REVIEW

by the official reviewer of the dissertation by Alexander Neske entitled "Managing Sustainability-Related Complexity in Supply Chains: A Capability-Based Managerial Framework for Organizational Response", submitted for the degree of Doctor of Philosophy (PhD) in the educational program 8D04101 – Management

№	Criteria	Eligibility (one of the answer options must be checked)	Justification of the position of the official reviewer
1.	The topic of the thesis (as of the date of its approval) corresponds to the directions of scientific development and/or state programmes	1.1 Compliance with priority areas of scientific development or state programmes: 1) The dissertation was completed within the framework of a project or target programme financed from the state budget (specify the name and number of the project or programme) 2) The dissertation was completed within the framework of another state programme (specify the name of the programme) **3) The thesis corresponds to the priority direction of science development approved by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan (specify the direction)**	The dissertation corresponds to the priority area "Ecology, Environment and Rational Use of Natural Resources", approved by the Higher Scientific and Technical Commission of the Republic of Kazakhstan. The research addresses the management of sustainability-related requirements in supply chains, with particular emphasis on environmental risks, organizational capabilities, and the verification of sustainability-related information. The relevance of the dissertation to Kazakhstan's national development priorities is supported by its alignment with the following strategic and regulatory documents: • Strategy "Kazakhstan 2050", which identifies green development as a national priority; • Concept for Transition of the Republic of Kazakhstan to a Green Economy, approved by Presidential Decree No. 577 of 30 May 2013; • Environmental Code of the Republic of Kazakhstan, No. 400-VI of 2 January 2021; • Strategy for Achieving Carbon Neutrality of the Republic of Kazakhstan by 2060, approved by Presidential Decree No. 121 of 2 February 2023. These documents and their implications for sustainable supply chain management are discussed in the Introduction and sub-chapter 1.2. The proposed Organizational Response Model and its practical recommendations are consistent with national objectives concerning environmental management, sustainable development, and corporate sustainability governance. The research also contributes to the objectives

			of SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), and SDG 17 (Partnerships for the Goals).
2.	The importance for science	The work **does**/does not make a significant contribution to science and its importance is **well-disclosed**/not disclosed	The dissertation contributes to research in management, sustainable supply chain management, and organizational capabilities by developing a capability-based Organizational Response Model (ORM). The model provides a framework for examining how organizations choose between internal capability development and interorganizational collaboration in responding to sustainability-related complexity. It introduces two conditions–perceptual convergence and prevalent cross-firm orchestration–to explain this choice. Drawing on empirical evidence from German and Kazakhstani organizations, the author develops a conceptual and methodological approach that complements existing research. The scientific contribution is clearly presented.
3.	The principle of independence	Self-reliance level: **1) High;** 2) Medium; 3) Low; 4) No autonomy	The author's level of independence is assessed as high. The dissertation demonstrates his personal contribution to the research design, data collection, analysis, and development of the proposed managerial framework. The author conducted the interviews for the first empirical study, performed the main analytical work for the second study, and independently developed the key components of the Organizational Response Model. These documented contributions indicate a high degree of independence in conducting the research and developing its main results.
4.	The principle of internal unity	4.1 Justification of the relevance of the thesis: **1) Justified;** 2) Partially justified; 3) Not substantiated.	The relevance of the dissertation topic is well justified. The author highlights the increasing complexity of sustainability requirements in global supply chains and their implications for Kazakhstan's resource-intensive industries, particularly in the context of environmental regulation and access to international markets. The dissertation identifies a research gap in existing sustainable supply chain management frameworks, which provide limited guidance on how organizations select, organize, and implement sustainability responses under resource constraints. The inclusion of Germany as a comparative context is also

			substantiated by its regulatory environment and its role in international supply chains. Overall, the relevance of the research is supported by both theoretical considerations and practical challenges facing organizations in Kazakhstan.
		4.2 The content of the thesis reflects the topic of the thesis: **1) Reflects;** 2) Partially reflects; 3) Does not reflect	The content of the dissertation reflects the stated research topic. The work is organized into three chapters covering the theoretical, empirical, and applied aspects of managing sustainability-related complexity in supply chains. Chapter 1 examines the theoretical foundations, institutional conditions in Germany and Kazakhstan, and research methodology. Chapter 2 presents two empirical studies and a comparative analysis of organizational responses to sustainability requirements. Chapter 3 focuses on the development of the Organizational Response Model (ORM), its quantitative operationalization, and practical recommendations. All three chapters address the central research problem and contribute to the development of the proposed capability-based managerial framework.
		4.3 The aim and objectives are consistent with the thesis topic: **1) correspond to;** 2) partially correspond; 3) do not correspond	The aim and objectives of the dissertation are consistent with the stated research topic. The aim focuses on developing a capability-based managerial framework for organizational responses to sustainability-related complexity in supply chains. The eight research objectives are clearly formulated and aligned with this aim, covering theoretical foundations, empirical analysis, model development, and practical recommendations.
		4.4 All sections and statements of the thesis are logically interrelated: **1) fully interrelated;** 2) partially interrelated 3)not interrelated	The dissertation is structured with clear internal logic. The theoretical and methodological foundations provide the basis for the two empirical studies, whose findings are subsequently used to develop the Organizational Response Model and practical recommendations. The conclusions are linked to the stated research objectives, while the relationship between the scientific novelty, propositions, and provisions submitted for defense is explicitly established. Overall, the chapters and main scientific arguments are logically connected and consistent with the research aim.
		4.5 The solutions (principles, methods) proposed by the author are substantiated and evaluated in comparison with existing approaches: **1) critical analysis is present;**	The dissertation demonstrates critical analysis of existing theoretical and methodological approaches to sustainable supply chain management. The author critically reviews international and Kazakhstani research, identifies gaps in the existing literature, and uses these findings to substantiate the proposed Organizational Response Model (ORM).

		2) the analysis is partial; 3) the analysis consists of quotations from other authors rather than the author's own reasoning; 4) no analysis is provided.	Particular attention is given to comparing the ORM with established approaches, including dynamic capabilities, sustainable supply chain management frameworks, organizational ambidexterity, and capability maturity models. The comparative analysis highlights both similarities and differences, clarifying the specific contribution of the proposed model. The author's conclusions are supported by theoretical reasoning and empirical findings, demonstrating an appropriate level of critical analysis.
5.	Principle of Scientific Novelty	5.1 Are the scientific results and statements new? 1) completely new; **2) <u>partially new (25–75% are new);</u>** 3)not new (less than 25% are new).	The scientific results and propositions presented in the dissertation are assessed as partially new. The research builds on established theoretical approaches while introducing several original contributions: • the conceptualization of sustainability-related complexity as a multidimensional construct and organizational response as a process of selective stabilization; • the development of a taxonomy of Packed Business Capabilities across Strategy, People, Process, and Technology, based on empirical research in German organizations and further explored using corporate reports from Kazakhstan; • the formulation of comparative propositions and proposed institutional mechanisms explaining differences in organizational responses across the two research contexts, together with the concept of capability signaling as a possible transitional link between sustainability communication and embedded organizational practice; • the development of the Organizational Response Model (ORM), incorporating two routing conditions, four response types, and a proposed framework for selecting between internal capability development and interorganizational collaboration; • the development and application of a GRI-anchored Capability Maturity Score (CMS) with 30 indicators, complemented by practical recommendations and proposed outcome metrics for future empirical testing. The central novel contribution is the routing mechanism, which specifies the choice between internal capability development and collaborative arrangements based on two observable field conditions: perceptual convergence and prevalent cross-firm orchestration. This mechanism and

			its operationalization extend existing theoretical approaches by providing a structured basis for configuring organizational responses to sustainability-related complexity.
		5.2 Are the conclusions of the dissertation new?	The conclusions of the dissertation are assessed as partially new. They are based on the author's empirical studies and provide additional insights into how organizations respond to sustainability-related complexity in different institutional contexts. The research identifies differences in capability patterns between German and Kazakhstani organizations, with German cases placing greater emphasis on People and Process capabilities, while Kazakhstani corporate reports emphasize strategic commitments and sustainability communication. The analysis of Kazakhstani companies also reveals differences in reported capability maturity and organizational response types, with Process emerging as the weakest domain. These findings contribute context-specific empirical evidence to existing research on sustainable supply chain management. At the same time, the conclusions are appropriately limited to the organizations and documents examined and do not establish causal relationships or generalizable national patterns.
		1) completely new;	
		2) partially new (25–75% are new);	
		3)not new (less than 25% are new).	
		5.3 The technical, technological, economic, or managerial solutions are new and substantiated:	The managerial solutions proposed in the dissertation are assessed as partially new and scientifically substantiated. The principal contribution is the Organizational Response Model (ORM), which provides a structured approach to choosing between internal capability development and interorganizational collaboration under different institutional conditions. The author also develops a GRI-anchored Capability Maturity Score (CMS) and a classification procedure, applied to 20 corporate reports from Kazakhstan. The practical component includes 14 recommendations, an implementation guide, and a set of performance indicators for monitoring organizational responses. These solutions are grounded in theoretical analysis and empirical findings and offer potential applications in sustainability management.
		1) completely new;	
		2) partially new (25–75% are new);	
		3) not new (less than 25% are new).	

6.	Validity of the Main Conclusions	All key conclusions **are based**/ are not based on scientifically sound evidence or are sufficiently well substantiated (in the case of qualitative research and academic programmes in the arts and humanities).	The main conclusions of the dissertation are sufficiently substantiated by theoretical analysis and empirical evidence. The first study draws on semi-structured interviews supported by documentary sources, while the second applies systematic content analysis of corporate sustainability reports. The author documents the data collection and coding procedures, assesses intercoder reliability, and conducts sensitivity analyses to examine the stability of the Capability Maturity Score (CMS) results. These procedures provide a reasonable basis for the conclusions concerning organizational capability patterns and reported response types. The author also acknowledges the limitations of the empirical evidence, particularly regarding the generalizability of the findings and the need for further validation of the proposed model's relationships with organizational outcomes.
7.	Key Propositions Submitted for Defense	Each proposition must be evaluated individually by answering the following questions: 7.1 Is the proposition substantiated? 1) substantiated; 2) rather substantiated; 3) rather not substantiated; 4) not substantiated; 5) it is impossible to assess the substantiation of the proposition in its current wording. 7.2 Is the proposition trivial? 1) yes; 2) no; 3) it is not possible to assess the triviality of the proposition in its current wording. 7.3 Is the proposition new? 1) yes; 2) no;	**Proposition 1** 7.1 Has the proposition been substantiated? – **Substantiated** 7.2 Is it trivial? – **No** 7.3 Is it new? – **Yes** 7.4 Scope of application: – **Medium** 7.5 Has it been substantiated in a scientific publication? – **No** **Proposition 2** 7.1 Has the proposition been substantiated? – **Rather substantiated** 7.2 Is it trivial? – **No** 7.3 Is it new? – **Yes** 7.4 Scope of application: – **Narrow** 7.5 Has it been substantiated in a scientific publication? – **No** **Proposition 3** 7.1 Has the proposition been substantiated? – **Rather substantiated** 7.2 Is it trivial? – **No** 7.3 Is it new? – **Yes** 7.4 Scope of application: – **Medium** 7.5 Has it been substantiated in a scientific publication? – **No**

		3) it is impossible to assess the proposition's novelty in its current wording. 7.4 Scope of Application: 1) narrow; 2) medium; 3) broad; 4) it is impossible to assess the scope of application in its current wording. 7.5 Has the proposition been substantiated in a scientific publication? 1) yes; 2) no; 3) it is impossible to assess whether the proposition is substantiated in a publication in its current wording.	**Proposition 4** 7.1 Has the proposition been substantiated? – **Substantiated** 7.2 Is it trivial? – **No** 7.3 Is it new? – **Yes** 7.4 Scope of application: – **Medium** 7.5 Has it been substantiated in a scientific publication? – **Yes** **Proposition 5** 7.1 Has the proposition been substantiated? – **Rather substantiated** 7.2 Is it trivial? – **No** 7.3 Is it new? – **Yes** 7.4 Scope of application: – **Medium** 7.5 Has it been substantiated in a scientific publication? – **Yes** **Proposition 6** 7.1 Has the proposition been substantiated? – **Substantiated** 7.2 Is it trivial? – **No** 7.3 Is it new? – **Yes** 7.4 Scope of application: – **Narrow** 7.5 Has it been substantiated in a scientific publication? – **No**
8.	Principle of Reliability Credibility of Sources and Information Provided	8.1 Is the choice of methodology justified or is the methodology described in sufficient detail? **1) yes;** 2) no.	The methodology is justified and described in sufficient detail. The dissertation combines an abductive embedded multiple-case study (Study I, following Yin and Eisenhardt) with deductive-inductive qualitative content analysis (Study II, following Mayring and Hsieh and Shannon) and design-science reasoning for model development. Sub-chapter 1.3 justifies the two-study design, the research period, the units of analysis, and the epistemological stance. Appendices F–I document sampling, measures to address potential bias, data collection, coding procedures, the coding scheme, and the interview guide. The differences between the two studies in observation periods and evidence sources are explicitly addressed, together with their implications for interpreting the findings.

		8.2 Were the results of the dissertation obtained using modern scientific research methods and data processing and interpretation techniques, including the use of computer technologies? **1) yes;** 2) no.	The dissertation employs modern research methods and computer-assisted data analysis techniques. Study I interview transcripts were coded using NVivo, while Microsoft Excel was used for the Study II coding matrix and Capability Maturity Score (CMS) calculations. Intercoder reliability was assessed using Krippendorff's alpha for a subsample of PBC-domain coding. The CMS and response-type classification were examined through sensitivity analyses involving alternative weighting schemes (Spearman rank correlations of 0.927–0.995), aggregation rules, and simulation-based perturbations of indicator and routing scores. These methods are appropriate for qualitative and design-oriented management research.
		8.3 Are the theoretical conclusions, models, identified relationships and patterns substantiated and confirmed by experimental research (for educational sciences – confirmed by pedagogical experiments)? **1) yes;** 2) no.	The theoretical conclusions and identified patterns are substantiated through empirical research appropriate to the qualitative, abductive and design-oriented objectives of the dissertation. The empirical evidence is provided by two complementary studies, followed by an initial application-based evaluation of the proposed model. Study I comprises 23 interviews conducted in 17 German organizations, supplemented by public documents. Study II involves qualitative content analysis of 20 reports from 11 Kazakhstani companies. The Capability Maturity Score (CMS) and classification function were applied to the complete Study II corpus, and the Organizational Response Model (ORM) underwent an initial evaluation against six design-science criteria. The proposed relationships between capability configurations and organizational outcomes are explicitly identified as propositions for future testing rather than empirically confirmed effects.
		8.4 Are key statements **confirmed** / partially confirmed / not confirmed by references to relevant and reliable scientific literature?	The key statements are supported by references to relevant and reliable scientific literature. The dissertation draws on foundational works in Social Systems Theory, institutional theory, and dynamic capabilities, established research on sustainable supply chain management, and recent international and Kazakhstani studies. Particular attention is given to research on ESG disclosure, organizational capabilities, and sustainability management in Kazakhstan, including publications in journals recommended by the Committee. The literature provides a sound theoretical and empirical foundation for the dissertation's arguments and the development of the proposed model.

		8.5 Are the literature sources used **sufficient** / insufficient for the literature review?	The dissertation draws on 243 references, supplemented by five regulatory documents of the Republic of Kazakhstan. The literature covers foundational and recent international research, relevant Kazakhstani and Central Asian studies, international sustainability reporting standards, and EU and German regulatory frameworks. It also incorporates reports and data from recognized international organizations and national institutions, including the World Bank, OECD, IEA, EBRD, PwC Kazakhstan, and KASE. The sources are sufficiently comprehensive and relevant to support the theoretical and empirical scope of the dissertation.
9.	Principle of Practical Relevance	9.1 Does the dissertation have theoretical significance?	The dissertation has theoretical significance. It clarifies sustainability-related complexity as a differentiated construct and conceptualizes organizational response as selective stabilization. It contributes to organizational capability theory by specifying the make-or-join decision through two observable field conditions: perceptual convergence and prevalent cross-firm orchestration. It also proposes capability signaling as an explanatory mechanism connecting the legitimacy logic of institutional theory with the maturation logic of capability theory. The study extends the application of Social Systems Theory to a cross-national and cross-method research design while appropriately positioning its contribution as a mid-range theoretical explanation rather than a test or extension of the theory itself.
		1) yes;	
		2) no.	
		9.2 Does the dissertation have practical relevance, and is there a high likelihood that the obtained results can be applied in practice?	The results have clear practical relevance. The Capability Maturity Score can be applied by companies, consultants, auditors and regulators to public sustainability reports under documented decision rules, as demonstrated on the 20 Study II reports. The routing conditions support decisions between internal capability build-up and participation in collaborative schemes, and the implementation guide and KPI dictionary translate the model into governance routines. The recommendations are relevant to Kazakhstani companies and public institutions, including AIFC and KASE, and align with national sustainability priorities. Acts of implementation for the use of the results in university teaching at Westsächsische Hochschule Zwickau and the Kazakh-American Free University are submitted to the dissertation council.
		1) yes;	
		2) no.	
		9.3 Are the practical recommendations new?	The practical recommendations are partially new. Individual measures, such as an ESG data layer, supplier pre-qualification, risk registers and

		1) completely new; **2) partially new (25–75% are new);** 3) not new (less than 25% are new).	KPI-based monitoring, correspond to established practice. Their novelty lies in three elements: the routing-dependent sequencing of these measures across the four response types (Table 41); their prioritization on the basis of the disclosure gaps measured in Kazakhstani companies, in particular the weakness of the Process domain; and the policy levers proposed to strengthen verification capacity and field-level orchestration.
10.	Quality of Writing and Formatting	Quality of Academic Writing: **1) high;** 2) average; 3) below average; 4) low.	The dissertation is written in clear academic English with consistent terminology. The definitions, list of abbreviations, construct dictionary and the hierarchy of statements (Table 31) support readability and traceability. The author consistently distinguishes reported from verified practice and states the epistemic status of each claim.
11.	Comments on the Dissertation	1. To facilitate the wider practical application of the Organizational Response Model, the author could consider preparing a concise practitioner-oriented decision aid that brings together the Capability Maturity Score, routing conditions and recommended actions for different organizational response types. This could complement the detailed implementation guidance already provided in the dissertation. 2. A promising direction for further research would be to explore the applicability of the proposed framework to Kazakhstani small and medium-sized enterprises. Study II focuses on large companies with established sustainability reporting practices, while the Capability Maturity Score relies on public disclosures that may be unavailable for smaller firms. Adapting the instrument to internal organizational data or structured self-assessment could broaden its practical application. 3. Future research could further examine the reproducibility and transferability of the proposed model through independent indicator-level rescoring of the Capability Maturity Score and comparative studies using more closely aligned observation periods and data sources. Such extensions would build on the methodological foundation established in the dissertation. These suggestions are intended for the further development and practical application of the research results and do not affect the overall positive assessment of the dissertation.	
12.	The scholarly quality of the doctoral candidate's publications related to the research topic (In case of a dissertation presented as a series of articles, official reviewers	The main results of the dissertation are published in four works: two articles in the Eurasian Journal of Economic and Business Studies, recommended by the Committee for Quality Assurance in the Sphere of Science and Higher Education (2023, Vol. 67, No. 1; 2024, Vol. 68, No. 1), a single-authored chapter in a collective monograph published by Peter Lang (Berlin, 2026) and indexed in Scopus, and a paper in the proceedings of the international conference TLC2M 2022 (SciTePress). The publications cover the systematic literature review on third parties in sustainable supply chain management, the empirical Study I, and the conceptual foundations of the routing conditions and outcome dimensions. The author's personal contribution to each co-authored publication is clearly specified. The	

	are expected to comment on the scientific quality of each publication related to the research topic.)	single-authored chapter demonstrates the author's ability to develop and publish independent conceptual work. The scientific level of the publications is assessed as good, and their content corresponds to the dissertation.
13.	Decision of the Official Reviewer (in accordance with Clause 28 of the current Standard Regulations)	Award the degree of Doctor of Philosophy (PhD)

The dissertation of Alexander Neske entitled "Managing Sustainability-Related Complexity in Supply Chains: A Capability-Based Managerial Framework for Organizational Response" is a completed, independently performed scientific work that meets the requirements of the Rules for Awarding Degrees. I recommend awarding Alexander Neske the degree of Doctor of Philosophy (PhD) in the educational program 8D04101 – Management.

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