AMERICAN Journal of Public Diplomacy and International Studies
Volume 3, Issue 10, 2025 ISSN (E):2993-2157

Improving the Methodology for Accounting for Indirect Costs in Cotton and Textile Clusters and Their Distribution Between Semi-Finished Products and Final Finished Products

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Abstract: The article discusses current issues in the methodology of indirect costs accounting in cotton-textile clusters. The main focus is on the problem of their rational distribution between semi-finished products (yarn, raw fabric) and finished products. The necessity of transition to improved process and multi-factor cost allocation methods is substantiated, taking into account the specific features of textile production cycles. Proposals are presented for the implementation of digital tools for accounting and standardization of distribution bases.

Keywords: Cotton and textile clusters; indirect costs; semi-finished products; production costs; cost allocation; process accounting; digitalization of accounting; costing methodology.

Introduction: The development of cotton and textile clusters in the Republic of Uzbekistan contributes to the deep processing of raw materials within the country and the increase of added value. However, the effectiveness of management in such multi-stage production chains largely depends on the accuracy of cost allocation, especially indirect costs that are generated at various levels and are not directly related to specific products.

Traditional approaches based on a single distribution base (e.g., production volume) are becoming less relevant in the face of increasing technological complexity and digitalization of processes. This is particularly problematic in the distribution of indirect costs between semi-finished and finished products, where misinformation can lead to incorrect management decisions and loss of profitability.

The purpose of the study. To develop theoretically substantiated and practically applicable recommendations for improving the methodology of accounting and distribution of indirect costs within cotton and textile clusters, taking into account technological and organizational specifics.

Research objectives:

- to analyze the current practice of accounting and distribution of indirect costs in textile clusters;
- to identify the key shortcomings of the current methods of distribution to intermediate and final products;
- to study the foreign and industry experience of using alternative methods of calculation (ABC, process method, standard cost);
- to develop an improved scheme for the distribution of indirect costs, taking into account the production stages;

- to propose digital and analytical tools for the automation of cost distribution;
- to formulate practical recommendations for the implementation of a new accounting methodology and staff training.

The object of the study is cotton-textile clusters as a production and economic structure that unites enterprises of the full cycle: from primary processing of cotton to the production of finished textile products.

The subject of the study is the methodology of accounting and distribution of indirect costs between semi-finished products and final products in the conditions of textile production.

Research methods. The following methods were used in the research process:

- inductive and deductive methods - for a logical transition from the analysis of individual observations (induction) to general conclusions, and vice versa - to test hypotheses in accounting methodology;
- SWOT analysis of the accounting system - to identify the strengths and weaknesses of the current cost accounting practices, opportunities and threats in terms of digitalization and clustering;
- business process modeling (BPM) method - to visualize and optimize cost accounting in terms of sections, automation of accounting cycles using BPMN or ARIS;
- functional cost analysis (FCA) - to determine which indirect costs do not add value and can be optimized;
- the method of expert assessments - to obtain a qualified opinion from scientists, practicing accountants, and financial directors on the correctness of accounting approaches.

Analysis and results.

The study used inductive and deductive methods, which allowed for a logical transition from analyzing specific practical situations (individual observations) to formulating general theoretical conclusions and, conversely, to test the developed hypotheses in practice.

At the first stage, an analysis of indirect cost accounting was carried out at individual enterprises in cotton and textile clusters. An inductive approach allowed us to identify repetitions and systemic errors, for example:

- use of simplified distribution bases (direct costs, wages);
- insufficient detail of calculation objects;
- mixing of administrative and production costs.

In the second stage, a deductive approach was applied: based on the identified patterns and preliminary hypotheses, it was assumed that such shortcomings were typical for most enterprises in the industry. These hypotheses were verified through a selective re-analysis, including at enterprises with a different production structure.

As a result of the conducted cycle of induction and deduction, the following generalized conclusions were formulated:

- the absence of standard methodological recommendations leads to the arbitrary distribution of indirect costs;
- the use of a process accounting method based on the logic of conversion production contributes to a more accurate and objective formation of costs;
- the implementation of digital accounting models (including those based on ERP systems and BPMN) eliminates the subjective factor and automates the distribution of costs.

Table 1. Inductive and deductive methods: logical transition from observations to conclusions

Stage	Content	Application in research	Expected result
Induction	Collection and analysis of practical cases of cost accounting in cluster enterprises	Analysis of real business transactions and accounting errors	Identification of recurring problems and patterns
Deduction	Testing hypotheses in other cluster enterprises	Application of previously identified dependencies to new data	Confirmation of the universality of the proposed methodology
Generalization	Formulating recommendations for cost allocation	Development of reasonable proposals based on the collected data	Methodological recommendations for modernizing accounting

Thus, the use of inductive and deductive methods ensured the theoretical validity and practical applicability of the conclusions made in this study.

As part of the study, a SWOT analysis of current cost accounting practices in cotton and textile clusters was conducted. The SWOT methodology allows for a comprehensive assessment of internal and external factors affecting accounting efficiency, highlighting:

- Strengths;
- Weaknesses;
- Opportunities;
- Threats.

Strengths:

The presence of a centralized accounting policy in a number of clusters, especially with the participation of large textile holdings.

The use of ERP systems (such as 1C, SAP Business One) for primary accounting, warehouse, and production document management.

The well-established document flow between the cluster's links, which allows for tracking the movement of raw materials and semi-finished products.

Weaknesses:

Insufficient detail of indirect costs by process — in most cases, they are distributed proportionally to direct costs, which distorts the actual cost.

Low level of cost allocation automation — calculations are often performed manually or in Excel.

Confusion between "costs by function" and "costs by object," which makes it difficult to analyze by center of responsibility.

Opportunities:

The transition to the process-based accounting method (Activity-Based Costing, Process Costing) allows for more accurate tracking of costs at each stage of the technological chain.

The digitalization of cost accounting and the implementation of business modeling (BPMN) provide end-to-end automation of accounting and planning.

The increased interest in financial transparency from investors and government agencies contributes to the implementation of more accurate accounting methods.

Threats:

Resistance to change from accounting staff, especially in regions where a traditional approach prevails.

A lack of qualified personnel capable of implementing and maintaining modern accounting and automation methods.

The absence of industry-specific standards for cost allocation, which creates regulatory uncertainty and hinders the unification of accounting.

Table 2. SWOT analysis of the cost accounting system in the cluster

Category	Factors	A practical example
Strengths (S)	Centralization of accounting functions, availability of 1C/ERP	In many enterprises, accounting is automated
Weaknesses (W)	Lack of a methodology for allocating costs by process	Indirect costs are divided conditionally, without taking into account the specifics
Opportunities (O)	Development of digitalization, interest in ABC/process approaches	The willingness of enterprises to invest in IT solutions
Threats (T)	Staff shortage, resistance to change	Accountants do not possess the process method of accounting

A SWOT analysis shows that the cost accounting system in textile clusters has high potential for development, but there are significant internal and external limitations. The main strategy should be the gradual implementation of a process-based accounting method, the digitalization of accounting procedures, and the training of personnel in new approaches. Industry-specific guidelines are also needed to overcome regulatory and practical barriers.

Business Process Modeling (BPM) is used as a tool for visualizing, analyzing, and optimizing production and accounting cycles in cotton and textile clusters. In particular, this method allows for a clear representation of how costs are generated and distributed across each stage of the production chain, from raw materials to finished products.

The goals of using BPM:

- Formalize the stages of resource movement (raw materials, semi-finished products, and costs) by process steps;
- Identify duplicate or inefficient actions that create unnecessary indirect costs;
- Create a basis for automating cost accounting and control using BPMN (Business Process Model and Notation) or software solutions (such as ARIS, Bizagi, and 1C-ERP).

Table 3. Business Process Modeling (BPM) Method: Cost Accounting by Process Steps

The model element	An example from accounting	Purpose of the simulation	Result
The "Spinning" process	Distribution of electricity and depreciation costs	Identify specific cost centers	Transparency of costs by stage
The "Weaving" process	Accounting for wages and materials from the previous stage	Assess the validity of indirect cost allocation	Alignment of costs between semi-finished products
The "Finishing" process	Costs for chemicals, water, and energy	Model the allocation base (normally or by time)	Building a logical costing scheme
Integration (ERP system)	Integration of the BPM model into the accounting system	Automate and control costs	Increasing the accuracy and speed of accounting

The advantages of the BPM approach in cost accounting:

- Visualization of costs by process steps facilitates resource management and allows you to identify "expensive" areas;
- Linking accounting to production processes ensures the correct allocation of both direct and indirect costs;
- It increases the transparency of calculating the cost of both intermediate and finished products;
- Support for automation — the ability to integrate models with ERP/1C/BPMN systems for complete closure of the business cycle.

The business process modeling (BPM) method is not only a tool for accounting optimization, but also a practical basis for implementing the process-based cost accounting method in the modern conditions of textile industry clustering. Its use provides a sustainable effect in reducing and reasonable distribution of costs at all stages of product processing.

Function-cost analysis (FCA) is a method of cost assessment from the perspective of utility and added value. In the context of cotton and textile clusters, FCA is used for:

- identifying costs that do not create value for the final product;
- proposing solutions to optimize indirect costs;
- improving resource efficiency at all stages of the production process.

The main categories of costs that need to be reviewed as a result of the FSA:

1. Excessive management levels - unnecessary approvals that do not add value but increase indirect costs.

2. Manual operations that are duplicated in automation systems (for example, double data entry).

3. Low-efficiency support processes - long-term intra-warehouse movements, non-automated sorting, and outdated accounting methods.

4. Hidden losses of time and resources - equipment downtime, staff downtime, and repeated operations due to a lack of standardization.

Table 4. Function-Cost Analysis (FCA): Identifying Inefficient Costs

The cost stage	Description	Value for the product	Conclusion
General production expenses	Lighting, security, and administrative costs	Low or indirect	Possible consolidation or outsourcing
Energy costs for idling equipment	Work without loading	Does not bring value	Optimize the production schedule
Auxiliary areas (repair, warehouse)	Indirect costs for warehouses and repair teams	Partially related to product output	Use the standard method or indirect coefficients
Accounting and control services	Financial and warehouse accounting	Value in management, but not in production	Centralize within ERP and reduce duplication of functions

FSA allows you not only to reduce costs, but also to make them meaningful in terms of the value they create for the customer or business. In the context of the cotton and textile cluster, this is especially important for:

- reducing the share of indirect costs in the production cost;
- streamlining technological chains;

- eliminating "unnecessary" costs that hinder price competitiveness.

Practical recommendations:

1. Implementing ABC analysis to assess costs by priority levels.

2. Developing regulations for eliminating non-value-added operations.

3. Transitioning to end-to-end accounting based on digital processes, where each cost element is justified through functionality.

The expert assessment method involves collecting and analyzing the opinions of professionals, such as accountants, economists, auditors, and IT specialists, in order to:

- identify problems and limitations in the current cost accounting system;
- assess the practical applicability of the process-based costing method;
- generate proposals for digitalization and optimization of accounting.

An expert survey was conducted among specialists working in cotton and textile cluster structures, as well as representatives of consulting and audit organizations.

Table 5. Expert Assessment Method: Expert Opinions

Question	**Expert response (as a percentage of the number of respondents)**	**Comment**
Do you consider cost accounting in the cluster to be transparent and efficient?	✗ No — 68%☑ Partially — 26%☑ Yes — 6%	Most experts point out the difficulty of tracking costs by process steps
What are the most pressing issues in accounting?	1. No unified methodology — 75%2. Weak automation — 62%3. Cost allocation errors — 59%	Accounting is based on templates, without in-depth analysis
Do you support the implementation of a process-based accounting method?	☑ Yes — 83% ? Не уверен — 12%✗ No — 5%	The method is perceived as progressive, but requires staff training
What elements of digitalization are essential in the first place?	1. ERP/1C automation — 81%2. Online accounting of warehouses and production costs — 64%3. Process-based costing models — 58%	The priority is transparency and real-time control

Conclusions based on expert assessments:

1. The current cost accounting practice in clusters needs to be reformed, especially in terms of:

- automation;
- details of accounting for indirect costs;
- digital transparency of data.

2. The process calculation method is perceived by most experts as a promising approach that allows:

- link accounting to production cycles;
- improve the accuracy of cost estimation.

3. Experts emphasize the need to standardize accounting methodology, as well as to develop standard digital solutions adapted to textile clusters.

Conclusion:

In the context of the active development of cotton and textile clusters as a key link in the national economy, there is an objective need to improve the cost accounting methodology and optimize the process of calculating the cost of production. The conducted research has shown that traditional cost accounting methods, which are primarily based on a process-by-process or section-by-section approach without digital support, do not provide complete transparency and accuracy in calculating the cost of production, especially in terms of indirect costs and intermediate semi-finished products.

The use of research methods such as analytical approach, comparative analysis, economic and mathematical modeling, expert assessments, as well as tools for functional cost analysis and business process modeling, has made it possible to identify bottlenecks in the existing accounting practices and develop scientifically based proposals for their improvement.

The key findings were:

The need to implement a process-based accounting method that allows for the formation of cost based on the sequential movement of resources and costs through production stages (steps).

The relevance of automation and digitalization of accounting, including through the implementation of ERP and BPM systems to ensure operational control and the formation of management reporting.

The expediency of revising the composition and structure of indirect costs, eliminating non-value-added operations, and improving the efficiency of cost allocation between semi-finished products and finished products.

The initiative is supported by practitioners (accountants, economists, and managers), as evidenced by the results of expert surveys.

Thus, the implementation of the approaches proposed in this paper will create conditions for improving the accuracy of accounting, transparency of management decisions, and reducing costs by optimizing expenses, which will directly affect the competitiveness of cotton and textile cluster products in both domestic and foreign markets.

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