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IMPROVING THE MECHANISM FOR ENSURING ORGANIZATIONAL ECONOMIC SUSTAINABILITY UNDER WORKFORCE OPTIMIZATION: THE CASE OF SIEMENS AG

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Abstract: The article examines the relationship between workforce optimization and organizational economic sustainability using Siemens AG's publicly available data for 2018-2025. Workforce optimization is interpreted not as mechanical headcount reduction but as a process combining functional redesign, automation, reskilling and the reallocation of labour toward higher-value activities. The study analyses labour productivity, personnel costs and an integrated economic sustainability index incorporating profitability, liquidity, capitalization and cash-flow indicators. Revenue per employee increased from €192.8 thousand in 2018 to €248.2 thousand in 2025. The baseline analysis revealed a strong positive relationship between labour productivity and economic sustainability, although the relationship lost statistical significance after controlling for the time trend. Siemens' 2025 restructuring experience demonstrates that workforce optimization may involve simultaneous capacity reduction in declining businesses and employment creation in expanding activities. Based on the findings, a six-stage organizational-economic mechanism integrating functional diagnosis, workforce reallocation, reskilling, automation and performance monitoring is proposed.

Keywords: workforce optimization, economic sustainability, labour productivity, human capital, digitalization, automation, restructuring, reskilling, HR-analytics.

Annotatsiya: Maqolada ish o'rinarini optimallashtirishning tashkilot iqtisodiy barqarorligiga ta'siri Siemens AGning 2018–2025-yillardagi ochiq ma'lumotlari asosida tadqiq etilgan. Ish o'rinarini optimallashtirish xodimlar sonini mexanik qisqartirish emas, balki funksional vazifalarni qayta ko'rib chiqish, avtomatlashtirish, xodimlarni qayta tayyorlash va mehnat resurslarini yuqori qiymat yaratuvchi faoliyatlarga yo'naltirish jarayoni sifatida talqin qilingan. Tadqiqotda mehnat unumdorligi, mehnat xarajatlari va iqtisodiy barqarorlik ko'rsatkichlari tahlil qilinib, rentabellik, likvidlik, kapital barqarorligi va pul oqimini birlashtiruvchi integral iqtisodiy barqarorlik indeksi qo'llanilgan. Natijalar Siemensda bir xodimga to'g'ri keladigan tushum 2018-yildagi 192,8 ming yevrodan 2025-yilda 248,2 ming yevroga oshganini ko'rsatdi. Mehnat unumdorligi va iqtisodiy barqarorlik o'rtasida kuchli ijobiy bog'lanish kuzatilgan bo'lsa-da, vaqt omili nazorat qilinganda bog'lanish statistik barqarorligini yo'qotgan. Siemensning 2025-yildagi qayta tashkillashtirish tajribasi qisqaruvchi faoliyatlardan o'suvchi segmentlarga mehnat resurslarini qayta taqsimlash optimallashtirishning muhim shakli ekanini ko'rsatdi. Tadqiqot yakunida olti bosqichli tashkiliy-iqtisodiy mexanizm taklif etildi.

Kalit so'zlar: ish o'rinarini optimallashtirish, iqtisodiy barqarorlik, mehnat unumdorligi, inson kapitali, raqamlashtirish, avtomatlashtirish, qayta tashkillashtirish (restrukturizatsiya), qayta tayyorlash, inson resurslari tahlili.

Аннотация: В статье исследуется влияние оптимизации рабочих мест на экономическую устойчивость организации на основе открытых данных Siemens AG за 2018-2025 гг. Оптимизация рассматривается не как механическое сокращение персонала, а как процесс пересмотра функций, автоматизации, переподготовки работников и перераспределения трудовых ресурсов в виды деятельности с более высокой добавленной стоимостью. Анализируются производительность труда, затраты на персонал и интегральный индекс экономической устойчивости, объединяющий показатели рентабельности, ликвидности, капитала и денежных потоков. Выручка на

одного работника Siemens увеличилась с 192,8 тыс. евро в 2018 г. до 248,2 тыс. евро в 2025 г. Базовый анализ выявил сильную положительную связь между производительностью труда и экономической устойчивостью, однако после учёта временного тренда статистическая устойчивость связи исчезла. Опыт Siemens показывает, что оптимизация может сочетать сокращение мощностей в отдельных направлениях с созданием рабочих мест и развитием компетенций в растущих сегментах. Предложен шестистадийный организационно-экономический механизм оптимизации рабочих мест.

Ключевые слова: оптимизация рабочих мест, экономическая устойчивость, производительность труда, человеческий капитал, цифровизация, автоматизация, реструктуризация, переподготовка, HR-аналитика.

INTRODUCTION

The rapid penetration of digitalization, automation, and artificial intelligence into economic activities is changing the content of work and the structure of jobs in enterprises and organizations. Research by the International Labour Organization shows that technological renewal is more likely to change the composition of tasks within many occupations than to lead to their complete disappearance¹. Therefore, in modern organizations, job optimization cannot be limited solely to reducing staff positions. In this study, we consider optimization as a process of increasing labor productivity and economic sustainability through the analysis of functional responsibilities, identification of repetitive operations, assessment of competencies, automation, employee retraining, and redeployment to other tasks. Under this approach, staff reduction becomes not the first step in optimization, but rather a last resort when other options are not economically feasible.

This issue is also highly relevant in Uzbekistan. The “Uzbekistan–2030” Strategy, the “Digital Uzbekistan–2030” Strategy², and the new Labour Code³ identify economic competitiveness, digitalization, productive employment, and human capital development as priority areas. According to national statistics, the country's labor resources increased from 20.1 million people in 2024 to 20.6 million in 2025⁴. Under these conditions, alongside the creation of new jobs, increasing the productivity and economic efficiency of existing jobs is also of significant importance.

The problem is that in enterprise practice, optimization is often assessed through the number of eliminated staff positions or the amount of saved wages. Such an approach does not fully reflect the impact on labor productivity, service quality, critical competencies, cash flows, and long-term financial sustainability.

The aim of this study is to assess the relationship between job and labor resource optimization and organizational economic sustainability based on publicly available data from Siemens AG, and to develop an organizational and economic mechanism that integrates functional auditing, automation, retraining, and control.

REVIEW OF LITERATURE ON THE SUBJECT

In human capital theory, Becker views an employee's knowledge and skills as capital that generates economic returns in the future⁵. According to Barney's resource-based theory, valuable and difficult-to-imitate competencies are a source of an organization's long-term competitive advantage⁶. These approaches indicate that optimization decisions should take into account not only the cost of an employee's wages but also the value of losing the knowledge and competencies associated with that employee.

There is no single conclusion in research on downsizing and restructuring. Datta et al. show that the outcomes of employee downsizing depend on the strategy and organizational context⁷. Gittell et al. found that, in some cases, large-scale layoffs can negatively affect an organization's ability to recover⁸. Luan and several other scholars have noted that reducing a firm to the “wrong size” may lead to a decline in performance⁹. Thus, the key issue is not simply reducing the number of employees, but determining which functional roles and

1 <https://www.ilo.org/publications/generative-ai-and-jobs-2025-update>

2 <https://www.lex.uz/uz/docs/-5030957>

3 <https://www.lex.uz/docs/6257345>

4 <https://siat.stat.uz/data/515/>

5 Becker, G. S. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. 3rd ed. University of Chicago Press, 1993.

6 Barney, J. Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120. <https://doi.org/10.1177/014920639101700108>

7 Datta, D. K., Guthrie, J. P., Basuil, D., & Pandey, A. Causes and effects of employee downsizing: A review and synthesis. *Journal of Management*, 36(1), 281-348. <https://doi.org/10.1177/0149206309346735>

8 Gittell, J. H., Cameron, K., Lim, S., & Rivas, V. Relationships, layoffs, and organizational resilience: Airline industry responses to September 11. *The Journal of Applied Behavioral Science*, 42(3), 300-329. <https://doi.org/10.1177/0021886306286466>

9 Luan, C. J., Tien, C., & Chi, Y. C. Downsizing to the wrong size? A study of the impact of downsizing on firm performance during an economic downturn. *The International Journal of Human Resource Management*, 24(7), 1519-1535. <https://doi.org/10.1080/09585192.2012.725073>

competencies should be retained or reallocated.

In the field of digital transformation, Vial¹⁰, Verhoef et al., and other scholars view technological renewal as a systemic process that transforms business processes and value-creation mechanisms¹¹. Contemporary empirical studies indicate that digitalization may increase demand for highly skilled labor and encourage the retraining of existing employees. This suggests the need to apply automation and retraining simultaneously in the optimization process.

In the field of human resource analysis in enterprises and organizations, Marler and Boudreau¹², as well as McCartney and Fu, argue that human resource decisions should be based on reliable data and linked to business outcomes. This approach makes it possible to assess optimization outcomes not only through the number of employees, but also through productivity, financial sustainability, and human capital indicators¹³.

The research gap is that downsizing, digitalization, human capital, and labor resource analysis in enterprises and organizations have mostly been studied separately. There remains a need for practical assessment approaches that integrate these areas into a unified mechanism and link them to labor productivity and economic sustainability.

The study assumes, first, that an increase in labor productivity is associated with an improvement in an organization's economic sustainability. Second, it is assumed that effective job optimization should not be limited to reducing the number of employees, but should also include automating certain tasks, retraining employees in new professional skills, redirecting them to other tasks, and creating new jobs in developing areas of activity. Third, since an increase in the level of optimization may not always have the same effect on economic sustainability, the relationship between them will be examined separately on the basis of specific data.

RESEARCH METHODOLOGY

We selected Siemens AG, a German company, as the empirical object of the study. The research examined the company's annual reports for 2018–2025, focusing on the number of employees, revenue, total employee-related costs, financial results, cash flow, and restructuring costs. First, particular attention was paid to the labor productivity indicator. This indicator shows how much revenue is generated per employee. It was considered not as a measure of pure physical productivity, but as a simple financial representation of economic productivity at the corporate level:

Labor productivity = Revenue / Number of employees

Next, the IBI was calculated by combining profitability, liquidity, capital stability, and free cash flow into a single index. The weights of the indicators were determined mathematically based on their level of information content:

$$IBI = w_1X_1 + w_2X_2 + \dots + w_nX_n$$

The study conducted an analysis aimed at determining the relationship between an increase in labor productivity and the economic sustainability of the organization. It also examined whether this relationship changes over time and whether it differs from a simple linear form:

$$IBI = \beta_0 + \beta_1LP + \varepsilon$$

ANALYSIS AND RESULTS

From 2018 to 2025, revenue per employee at Siemens increased from €192.8 thousand to €248.2 thousand, representing a 28.7% increase. During 2021–2025, the average annual growth rate of revenue was 6.10%, while the number of employees grew by 1.22% and revenue per employee increased by 4.83%. Thus, during this period, the company's revenue grew faster than its number of employees (Table 1).

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Table 1. Key Indicators of Siemens AG¹⁴

Year	Revenue, € billion	Employees, thousand	Revenue per employee, € thousand	IBI index
2018	55.538	288	192.8	0.293
2019	56.797	287	197.9	0.320
2020	55.254	285	193.9	0.365
2021	62.265	303	205.5	0.320
2022	69.519	296	234.9	0.291
2023	74.882	305	245.5	0.642
2024	75.930	312	243.4	0.739
2025	78.914	318	248.2	0.719

The IBI index increased from 0.293 in 2018 to 0.719 in 2025. The highest value, 0.739, was recorded in 2024. However, in 2025, despite another increase in revenue per employee, the IBI index declined slightly. This indicates that although increasing labor productivity is an important factor in organizational sustainability, it cannot fully substitute for the condition of profitability, liquidity, capital, and cash flow.

The data show that labor costs do not necessarily have to decrease immediately as a result of optimization. In 2025, employee-related restructuring costs reached €636 million, while total employee-related costs accounted for 40.04% of revenue. Transformation may require additional short-term expenditures, such as compensation, retraining, process restructuring, and technological investments (Table 2).

Table 2. Labor and Restructuring Costs of Siemens AG¹⁵

Year	Total employee-related costs, € billion	Total employee-related costs / revenue, %	Restructuring costs, € million
2021	24.789	39.81	410
2022	27.201	39.13	272
2023	28.650	38.26	416
2024	29.875	39.35	312
2025	31.598	40.04	636

Siemens' Optimization Experience in 2025. In 2025, the company announced measures to adjust capacity affecting approximately 5,600 jobs in the automation business and 450 jobs in the electric vehicle charging business. At the same time, the company also created new jobs in growing areas of activity: new investments in the United States were planned to create more than 900 jobs, while the production and service complex in Munich-Allach was expected to create more than 500 new jobs.

Optimization involves not a mechanical reduction of the overall workforce, but the reallocation of labor resources from activities experiencing declining demand to activities with higher growth potential.

This case practically supports the second scientific hypothesis proposed in the study using Siemens as an example, namely that effective optimization should not be limited to reducing the number of employees, but should also include the reallocation of labor resources, retraining, and the creation of new jobs in growing areas of activity. In addition, the company continued to develop its employees' skills. This demonstrates that automation and digitalization do not simply reduce the demand for labor, but also transform the composition of required competencies.

Econometric Results. The correlation between labor productivity and economic sustainability was $r = 0.803$. Correlation reflects the degree to which two indicators change in the same direction. This value indicates a strong positive relationship in the Siemens company data. For the baseline regression, $R^2 = 0.645$, meaning that the model explains approximately 64.5% of the variation in the IBI index. The $p = 0.016$ result indicates that the baseline relationship is statistically significant (Table 3).

¹⁴ Source: Authors' calculations based on Siemens AG annual reports.

¹⁵ Source: Authors' calculations based on Siemens AG annual reports.

Table 3. Relationship Between Labor Productivity and Economic Sustainability¹⁶

Indicator	Result	Simple interpretation
Correlation	$r = 0.803$	Strong positive relationship
R^2	0.645	The model explains 64.5% of the variation in the IBI
p-value	0.016	The baseline relationship is statistically significant
Controlling for time trend	$p > 0.05$	The relationship is not statistically stable

However, when the time trend was included in the model, the coefficient for labor productivity lost its statistical significance. Therefore, the result is interpreted not as a causal conclusion that “labor productivity directly causes economic sustainability,” but rather as an observed relationship in the empirical data. A nonlinear, specifically inverted U-shaped relationship, was also tested; however, the available public data from Siemens did not statistically confirm such a relationship. Thus, the baseline model supports the assumption that an increase in labor productivity is associated with an improvement in organizational economic sustainability. The company’s practices also confirmed that effective job optimization should not be limited to reducing the number of employees, but should also include automating certain tasks, retraining employees in new professional skills, redirecting them to other tasks, and creating new jobs in growing areas of activity. Since an increase in the level of optimization may not always have the same effect on economic sustainability, the relationship between these variables was separately tested using specific data; the results did not confirm an inverted U-shaped relationship.

Based on the results obtained, a six-stage mechanism is proposed to integrate job optimization with the economic sustainability of an organization (Figure 1). The core principle of the mechanism is: “optimize functions and processes first, then competencies, and only afterward the workforce.” The optimization decision is assessed according to two criteria: the economic criterion addresses whether the decision improves productivity, costs, and cash flow, while the human capital criterion considers whether hard-to-replace jobs and an appropriate workload are preserved. These two criteria ensure a balance between short-term savings and long-term economic sustainability.

The scientific novelty of the study is reflected in three areas. First, the concept of job optimization has been expanded from reducing the number of employees to reallocating functions, competencies, and technologies in accordance with their potential to create economic value. Second, a simplified economic sustainability index linking labor productivity with profitability, liquidity, capital stability, and cash flow was tested using data from Siemens AG. Third, a six-stage organizational and economic mechanism was developed that integrates functional auditing, automation, restructuring, job reassignment, and economic monitoring into a single management cycle.

In practice, organizations are recommended to: 1) begin optimization with a functional audit; 2) plan the workforce according to the logic of “outcome–function–competency” rather than “position–employee”; 3) assess opportunities for automation, retraining, and reassignment before reducing employees; 4) evaluate the results not only through wage savings, but also through labor productivity and the organization’s Economic Sustainability Index (IBI); and 5) introduce monitoring at 3-, 6-, and 12-month intervals after optimization (Figure 1).

16 Source: Authors’ calculations.



Figure 1. Organizational and Economic Mechanism for Job Optimization¹⁷

CONCLUSIONS AND SUGGESTIONS

The research results showed that understanding job optimization simply as a reduction in the number of employees is insufficient. Optimization is a comprehensive management process involving the review of business processes, coordination of functions, automation, employee retraining, and the allocation of labor resources to activities that create higher economic value.

In the case of Siemens, revenue per employee increased from €192.8 thousand to €248.2 thousand, or by 28.7%, between 2018 and 2025. The Economic Sustainability Index increased from 0.293 to 0.719, with its highest value of 0.739 recorded in 2024. The baseline statistical analysis identified a strong positive relationship between labor productivity and economic sustainability: $r = 0.803$, $R^2 = 0.645$, and $p = 0.016$. However, when the time trend was controlled for, this relationship lost its statistical significance; therefore, it was assessed as an empirical association rather than a causal effect.

The nonlinear hypothesis that optimization may reduce economic performance beyond a certain point, that is, the scientific assumption that the relationship between the two indicators may not follow a straight-line pattern but may change in direction or strength after a certain point, was not confirmed by the Siemens data. At the same time, the company's practices in 2025 demonstrated that while jobs were being reduced in certain areas of activity, new jobs were being created in areas with higher growth potential. Thus, the essence of effective optimization lies not in reducing the overall number of employees, but in economically justified reallocation of labor resources across different areas of activity.

The proposed six-stage mechanism is designed to manage functional diagnostics, automation, restructuring, human capital risks, and economic outcomes within a single system. Its practical significance lies in ensuring a balance between short-term cost savings and long-term economic sustainability.

Since the empirical analysis is based on one company and eight years of publicly available data, the findings cannot be directly generalized to all organizations. Changes in Siemens' corporate portfolio and the limited public availability of internal company data—including functional workload, individual competencies, and

¹⁷ Source: Author's own work.

indicators of internal job restructuring—also constitute limitations of the study.

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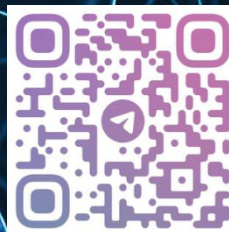
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