

REFERENCE
of the domestic scientific advisor on the dissertation
of Alexander Neske
on the topic: "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"

The dissertation carried out by A. Neske is devoted to a comprehensive study of the mechanisms of organizational response to sustainability-related complexity in supply chains and to the development of a capability-based Organizational Response Model (ORM). The chosen topic is relevant in both theoretical and applied terms, because, as national and supranational sustainability requirements are tightened (the 2021 Environmental Code of the Republic of Kazakhstan, the Strategy for Achieving Carbon Neutrality by 2060, the AIFC ESG disclosure guidance, the European supply-chain due diligence legislation and the Carbon Border Adjustment Mechanism, CBAM), the ability of companies to construct a verifiable, governable and documented response to these requirements is becoming a factor of competitiveness and export resilience for the economy of Kazakhstan.

In the current academic literature, sustainable supply chain management is more often examined either in regulatory terms or descriptively, through lists of individual "best practices". The author of the dissertation proposes a different, systemic and management-oriented approach, in which sustainability-related complexity is treated as a differentiated construct (regulatory, stakeholder, data and auditability, interorganizational and temporal change dimensions), and the organizational response is understood as selective stabilization into routines, roles and evidence practices. This made it possible to move from describing individual corporate initiatives to examining the mechanisms of capability formation and of the governed choice between building capabilities internally and participating in collaborative arrangements at the field level.

The structure and content of the dissertation are logically arranged and meet the requirements for scientific research. The work consists of an introduction, three chapters comprising nine sub-chapters, a conclusion, a list of regulatory documents, a list of references and appendices. Chapter One establishes the theoretical and conceptual framework of the research: approaches to sustainable supply chain management are critically analyzed; Social Systems Theory is substantiated as an interpretive lens for the analysis of complexity reduction, complemented by stakeholder and institutional theories, the resource-based view and the dynamic capabilities perspective; the institutional, regulatory and assurance boundary conditions of Germany and Kazakhstan are systematized; and the two-study abductive research design and its quality criteria are substantiated. The theoretical analysis is distinguished by its systemic character and critical depth.

Chapter Two presents a detailed empirical analysis. On the basis of 23 semi-structured interviews with executives, sustainability managers and purchasing managers in 17 German organizations across six supply-chain cases (Study I), the taxonomy of Packed Business Capabilities across the Strategy, People, Process and Technology domains has been reconstructed. On the basis of a qualitative content analysis of 20 sustainability, integrated and annual reports of 11 large Kazakhstani companies published in 2022–2025 (Study II), the

publicly articulated capability profiles and inductively identified context-specific extensions have been established, including strategic data infrastructures and logistics digitization standards. Of particular value is the cross-context synthesis, in which eight comparative propositions (P1–P8) and four institutional mechanisms (M1–M4) are formulated and the mechanism of capability signaling is identified.

Chapter Three develops the author's Organizational Response Model, built on two routing conditions — perceptual convergence and prevalent cross-firm orchestration — which make it possible to distinguish four response types (Internal-first, Co-Developer, Selective Joiner, Collaborative-first), five moderators, six mechanism claims and a normative transition logic. A substantial scientific result is the quantitative operationalization of the model: a GRI-anchored 30-indicator Capability Maturity Score and a formal response-type classification function have been developed and applied to the entire corpus of 20 reports of Study II, and three mechanism-oriented outcome metrics have been operationally defined, namely time-to-mitigation, auditable tier coverage and coordination cost per covered spend.

The scientific novelty of the dissertation research is manifested in the following key results:

- the content of the category "sustainability-related complexity" in supply chains has been clarified as a differentiated construct, and the organizational response has been conceptualized as selective stabilization into routines, roles and evidence practices;
- an empirically grounded taxonomy of Packed Business Capabilities across the Strategy, People, Process and Technology domains has been developed, and its applicability to the publicly disclosed capabilities of Kazakhstani companies has been explored;
- eight comparative propositions (P1–P8) and four institutional mechanisms (M1–M4) explaining the cross-context differences have been formulated, and capability signaling has been identified as a transitional stage that precedes embedded practice;
- a capability-based Organizational Response Model (ORM) has been developed, which explains the allocation of organizational effort between internal capability build-up and collaborative arrangements through two observable routing conditions and links the capability portfolio to measurable outcome metrics;
- a GRI-anchored 30-indicator Capability Maturity Score (CMS) with a formal classification function has been proposed and applied to the full corpus of Study II reports, and 14 prioritized recommendations, a 90-day and 12-month implementation guide and a KPI dictionary for Kazakhstani companies and policymakers have been developed.

The practical significance of the dissertation lies in the possibility of using the developed model and methodological toolkit by companies in the extractive, energy, financial, construction and transport sectors of Kazakhstan in order to diagnose their current response configuration and to justify the choice between internal capability build-up and collaboration, as well as by state bodies, the Astana International Financial Centre and the Kazakhstan Stock Exchange in designing instruments that raise verification capacity and field-level coordination. The toolkit can be used by consulting and audit organizations as a structured diagnostic of assurance readiness, and by higher education institutions in training specialists in management, supply chain management and sustainable development. The results of the research are consistent with the objectives of the Strategy for Achieving Carbon Neutrality by 2060, the Concept for Transition to a Green Economy and the Environmental Code of the Republic of Kazakhstan, as well as with SDG 12, SDG 13 and SDG 17.

The author's command of modern methodological tools should be noted as being of a high standard. The work organically combines methods of systemic, institutional, comparative and structural-functional analysis, case-study methodology, qualitative content analysis, an intercoder reliability check using Krippendorff's alpha ($\alpha = 0.818$ on a stratified subsample), and the formal scoring and classification of the reports by means of the developed instrument. The information base includes the transcripts of 23 interviews, 20 reports of Kazakhstani companies, the GRI Standards, the regulatory legal acts and strategic documents of the Republic of Kazakhstan, the regulatory acts of the European Union and Germany, and the data of international organizations and rating providers. This comprehensive approach enabled the author to examine the research problem in full and to propose an original scientific solution.

The style of presentation deserves particular attention: the text is written in correct academic language, the argumentation is logical and consistent, and the conclusions are supported by empirical data, tables, calculations and modelling results. The author openly discusses the limitations of the research and identifies directions for further work, which testifies to his scientific integrity. During his doctoral studies, A. Neske demonstrated independence, analytical maturity, a high level of research discipline and the ability to formulate his own scientific position; all stages of the research — from the development of the design and the collection of the empirical material to the construction of the model and the formulation of the recommendations — were carried out by him personally.

In view of the above, I consider that the dissertation of Alexander Neske on the topic "Managing sustainability-related complexity in supply chains: A capability-based managerial framework for organizational response" constitutes a completed, independent and substantive piece of scientific research that fully meets the requirements for dissertations submitted for the degree of Doctor of Philosophy (PhD) in the educational program 8D04101 – "Management", and may be recommended for public defense.

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