological doubts the Doctoral Candidate draws selectively from the procedures of grounded theory without implementing it in its full scope, which means that the work does not meet the requirements of classical grounded theory (Glaser and Strauss, 1967; Strauss and Corbin, 1990), and at the same time it is not fully transparent what exact criteria determined the transition between successive stages of coding and how the theoretical saturation of categories was ensured. This aspect should have been better justified and grounded. The SOCAR case study, which was intended to serve as a representative of emerging markets and constitute a reference point for the comparative analysis of developed and developing contexts, is in the dissertation clearly less developed than the cases of Western corporations both in terms of depth of analysis and availability of data which may result from the limited transparency of this organisation, but nevertheless weakens the comparative value of the entire study declared by the Doctoral Candidate. The recommendations formulated in sub-chapter 6.8 have an applicatively useful character; however, their embedding in a broader theoretical context is insufficient the Doctoral Candidate does not explicitly relate them to any established theory of supply chain management, such as transaction cost theory, the *Resource-Based View* or stakeholder theory which limits the theoretical significance of the formulated framework and makes it difficult to locate it in the broader scientific discourse of the discipline of management and quality sciences.

While positively assessing the Doctoral Candidate's scientific-research enquiries, I ask for answers to the following questions:

1) In the dissertation, the main aim was formulated as the exploration of the strategic integration of reverse logistics in waste management in the oil and gas industry, and its realisation resulted in the development of an implementation framework and a set of recommendations contained in sub-chapter 6.8. However, an analysis of the content of the dissertation indicates that the formulated framework is primarily descriptive and process-oriented in character that is, it describes a sequence of steps and decision areas rather than normative or predictive, i.e. it does not allow for predicting which configurations of organisational, regulatory and infrastructure variables lead to higher efficiency of the reverse logistics system compared to others. Please therefore explain to what extent the proposed framework actually realises the aim of the dissertation understood as the strategic integration of reverse logistics and not merely its description and systematisation and whether and in what way the Doctoral Candidate plans in future research to give this framework an empirically verifiable dimension, enabling its validation in a wider population of oil and gas sector enterprises.

2) The dissertation relies exclusively on a qualitative approach, while waste management and reverse logistics in the oil and gas industry generate rich quantitative data e.g. KPI indicators, waste volumes, operating costs, recycling rates. Please address this choice and explain whether and in what way the inclusion of quantitative data in the research procedure could strengthen the formulated framework for implementing reverse logistics and increase the possibilities of generalising conclusions beyond the group of six studied enterprises.

3) One of the key declared merits of the dissertation is the comparative analysis of reverse logistics in the context of developed and developing countries, with SOCAR the national oil operator from Azerbaijan being the only representative of emerging markets. Please justify why the selection of one enterprise from one country sufficiently represents the complexity and diversity of operational conditions of emerging markets in the oil and gas sector, and how the Doctoral Candidate assesses the limitations arising from this decision for the formulated comparative conclusions.

4) In Chapter 2, the Doctoral Candidate discusses a number of theoretical concepts supply chain theory, the concept of outsourcing, performance measurement and the role of Industry 4.0 technologies however the framework for implementing reverse logistics formulated in the dissertation is not explicitly anchored in any of the established management theories, such as transaction cost theory, the *Resource-Based View* or stakeholder theory. Please explain what theoretical background constitutes the foundation of the proposed framework and in what way it fits into the broader theoretical discourse of the discipline of management and quality sciences.

5) The dissertation focuses on reverse logistics as a mechanism for improving waste management in the oil and gas industry, positioning it as a strategic component of the supply chain oriented towards environmental, cost and compliance goals. Meanwhile, in the subject literature, the concept of the *circular economy* is increasingly emphasised as the overriding paradigm, within which reverse logistics constitutes only one of many instruments of the systemic transformation of business models towards closed material loops. Please therefore address the relationship between reverse logistics and the broader concept of the circular economy in the context of the oil and gas sector and explain whether the approach adopted in the dissertation to reverse logistics is sufficient to describe the complexity of environmental challenges facing this sector, or whether in the Doctoral Candidate's opinion it is necessary to embed the proposed framework in the broader circular economy paradigm, for it to be able to aspire to the status of a comprehensive and long-term relevant management tool in the discipline of management and quality sciences.

The questions are intended to initiate a scientific discussion which may perhaps contribute to an easier and more effective understanding and deepening of the issue of strategic integration of reverse logistics in waste management in the oil and gas industry, and will also influence the

development of theoretical aspects of the studied topic in the discipline of management and quality sciences particularly in the area of building empirically grounded implementation models, embedded in established supply chain management theories, and in the area of methodological strengthening of qualitative approaches applied in research on reverse logistics in sectors with high environmental risk.

III. Other detailed remarks

The work of Mr. Khalil Bayramov, MSc, was written in a communicative and very careful manner. The text is accompanied by a significant number of tables and figures the dissertation contains extensive thematic and comparative tables which significantly facilitate the reader's perception of the presented empirical material. It should be indicated that the language of the work is correct, precise and maintained at a high academic level, which attests to the Doctoral Candidate's good command of the scientific English language. Very few linguistic and editorial errors appear in the work, which do not affect the positive assessment of the work. Among the noted shortcomings, attention should be drawn primarily to sporadic typographical errors an example being the use of the form "Litereature" instead of "Literature" in Chapter 2 as well as infrequent punctuation-editorial errors. Furthermore, it should be noted that in Chapter 1 reference is made to the source
Mashuri et al. designated as "n.d." i.e. without providing a year of publication. These shortcomings are purely technical and editorial in character, not substantive, and do not in any way affect the assessment of the scientific value of the submitted dissertation.

Among the main merits of the work, the following should be listed: the accurate identification and multidimensional justification of the research gap in the area of reverse logistics in the oil and gas sector, the considered and methodologically coherent construction of the research procedure combining systematic literature review, multiple case study and grounded-theory-inspired coding, as well as the originality of the undertaken subject matter expressed in the adaptation of the concept of reverse logistics to the specific operational, regulatory and environmental conditions of the extractive industry. The value of the dissertation lies also in the extensive and carefully constructed bibliography of 229 items, including 191 articles from peer-reviewed scientific journals, attesting to the thorough embedding of the argument in the current output of the discipline, as well as the practical recommendations for designing reverse logistics networks formulated in sub-chapter 6.8, which constitute a concrete and operationally useful response to the identified needs of oil and gas sector enterprises striving to improve their environmental efficiency and compliance with regulatory requirements.

Summarising, I wish to emphasise that the dissertation of Mr. Khalil Bayramov, MSc, constitutes a mature, substantively valuable and methodologically correct scientific work, which in an original and empirically grounded manner makes a real contribution to the output of the discipline of management and quality sciences in the area of sustainable supply chain management. A certain limitation is the fact that the declared comparative dimension of the work encompassing a comparison of practices in developed and developing countries is based on the empirical material of only one enterprise representing emerging markets, which naturally

narrows the possibilities of comparative conclusions and constitutes an area requiring development in future research. Nevertheless, the submitted dissertation meets the requirements for doctoral dissertations as set out in the applicable legal provisions, and its Author demonstrated scientific independence, research maturity and the ability to conduct in-depth empirical studies, which fully justifies the admission of Mr. Khalil Bayramov, MSc, to the further stages of the doctoral procedure.

IV. Conclusion

The presented remarks and questions do not diminish my general, positive assessment of the work. Mr. Khalil Bayramov, MSc, undertook the elaboration of a dissertation on an interesting and important topic, related to the improvement of waste management operations in the oil and gas industry through the strategic implementation of reverse logistics as a component of supply chain management a subject insufficiently explored in the scientific literature to date, and at the same time extremely significant from the point of view of the environmental, regulatory and operational challenges facing the global extractive sector. The research problem was resolved using appropriately selected research tools applied in the discipline of management and quality sciences, including systematic literature review, multiple case study and semi-structured interviews analysed using grounded-theory-inspired coding. The Author demonstrated theoretical knowledge in the subject area of the dissertation, the ability to formulate research questions and aims adequate to the identified gaps in the scientific output of the discipline. The Doctoral Candidate proved that he is able to independently conduct scientific research and formulate in-depth conclusions based on the obtained empirical results.

The submitted doctoral dissertation unequivocally confirms that Mr. Khalil Bayramov, MSc, possesses extensive and in-depth theoretical knowledge in the discipline of management and quality sciences, with particular emphasis on the area of supply chain management and logistics. The Doctoral Candidate demonstrates thorough familiarity with the scientific output in the field of reverse logistics, referring to classical and contemporary theoretical concepts formulated by leading representatives of the discipline, such as Rogers and Tibben-Lembke, De Brito and Dekker, Pokharel and Mutha and Presley et al. The theoretical knowledge of the Doctoral Candidate is also reflected in the skilful application of the conceptual apparatus appropriate to management and quality sciences including the concepts of outsourcing, performance measurement, stakeholder management and technological innovations in the context of Industry 4.0 and its embedding in the specific operational conditions of the oil and gas sector. The systematic literature review encompassing 229 sources, including 191 articles from peer-reviewed scientific journals, additionally confirms the breadth and currency of the Candidate's theoretical knowledge. I assess the requirement concerning general knowledge in the discipline as fulfilled.

The submitted doctoral dissertation convincingly demonstrates that Mr. Khalil Bayramov, MSc, possesses the ability to independently conduct scientific work. This is evidenced primarily by the independent design and conduct of a multi-stage research procedure, encompassing: a rigorous systematic literature review, purposive selection of the research sample and the

conduct of twenty-two semi-structured interviews with industry experts from six international oil and gas enterprises, and subsequently the independent analysis of the collected empirical material using three-stage grounded-theory-inspired coding. The Doctoral Candidate further demonstrated the ability to critically identify research gaps, formulate research questions adequate to the identified problems, select appropriate research methods and synthesise results in the form of a practical implementation framework. An important evidence of scientific maturity is also the awareness of the limitations of one's own research, expressed explicitly in Chapter 7, and the formulation of specific directions for future research.

The doctoral dissertation constitutes an original solution to a scientific problem within the meaning of the applicable legal provisions. The originality of the work manifests itself in several mutually complementary dimensions. First, the Doctoral Candidate, as one of the few researchers, undertook a comprehensive and empirically grounded analysis of reverse logistics in the context of the oil and gas industry an area previously overlooked in the subject literature, dominated by research in the manufacturing and commercial sectors. Second, as a result of the conducted research procedure, the Doctoral Candidate constructed an integrated framework for implementing reverse logistics dedicated to the operational specificity of the oil and gas sector, encompassing the dimensions of: waste stream mapping, reverse network design, stakeholder coordination, outsourcing, performance monitoring and technological integration which constitutes a contribution both to supply chain management theory and to the operational practice of sector enterprises. Third, original is the application of comparative case analysis of global oil corporations in juxtaposition with a national operator from an emerging market, which notwithstanding the limitation of representing emerging markets by only one enterprise opens a new research perspective on the diversity of implementation contexts of reverse logistics. The formulated recommendations have an applicative character and constitute an original solution in the area of applying the results of one's own scientific research in the economic sphere.

Summarising, the dissertation submitted for review I assess positively, as fulfilling the requirements for doctoral dissertations in the discipline of management and quality sciences.

Concluding, I state that the doctoral dissertation of Mr. Khalil Bayramov, MSc, entitled "Improving Waste Management Operations in the Oil and Gas Industry through Reverse Logistics", written under the scientific supervision of dr hab. T. Bartosz Kalinowski, Prof. UŁ, meets the requirements set out in Act of 20 July 2018 – Law on Higher Education and Science (Journal of Laws of 2024, item 1571, as amended). In connection with the above, I move for its acceptance and submit to the Committee for academic degrees in the discipline of management and quality sciences at the University of Lodz the motion to admit Mr. Khalil Bayramov, MSc, to the further stages of the doctoral procedure, i.e. to the public defence of the dissertation.

Szczecin, 06 April 2026

Signature Not Verified
Dokument podpisany przez
Blanka Tundys
Data: 2026.04.07 10:47:53 CEST

dr hab. Blanka Tundys, Prof. US