

Conceptual principles of inter-organizational (network) accounting in clusters based on the provisions of institutional theory

Konceptualne zasady rachunkowości międzyorganizacyjnej (sieciowej) w klastrach oparte na założeniach teorii instytucjonalnej

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Received: 18.09.2023 – Revised: 29.12.2023; 17.04.2024; 1.05.2024 – Accepted: 2.05.2024

Abstract

Purpose: The purpose of the article is to study the key theoretical principles of institutional theory as the basis for shaping an accounting system of inter-organizational (network) linkages in the cluster and to propose directions for their solution.

Methodology/approach: The methodological tool is a systematic analysis of the fundamental provisions of economic teachings and scientific works of accounting researchers. Bibliometric analysis was applied to scientific publications indexed in Scopus, which made it possible to determine the most popular economic theories as thematic guidelines. We also used methods of learning induction and deduction for contextual research of keywords in scientific publications and to establish links between the research characteristics of each of the selected theories. The abstract-logical method was used to formulate scientific-theoretical generalizations and conclusions.

Findings: The problem of inter-organizational accounting in the cluster is outlined based on the provisions of the institutional theory. Development directions are proposed, and recommendations are given for improving accounting within the framework of agency theory, transaction cost theory, contract theory, and actor-network theory.

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Originality/value: The results of the study contribute to the analysis of changes and directions of development of inter-organizational accounting in the cluster and also complement accounting theory. The article fills a research gap by presenting the development of inter-organizational accounting based on agency theory, transaction cost theory, contract theory, and actor-network theory. The originality of the research lies in its creation of a foundational framework and its introduction of a novel perspective on the role of accounting in inter-organizational (network and cluster) relations, allowing for a more comprehensive understanding of their developmental peculiarities.

Keywords: inter-organizational accounting, cluster, institutional theory, agency theory, transaction cost theory, contract theory, actor-network theory.

Streszczenie

Cel: Celem artykułu jest zbadanie kluczowych założeń teorii instytucjonalnej jako podstawy kształtowania systemu rozliczania powiązań międzyorganizacyjnych (sieciowych) w klastrze oraz zapropionowanie kierunków ich rozwiązania.

Metodologia/podejście badawcze: Narzędziem metodologicznym jest systematyczna analiza podstawowych założeń nauk ekonomicznych i prac naukowych z zakresu rachunkowości. Do publikacji naukowych indeksowanych w bazie Scopus zastosowano analizę bibliometryczną, która umożliwiła wyznaczenie najpopularniejszych teorii ekonomicznych jako wytycznych tematycznych. Metody uczenia się indukcji i dedukcji wykorzystaliśmy także do kontekstowych badań słów kluczowych w publikacjach naukowych oraz do ustalenia powiązań pomiędzy charakterystykami badawczymi każdej z wybranych teorii. Do formułowania uogólnień i wniosków naukowo-teoretycznych wykorzystano metodę abstrakcyjno-logiczną.

Wyniki: Problematyka rachunkowości międzyorganizacyjnej w klastrze została zarysowana na podstawie założeń teorii instytucjonalnej. Zapropionowano kierunki rozwoju i podano zalecenia dotyczące doskonalenia rachunkowości w ramach teorii agencji, teorii kosztów transakcyjnych, teorii kontraktu i teorii aktora-sieci.

Oryginalność/wartość: Wyniki badania przyczyniają się do analizy zmian i kierunków rozwoju rachunkowości międzyorganizacyjnej w klastrze, a także uzupełniają teorię rachunkowości. Artykuł wypełnia lukę badawczą, przedstawiając rozwój rachunkowości międzyorganizacyjnej opierając się na teorii agencji, teorii kosztów transakcyjnych, teorii kontraktu i teorii aktora-sieci. Oryginalność badań polega na stworzeniu podstawowych ram i nowatorskim spojrzeniu na rolę rachunkowości w relacjach międzyorganizacyjnych (sieć i klastry), pozwalając na pełniejsze zrozumienie ich właściwości rozwojowych.

Słowa kluczowe: rachunkowość międzyorganizacyjna, klastr, teoria instytucjonalna, teoria agencji, teoria kosztów transakcyjnych, teoria kontraktu, teoria aktora-sieci.

Introduction

Inter-organizational accounting has received increased attention in recent years. Interorganizational relations can be characterized as various forms of cooperation between independent organizations. Cooperation involves developing and implementing activities to meet partners' needs, which determines close interaction. In general, the development of relationships between organizations can be represented as an increase in their awareness of the activities of partners and an understanding of how interactions with each partner take place.

The main advantages of inter-organizational accounting include the conclusion of long-term contracts, determining an overall development strategy, reducing costs based on cooperation, optimizing business processes, reducing the probability of bankruptcy, strengthening competitive advantages, reducing transaction costs, and fostering sustainability in economic development. The main advantage of such cooperation is the emergence of a synergistic effect, when the organizations receive a higher financial result than if they functioned independently.

Inter-organizational accounting gives rise to new accounting practices: inter-organizational cost management, open-book accounting in networks, the use of integrated information systems, and accounting in the value chain open-book.

The activity of network formations (such as clusters, strategic alliances, and other types of enterprise associations) can be analyzed using various methodological perspectives, each offering a unique interpretation of their structure, the relationships between elements, and the behavior of the entities involved. One widely used perspective is institutional theory, which is frequently used in accounting research. In recent years, institutional theory has greatly influenced research across many social science disciplines, including economics, sociology, political science, organizational theory, public administration, and accounting. As Scapens and Varoutsas (2010) pointed out, three types of institutional theories have significantly impacted accounting research (especially management accounting): new institutional economics, old institutional economics, and new institutional sociology.

We agree with Szychta's (2014) opinion that theories that form the conceptual basis for management accounting systems, as well as the various relationships of its elements with the organizational and social context, come from the discipline of economics, operations research, and production theory in conventional studies. In alternative studies, they come from organizational theory, sociology, psychology, and philosophy.

Hybrid organizational forms, such as clusters, combine values and practices from different institutional spheres. This complexity makes it difficult to fit them clearly into the structures of existing organizational forms and affects the accounting system (Hyk et al., 2022b). Consequently, there is an urgent need to establish the conceptual foundations of accounting based on institutional theory to integrate the interests of participants in network structures.

Therefore, the purpose of the article is to study the theoretical aspects of institutional theory as the basis for developing an accounting system of inter-organizational (network) connections within clusters. The article is structured as follows: Section 1 covers the theoretical foundations of the study, while the research methodology is presented in Section 2. The results are described in Section 3, and the last section concludes.

1. Theoretical background

The rapid spread of the inter-organizational (network) form of management at the beginning of the 21st century had a significant impact on management systems and its information subsystem, i.e., accounting. Researchers around the world have studied the development of accounting as a means of information support for the

activities of network structures. Researchers around the world have studied the development of accounting as a means of information support for the activities of network structures. Table 1 provides a brief overview of selected papers.

Table 1. Selected papers on the development of accounting as a means of information support

Researcher(s)	Year	Focus of study
Chapman	1998	Involvement of accounting in the coordination of network activities
Tomkins	2001	Interaction between trust and accounting information in inter-organizational relations
Håkansson and Lind	2006	Accounting relationships and classical forms of hierarchy coordination
Mouritsen and Thrane	2006	Theoretical issues of accounting, management control, and inter-organizational relations
Kulmala	2002	Open-book accounting in networks

Source: authors' own elaboration.

The first work to systematically explain the principles of accounting and control in horizontal relationships between legally independent organizations was “Accounting in Networks”, edited by Håkansson et al. (2010). The book describes theoretical views and problematic issues regarding economic perspectives and transaction cost accounting (Anderson, Dekker, 2009), accounting and industrial network approaches (Håkansson et al., 2010), actor-network theory, and the study of inter-organizational network relations (Mouritsen et al., 2010) and perspectives of the institutional theory of accounting in inter-organizational relations (Scapens, Varoutsas, 2010).

The emergence of network structures presents both opportunities and challenges for accounting theory. On the one hand, it offers a chance for further development. On the other hand, adequately transforming accounting practices to fit these structures can be difficult. The development of accounting in inter-organizational management can be based on the provisions of institutional theory (Vysochan et al., 2021). Institutional theory creates theoretical and methodological foundations for the study of inter-organizational relations. It is a powerful research tool for describing and explaining contractual arrangements between the principal (owner) and the agent (accounting entity), accounting for transaction costs, and even the manipulation of financial reporting indicators within chosen accounting policies from a different angle.

Recent research on accounting theory in inter-organizational management has changed focus. As noted by Ahlgren and Lind (2023), more recent research on the topic is characterized by theoretical pluralism, in-depth case studies, and an interest in micro-processes in various inter-organizational settings and from a multi-stakeholder perspective.

De Almeida (2022) used Transaction Cost Theory and Contingency Theory to explain the diversity in the adoption of management accounting best practices. The symbiosis between these theories can help understand how the distinctive attributes of transactions and contracts in counterparty relationships can influence the adoption of good management accounting practices. Meanwhile, as Carlsson-Wall (2018) pointed out, accounting can play an important role in such innovation processes. Nevertheless, in-depth systematic knowledge on this issue is scarce.

While theoretical and practical scientific results have significantly impacted the development of accounting in inter-organizational management, the developing economic landscape demands a reassessment of existing theoretical problematic issues. In light of this, our article poses a key research question:

How can institutional theory (agency theory, transaction cost theory, contract theory, and actor-network theory) be used to develop accounting provisions for inter-organizational relations within clusters?

2. Methodology

This study adopted a systematic three-step approach:

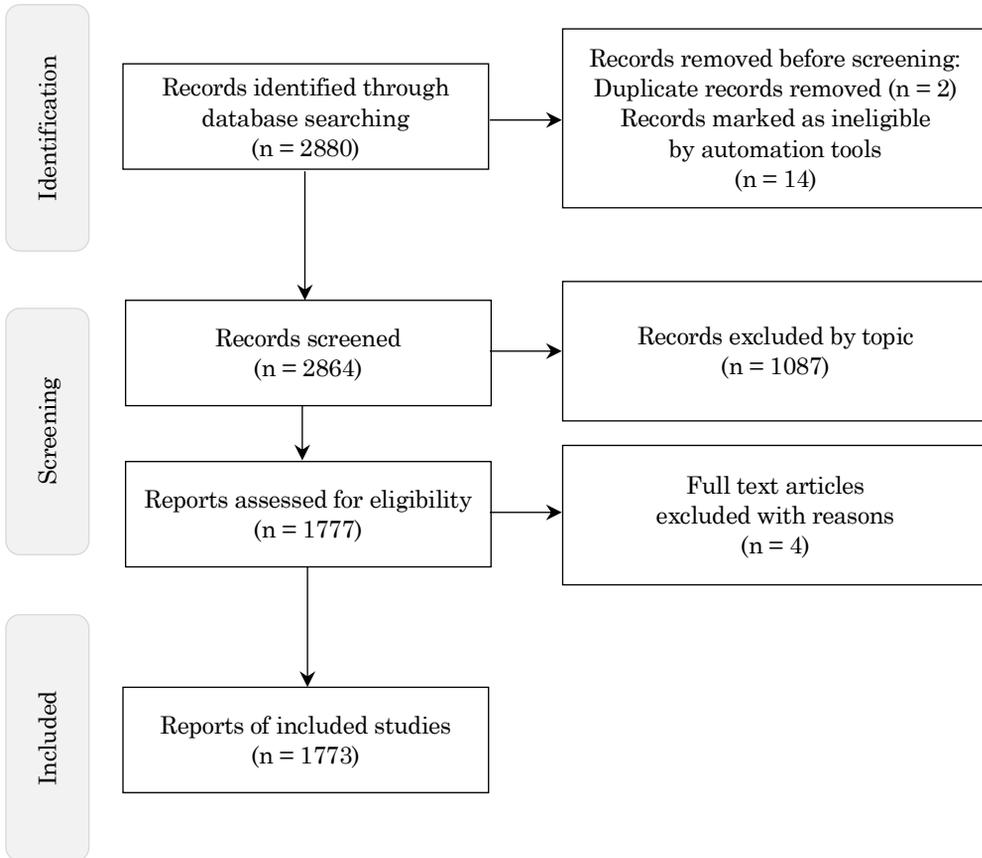
1. Defining key institutional theories to explain the reasons for the accounting processes and activities of network (cluster) structures.
2. Establishing connections between the provisions of selected theories and the evolution of accounting in cluster structures.
3. Formalizing the identified cause-and-effect relationships into the accounting system in cluster structures.

Analysis of the most pertinent research on the topic enabled the identification of key directions in institutional theories. In our opinion, these theories can ensure the development of accounting in the management of cluster entities, i.e., agency theory, the theory of transaction costs, contract theory, and actor-network theory.

To determine the most popular directions and trends in the development of research on this topic, a systematic literature review was conducted using the bibliometric method (Hyk et al., 2022a; Vysochan et al., 2022; Dobija et al., 2023). This review involved searching the Scopus database using keywords within the fields of Business, Management, Accounting, Economics, Econometrics, and Finance. It was formulated as follows:

[TITLE-ABS-KEY (actor-network AND theory) OR TITLE-ABS-KEY (transaction AND cost AND theory) OR TITLE-ABS-KEY (contract AND theory) OR TITLE-ABS-KEY (agency AND theory) AND TITLE-ABS-KEY (network*) OR TITLE-ABS-KEY (cluster*) OR TITLE-ABS-KEY (inter-organi*atio*) OR TITLE-ABS-KEY (interorgani*atio*) AND LIMIT-TO (SUBJAREA, "busi") OR LIMIT-TO (SUBJAREA, "econ")].

The document selection scheme using PRISMA was carried out as follows (Figure 1):

Figure 1. PRISMA 2020 diagram (adapted from Page et al., 2021)

Source: authors' own elaboration.

All acquired data were saved using the “Data Export” function for processing in the VOSviewer program. The next stage involved analyzing the 1,773 publications for keywords that were mentioned at least ten times.

4. Results

As a result, a visual presentation of integration chains (bibliometric map) by key terms was obtained (Figure 2).

Based on the bibliographic map, six clusters of the total set of selected terms were obtained (Table 2).

Cluster name	Theory name	Articles received on request		Highlighted key terms
		Number	Share (%)	
Cluster 3 (blue)	Contract theory	246	13.87	Contracts, decision-making, contract theory, decision-making theory, stakeholder, risk management
Cluster 4 (yellow)	–	87	4.91	Electronic commerce, information technologies, information management, inter-organizational systems, society and institutions
Cluster 5 (purple)	Actor-network theory	398	22.45	Actor-network theory, social networks, theoretical research, cooperation, sustainability, sustainable development
Cluster 6 (light blue)	Game theory	88	4.96	Game theory, supply chain management, logistics, sales, investment, behavioral research
In general		1773	100.00	

Source: authors' own elaboration based on VOSviewer.

As a result of clustering the sample by keyword, each of the five identified theories is automatically assigned to a separate cluster according to the given algorithms, which determine the thematic number of terms mentioned in the publications. This is evidence of the distinct thematic orientation of the publications devoted to these theories. The above indicates that selected theories are quite popular in research on accounting issues in cluster (network) structures. However, for the purposes of this article, we will not focus on game theory. Such significant development of the above-mentioned theories suggests that their provisions and conclusions are the most suitable for forming a system of accounting provisions in cluster structures. In addition, two more clusters were identified that focus on e-commerce and information technologies in the context of inter-organizational systems (cluster 4) and supply chain management issues (cluster 6).

According to Baiman and Rajan (2002a), Baiman and Rajan (2002b), Gietzmann (1996), and Gietzmann and Larsen (1998), who applied agency theory, problems may arise if a supply chain participant invests in new technologies and bears the costs while another member of the supply chain reaps the benefits of the investment. However, investments that are effective for the overall value chain are unlikely to be made because each firm will be concerned with optimizing its own operations. Thus, transactions within cooperative interfirm relationships create incentive problems. A key question in this approach is how accounting and other interfirm design tools can be used to mitigate these incentive problems.

Baselines based on agency theory have often been used in the inter-organizational management and accounting literature (Håkansson, Lind, 2006; Baiman, Rajan, 2002a; Baiman, Rajan, 2002b; Gietzmann, 1996; Gietzmann, Larsen, 1998;

Demski, Sappington, 1993; Kulp, 2002). The inter-organizational relationships in these works are mostly about buyer-supplier dyadic relations. The problematic issues of incentives and information sharing are two closely related topics that are based on agency theory. The general argument is that greater information sharing leads to greater efficiency in the value chain.

The rapid development of interaction between business entities has led to a shift in focus from traditional dyadic relationships, on which most research focuses, to network relationships. In economic theory, the network principle of relationships between economic agents is best embodied in the concept of clusters. Clusters create an institutional environment through various norms, principles, value systems (organizational culture), and rules of the game in the economy and society, shaping the behavior of their agents (members).

The issues identified in more recent papers related to this theory concern risks and interfirm relations in the context of agency theory, economic theory, social identity theory, social comparison theory, and contingency theory (Krisnadewi et al., 2023). These works highlight the importance of communication as a form of agency in accounting practice, viewed through a strong structuring perspective (Daff, Jack, 2018; Vysochan et al., 2024). Additionally, agency and cooperation theories provide a strong foundation for accountability issues in public administration networks (Mitchell, Mohr, 2019).

The development of accounting based on agency theory is possible by ensuring the formation of the exchange of accounting data between actors within a unified information space of the cluster. The key characteristic of the network form of interaction, from an accounting point of view, is the efficient exchange of information that reveals the content of horizontal and vertical connections. The transfer of credentials must consider the principles of inter-organizational (cluster) interaction, including voluntariness, trust, and information exchange, among others.

According to Yukhymenko-Nazaruk (2017), who views accounting as an information and measurement system, agency theory in accounting research can be used to address two main aspects:

1. Reducing information asymmetry between principals (providers of capital) and agents (subjects of implementing the enterprise's accounting policy).
2. Increasing the motivation of agents for the effective implementation of their duties to meet the needs of principals. This minimizes agency costs through the development of the accounting regulation system, which can include introducing normative concepts of professional accounting ethics.

The development of accounting in cluster formations based on agency theory sheds light on how accounting information flows between participating enterprises. These enterprises, bound by contractual relationships, often have different goals and visions for achieving them. However, despite its valuable contribution to inter-organizational management accounting, agency theory remains significantly underutilized by Ukrainian accounting researchers.

For the development of accounting in cluster formations, the following consequences of agency theory are significant:

- The individuals (accountants or managers) responsible for organizing accounting and formulating and implementing the company's accounting policy can act in their own interests;
- In the course of the company's activity, a new type of costs (agency costs) arises, associated with monitoring and establishing relations among various groups of subjects, in particular, those involved in the management and organization of accounting. Neo-institutionalists focus on minimizing these costs.

Transaction cost theory is the dominant concept used to analyze the economics of interfirm relationships. This is also confirmed in our study since transactional theory produced the most articles (496). Institutionalism divides all costs into transformational (e.g., technological, workshop, and production) and transactional. In the context of organizational restructuring, the use of transaction costs is associated with the works of Commons (1934), who recognized these costs as a factor and measure of the effectiveness of the organizational structure.

Within the framework of the latest institutional theory, businesses' relationships are considered through the lens of the transactional approach. One of the provisions of the theory indicates that subjects satisfy their needs through an exchange that occurs without costs, taking into account the initial distribution. However, a high level of entropy appears in the real economy, which accompanies the process of contractual relations (Altukhova, 2012). The presence of such uncertainty leads to the emergence of transaction costs, which Coase (1988) defines as the "costs of gathering and processing information, costs of negotiations and decision-making, costs of control". Nobel prize winner in economics, Oliver Williamson (1981), divides these costs into transaction costs *ex-ante* (expected costs that arise when drawing up and negotiating contracts and that change with the object of the agreement) and *ex-post* (actual costs that are associated with a management structure, monitoring, evaluation, possible incompatibility, negotiations, and security of liability).

Networked cluster organizations are characterized by open communication and exchange, fostering a more sustainable economic model for member organizations. Shared economic interests and synergies within clusters boost operational efficiency. This reduces transaction costs and overall disorder in the system. These formalized interactions, called inter-organizational cost management, aim to collectively reduce costs in the value chain.

Economists have extensively studied the theory of transaction costs in the context of inter-organizational management. Jarillo (1988) indicated the use of the theory of transaction costs in organizations with an inter-organizational design. He identified a third option, in the "make or buy" decision, implemented through various forms of cooperation between organizations in terms of inter-organizational design. Ćetković et al. (2016) also made considerable contributions to understanding the influence of transaction cost theory on modern inter-organizational relations.

Transaction costs are one of the important research categories in modern accounting theory and practice. According to Anderson and Dekker (2009), transaction cost theory suggests two main points: 1) firm boundaries are the result of management

decisions to reduce business costs, and 2) firms use organizational structure, management, and management accounting and control choices to reduce exchange risks and improve transaction efficiency.

While collaboration offers the potential for value chain efficiency, it also presents challenges. Dekker (2003) identified three key issues faced by firms when pursuing joint cost management and accounting information sharing practices: 1) sharing confidential information, 2) sharing costs and benefits from implemented improvements and 3) investments in specific assets as part of value chain improvements.

Our literature review revealed the following topics among recent research: an exploration of the practical implications for future research on supply chain transparency using nine theories: stakeholder theory, technology adoption model, transaction cost theory, commodity theory, the theory of competing values, company vision based on natural resources, actor-network theory and neo-institutional theory (Morgan et al., 2023); the perspective of inter-organizational relations from the point of view of the theory of contingencies and the theory of transaction costs and the implementation of advanced management accounting methods (De Almeida, 2022).

Transaction costs pose a significant challenge for economists due to the difficulties in identifying and assessing them and reducing their level. Sobiecki (2011) states that transaction costs are often difficult to identify and measure in practice as it is impossible to separate them from production costs, which depend on each other and have a common origin.

Baron and Palmén (2011) note that the level of transaction costs depends on three main criteria: asset specificity, uncertainty, and frequency of transactions. Therefore, identifying opportunities to reduce transaction costs is one of the first tasks performed in new cluster formations.

According to Solovyeva et al. (2018), factors that may reduce transaction costs in the cluster structure include the development and assimilation of intracluster routines, the convergence of participants' mental models, accounting and information openness and repetitive interaction, mutual trust of participants, and the development of social capital. Additionally, investments in specific assets, special mechanisms of enforcing contractual obligations (such as compelling one party to perform part of the contract as discussed before signing), the formation of local norms and rules, and the economies of scale achieved through the creation of special intracluster structures, such as transaction cost centers, also contribute to reducing transaction costs (Yaremko et al., 2018).

An important determinant of transaction costs is opportunism (opportunistic behavior), which refers to self-serving actions that create uncertainty between transacting parties. Within transaction cost economics, opportunism is not merely a human tendency but also a characteristic of transactions themselves, termed "behavioral uncertainty" (Niesten, Jolink, 2012). Opportunistic behavior, such as violating pre-agreed contracts or modifying them to one party's advantage, leads to transaction costs. These include costs associated with enforcing the contract, gathering additional information, negotiating new contract terms, and monitoring and

evaluating contract performance (Hodgson, 2004). The threat and extent of opportunism depend on the transaction's level of uncertainty, risk, and complexity.

Maciejczak and Szczupska (2012) argue that the desire for higher profits motivates the constant search for ways to reduce transaction costs. Transaction costs arise because human decisions are controlled by rational behavior, and human interactions are controlled by opportunistic behavior. Rationality leads to increased information gathering and processing costs, while a potential business partner's opportunism increases negotiation and contracting costs.

Iammarino and McCann (2006, pp. 1024–1027) categorize business clusters into three types based on transaction cost theory:

- Pure agglomeration: “Inter-firm relations are inherently transient. Firms are essentially atomistic, in the sense of having no market power, and they will continuously change their relations with other firms and customers in response to market arbitrage opportunities, thereby leading to intense local competition. As such, there is no loyalty between firms, nor are any particular relations long-term”.
- Industrial complex: This type is “characterised primarily by long-term stable and predictable relations between the firms in the cluster, involving frequent transactions. [...] Access to the group is [...] severely restricted both by high entry and exit costs, and the rationale for spatial clustering [...] is that proximity is required primarily in order to minimise inter-firm transport transactions costs”.
- Social network: In this type, “mutual trust relations between key decision making agents in different organisations may be at least as important as decision-making hierarchies within individual organisations. These trust relations will be manifested by a variety of features, such as joint lobbying, joint ventures, informal alliances, and reciprocal arrangements regarding trading relationships. However, the central feature of such trust relations is an absence of opportunism, in that individual firms will not fear reprisals after any reorganisation of inter-firm relations”.

Ammarino and McCann categorized business clusters based on firm interactions and transaction costs. However, their classification is descriptive, not explanatory, relying on the existing agglomeration and clustering literature.

A key indicator of a cluster's efficiency is its ability to minimize transaction costs. Clusters offer stronger control and monitoring mechanisms than the market, as they can promote the real involvement of cluster members and remove opportunistic actors from the group. Coordination of behavior in a cluster based on formal and informal institutions reduces opportunistic behavior (Bembenek, 2015).

Formal institutions like contracts, supported by informal ones like common norms and values (e.g., organizational culture and social capital), can promote cooperation and coordination in the structure and reduce transaction costs. Thus, one of the most progressive directions of institutional economic theory, which is closely related to the theory of transaction costs, is contract theory, which returned 246 articles in our search. Accounting must also be considered an institution that provides

informational support to management. It plays the most important role when signing contracts based on accounting data.

Lambert (2001) explored the potential conflicts between two (or more) parties and the role of accounting information in managing them. He developed a model that incorporates this concept and concluded that the contractual paradigm has been very useful in providing an understanding of many management accounting practices.

The application of contract theory to accounting is gaining traction in Ukrainian research. Yukhymenko-Nazaruk (2017) argues that contract theory provides a formal framework for analyzing contractual relationships that relate to the construction and functioning of the accounting system at the enterprise. They can be considered a powerful tool for solving actual accounting problems that researchers face when moving to a more liberalized system of accounting regulation. Luchko (2016) suggests that studying accounting, transaction costs, and contractual relations within consolidated enterprise groups can reveal the mechanisms by which legally separate entities are unified.

In modern research, authors have considered the following issues: mitigating inter-organizational conflicts, the role of contractual agreements, and trust (Prakash et al., 2022); interlocal contracting as a multiplex network phenomenon (Shrestha, Feiock, 2021); whether smart contracts can change the nature of inter-organizational collaboration through the prism of relational capital and blockchain technology (Brache, Zwerg-Villegas, 2021).

Contract theory views clusters as a specific type of inter-organizational network. These networks are essentially systems of contracts between formally independent economic agents that optimize resource utilization within a sector or across sectors. By applying the theory of transaction costs, we can analyze how these contracts impact internal interactions within a cluster. Thus, contract theory enables the study of all stages of the contract process in a cluster, which is understood as the order of organization of economic operations.

Classical contracts, used in simple transactions, represent market-based coordination relationships. Relational contracts are the basis for many inter-organizational forms. Therefore, according to the provisions of contract theory, interaction within the cluster can be divided into two levels:

- the basic relative contract, which is the basis of internal interactions for the entire period of the cluster's existence;
- business contracts, current investments, and other agreements, which are usually neoclassical contracts.

Having conducted a thorough analysis of the research and work of accounting academics on this topic, we offer the following directions for the development of accounting based on transaction cost theory and contract theory in clusters.

Firstly, accounting of transaction costs and analysis of contractual relations should be carried out according to the stages of the life cycle of the cluster. The life cycle model is widely used when analyzing clusters, and researchers generally agree on four stages of cluster existence: formation, growth, maturity, and decline (with the subsequent disappearance/disintegration or transformation of the cluster).

At the formation stage, the actor-initiator (which can be a firm or a group of firms that already have a history of interaction) must collect information (including accounting information) about the interaction of potential partners and applied technologies and assess their reliability and interest in repeated negotiations. This involves clarifying the strategy and vision of joint development, aligning economic interests and establishing incentives.

The consolidated view of accounting in networks has received many favorable reviews. For example, Laine et al. (2006) suggest using an approach that is the basis of consolidated accounting and financial reporting in networks. However, they also cite several problematic questions:

- 1) Who will keep records and bear responsibility in a consolidated network?
- 2) Which companies are allowed to participate in fiduciary open relationships?
- 3) How can the accounting methods used in the network be standardized, not to mention the resources required for accounting in the consolidated network?

At this stage, we can talk about the existence of ex-ante transaction costs of the basic relative contract, i.e., costs incurred before the conclusion of the agreement. They include the costs of searching for information, conducting negotiations, and drawing up a contract. The creation of a cluster is preceded by consultations and negotiations, identification of strategies, and target functions. Therefore, at the cluster formation stage, there is an increase in transaction costs in connection with the participants initiating and completing completely new accounting processes and procedures. The creation of a specialized cluster development organization will be considered at the end of this stage.

At the cluster functioning stage (we have combined the stages of growth and maturity, since, from the point of view of our analysis, they are similar), there is a gradual strengthening of strategic ties, which achieves the maximum efficiency of interaction at the maturity stage. At the growth stage, the number of cluster participants increases; at the maturity stage, however, the number of new participants decreases, and the processes of leaving the cluster begin (Klink, Langen, 2001). As the size of the cluster increases, the costs of coordinating activities and managing relationships increase.

At the stage of cluster operation, the following transaction costs are manifested:

- Management: maintaining the organizational structure, developing a general strategy, and coordinating the actions of participants.
- Ex-ante (relative contract): Seeking new participants and verifying and considering potential participants.
- Ex-post (relative contract): Transaction costs of opportunistic behavior, contract revisions.
- Ex-ante and ex-post contractual transaction costs for internal economic and investment contracts.

At the growth and maturity stages of the cluster, there is a decrease in transaction costs as business processes become more predictable.

At the decline stage, both the number of participants and the size of the cluster decrease. When configuring the network, transaction costs can be reduced as

several participants and there is a reduction in the number of transactions. However, negative exogenous factors become more important for the way the cluster functions than exogenous cost savings. The result of this stage includes the disappearance of the cluster, the framework of the existing association changes, or the cluster transforms in a new direction, i.e., new actors become involved in the inter-organizational network. Transformation involves revising the relative contract. If the cluster disappears and a new cluster appears with some of the actors from the old cluster, it will be necessary to repeat all the costs of the “inception” stage and develop organizational routines and social capital.

Based on the existing approaches in the accounting literature, we proposed allocating transaction costs depending on the stage in the contractual process in the cluster (Table 3).

Table 3. Transaction costs in the contractual process and their accounting treatment in Ukraine

Stage	List of expenses	Accounting treatment
Negotiation	The costs of searching for information about a potential partner, costs of negotiating with terms of exchange and choosing the form of the agreement	The accounting treatment of transaction costs of the contractual process should take into account the type (direction) of the contract. Transaction costs of the contractual process must be reflected in accounts 92 “Administrative costs” and 93 “Sales costs”
Signing the contract	Costs for legal execution of contracts	
Execution of the contract	Costs for adapting the terms of the contract to the circumstances arising in its execution; costs related to changes in legislation; other transaction costs arising during the contract execution processes	Transaction costs are reflected in accounts of class 9 “Activity costs” (except for accounts 90 “Cost of sale” and 91 “General production costs”)
Analysis of contract performance	Costs related to analyzing contract execution; expenses for audit, services, and other outsourcing services	Transaction costs must be reflected in accounts 92 “Administrative costs” and 93 “Sales costs”
Control over the execution of the contract	Costs associated with monitoring the fulfillment of the terms of the agreement and preventing deviations from the fulfillment of these terms; costs of legal services related to the protection of property rights and restoring violated rights; court costs; the costs of poor specification and unreliable property rights protection	

Source: authors’ own elaboration.

The proposed approach to the development of accounting will allow a deeper understanding of the content of transaction costs and contractual relations. It will also make it possible to determine the features and develop a methodology for their management, including features of accounting, analysis, and control for operational regulation and to identify reserves for reducing transaction costs in the cluster.

In the context of cluster formations, the principles of contract theory play a pivotal role. The enterprise should be considered a place where contractual relations among such subjects as managers, accountants, investors, etc. intersect. Contracts can be concluded both between the enterprise and external entities and within the cluster. The development of contract theory in accounting is fundamentally changing our understanding of accounting's role as a separate socio-economic institution. Thus, contract theory allows us to broaden the scope of accounting. It positions accounting not just as a data collection function but also as a crucial tool for managing contractual interactions. As a result, it can be considered an institutional practice with a deep historical foundation. This can be evidenced by the existence of several historically formed accounting principles, in particular, the principle of autonomy.

Transaction cost theory and contract theory, which partially overlap, offer valuable insights for developing accounting within clusters. These theories help explain the relationships between participants involved in implementing accounting procedures.

Actor-network theory (ANT), also known as the sociology of translation, was developed by Bruno Latour, Michael Callon, and John Lowe in the late 1970s as a means to understand the social construction of science. ANT returned 398 articles in our search. In the context of accounting, ANT emphasizes the network-like character of interactions within various spheres. It highlights the interconnectedness of people, objects (like accounting systems), and organizations within clusters. Their mutual influence shapes accounting procedures and the resulting knowledge produced.

In the early 1990s, actor-network theory, particularly Bruno Latour's book "Science in Action", inspired accounting scholars and led to several innovative studies in accounting (O'Connell et al., 2014). As Justesen and Mouritsen (2011) point out, institutional theory emphasizes that accounting entities are the consequences of various "irrational" driving forces. The actor-network approach assumes that the social environment is ambiguous until its accounting relationship is identified.

Overall, the influence of ANT has led to a wide variety of research, but one major area of interest is the analysis of changes in accounting viewed as translation processes. According to Alcouffe et al. (2008), management accounting research based on ANT should be considered in two directions, i.e., as "accounting in the making" and "accounting in action".

Studies of "accounting in the making" examine the creation, modification, and adoption of accounting practices. These studies focus on translation processes aimed at persuading others to accept fact-based accounting systems and their solutions to create a so-called "black box" (Bloomfield et al., 1992). The purpose of translation processes is to ensure that accounting facts and methods are accepted by users without change.

The second strand, "accounting in action" investigates the role that accounting practices play in organizations and society once they are removed from the "black box".

In this type of research, accounting information is considered an array of data that “acts at a distance” (Chua, Mahama, 2007; Cuganesan, Lee, 2006; Quattrone, Hopper, 2005; Zawawi, 2018; Robson, 1991).

Drawing on actor-network theory, Mouritsen and Thrane (2006) conceptualize accounting as part of a network rather than merely a technology or network governance structure. They argue that accounting works through mechanisms of “self-regulation” or “organization” that stabilize and develop the network.

Chua and Mahama (2007) emphasize that while economic theory mainly models interfirm alliances (clusters) as dyadic relationships between buyer and supplier, actor-network theory allows us to consider them as part of a complex and dynamic network of relationships.

In modern research, authors have used ANT to consider issues such as accounting, management control mechanisms, and accountability in hybrid public sector organizations (Zawawi, Hoque, 2022). Thus, in our opinion, the direction of development of accounting in clusters based on ANT expands opportunities and practices of accounting for joint activities due to trust and partnership between cluster participants. The involvement of people from various institutional spheres (business, academia, state authorities, public associations and other types of non-profit organizations) in network interactions determines the breadth and variability of accounting combinations in relations and connections. These interactions can include:

- The exchange of accounting information;
- Consistency and coordination of actions regarding intra-cluster (intra-network) processes and the external environment (e.g., strategic partnerships);
- Correlation of operational activities and strategic planning regarding individual and network-wide development trajectory.

The interaction of disparate actors, each with distinct knowledge bases and sets of competencies but complementary in the context of individual elements of the process, is a significant source of innovation, forming the competitive advantages of network stakeholders.

The cluster structure of actors’ interactions is ensured both by the presence of large companies and the interest of members of the scientific, educational, and non-commercial sectors, which radically changes the interaction structure. Inter-branch, inter-organizational relationships of clusters of actors involve going beyond the framework of higher branch specialization. They are also characterized by a combination of formal (transactional) and informal (social) relations, with a tendency towards the former. Thus, in the cluster, interactions have an intra-system nature. They form based on the participants’ desire to keep records of joint activities based on mutually beneficial partnerships and coordination. Targeted and sustainable internal relations are based on elements of inter-organizational strategic accounting management (long-term strategic cooperation and collaboration), the benefits of which outweigh the benefits of competition. However, as Pronyaeva and Fedotenkova (2018) note, inter-organizational strategic accounting in clusters should be considered not only as an information source for strategic decision-making but also as an instrumental resource for ensuring strategy and strategic management.

Conclusion

Many aspects of institutional theory are still in the stage of development and improvement. As a result, accounting, which is functionally dependent on economic theory, has not yet sufficiently integrated the main neo-institutional ideas to improve its theoretical and methodological foundations. Thus, using institutional theory, a conceptual update of the issues of accounting in clusters was carried out. It was determined that the key problematic issues from the perspective of agency theory are stimulation and information exchange. The research established that transaction cost theory is one of the theoretical foundations of modern forms of inter-organizational relations. The accounting system is the primary source of reliable information for management purposes, designed to reduce transaction costs.

The proposed approach to accounting for transaction costs and analyzing contractual relations at the stages of the cluster's life cycle showed that relative savings in transaction costs can occur only at the stages of growth and maturity, and positive cluster effects are delayed. At the formation stage of the cluster, there is a natural increase in transaction costs for all participating organizations. The use of the actor-network theory as the main tool for analyzing the existing relationships allows us to refocus the view from the dyadic relationship between the buyer and the supplier to the complex and dynamic relationships within the network.

Thus, based on the research, it can be concluded that the role of accounting in inter-organizational relations remains extremely important today. The constant development of inter-organizational management poses new challenges to the accounting system, which must be addressed using a range of theoretical approaches.

Grounded theoretical aspects, as well as the proposed practical recommendations for improving accounting within the framework of agency theory, transaction cost theory, contract theory, and actor-network theory, will help increase the efficiency of inter-organizational management and the accounting of cluster activities.

The analysis of international research allows us to state that the selected theories can be applied for the further development of other related fields of scientific research, in particular, management accounting, management control, accounting, and information support for the management of cluster-type enterprises.

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Acknowledgment

This study was conducted within 2 academic projects: “Accounting in the context of sustainable economic development” (code of R&D work – OA–16) and “Formation and distribution of information flows between the subjects of the accounting system of the enterprise” (code of R&D work – OA–20).