

HUMAN CAPITAL INVESTMENT AND LABOUR PRODUCTIVITY IN RAILWAY DIGITALIZATION: THE CONVERSION GAP

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Introduction. Digital systems create value only when staff are able to use them, which makes training the standard complement to digital investment. Human capital theory treats training as an investment whose return appears as higher productivity [1]. Whether this conversion actually takes place is an empirical question. The aim of this study is to compare the dynamics of training expenditure, labour productivity and staff turnover at Uzbekistan Railways JSC.

Methods. Target and actual values of training costs per employee, labour productivity and the staff turnover coefficient were taken from the company's performance analyses for 2020 and 2022 [2; 3]. Headcount and revenue per employee for 2017–2020 were drawn from the company's basic statistics [4], and the 2023 headcount from its business plan [5].

The ratio of productivity growth to training cost growth was used as a simple indicator of conversion; given the small number of observations, it is interpreted as descriptive rather than causal.

Table 1.

Human capital and productivity indicators¹

Indicator	2020	2022	Change	Target 2022	Achieved
Training costs per employee, UZS th.	20.99	33.53	+59.8%	11.24	298%
Labour productivity, UZS th. per employee	172,495	187,623	+8.8%	197,581	95.0%
Staff turnover coefficient	0.977	1.050	+7.5%	1.000	95.2%

Results. Between 2020 and 2022 training expenditure per employee grew by 59.8% and exceeded its target almost threefold. Labour productivity rose by only 8.8% and fell short of its target, reaching 95.0%. The staff turnover coefficient deteriorated by 7.5%. The ratio of productivity growth to training cost growth amounts to 0.15: each percentage point of additional training expenditure was accompanied by roughly one seventh of a percentage point of productivity growth. Over a longer horizon, revenue per employee rose from 66.2 to 116.6 million UZS in 2017–2020 in nominal terms, while headcount fluctuated between 81,016 and 88,567 and stood at 79,421 in 2023.

Discussion. The results reveal a conversion gap between human capital investment and productivity. The gap has at least two sources.

¹ Source: author's calculations based on [2; 3].

The first is retention: rising staff turnover means that part of the trained workforce leaves the company, so that the return on training is partly captured elsewhere.

The second is the absence of a link between acquired competences and job requirements: training expands skills, but without corresponding changes in roles and processes these skills are not applied. The comparison is affected by the financial downturn of 2022 and by the time lag between training and its effect, which calls for caution in interpreting the magnitude of the gap, though not its direction.

The target-setting itself deserves attention. The 2022 target for training expenditure was set at 11.24 thousand UZS per employee, while actual spending was almost three times higher. A target so far below the realized value cannot guide resource allocation: it neither constrains spending nor signals the level of investment required. By contrast, the productivity target turned out to be ambitious relative to the outcome. The asymmetry suggests that input-oriented targets are set cautiously and output-oriented targets optimistically, which widens the apparent gap between them.

The longer-term evidence must be read with care. Revenue per employee almost doubled in 2017–2020, but this indicator is nominal and reflects tariff and price changes as much as real productivity. A reliable assessment of the return on training therefore requires physical productivity measures — for instance, traffic volume or repaired units per employee — observed over several years and compared between units with different levels of training intensity. Such data would also make it possible to estimate the time lag between training and its effect.

International practice offers a way to close the gap. East Japan Railway Company plans digital competences in three tiers with explicit numerical targets for the end of fiscal year 2028 — about 200 experts, 5,000 intermediate and 25,000 basic-level specialists [6]. Such planning turns training from an expenditure item into a measurable workforce objective linked to specific roles.

Conclusion. Increasing training expenditure alone does not ensure productivity growth.

Human capital policy in railway digitalization should combine training with retention measures and with tiered competence planning tied to job roles, and its results should be monitored through productivity and turnover indicators rather than through spending volumes.

References

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