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DIGITAL PROCESS INNOVATION AND LABOUR PRODUCTIVITY IN SMALL ENTERPRISES IN UZBEKISTAN

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Abstract

Small enterprises increasingly use digital tools to manage sales, inventories and payments, but adoption alone provides limited evidence of productivity improvement. This article examines how digital process innovation may raise labour productivity in small retail and service enterprises in Uzbekistan. A narrative synthesis of conceptual, empirical and policy literature identifies three mechanisms: reducing duplicate work, improving coordination across business functions and enabling more timely decisions. The article proposes a measurement framework that links actual use of digital systems to process outcomes and real value added per hour worked. It distinguishes operational gains from changes driven by prices, seasonal demand, outsourcing or workforce composition. An illustrative calculation shows how labour productivity can rise without an increase in real value added, while a prospective evaluation design sets out how staggered adoption could be studied using comparable firms and repeated observations. The framework also accounts for implementation and recurring costs, allowing owners and policymakers to examine whether process improvements translate into an economically viable investment. Uzbekistan provides the institutional context for the framework. The article does not estimate a national or firm-level treatment effect.

Keywords Digital innovation · Small enterprises · Labour productivity · Process innovation · Uzbekistan

JEL classification D24 · L26 · O33 · M15

1 Introduction

A small retailer can sell through several channels while relying on separate records for orders, stock and accounting. Employees may enter the same transaction more than once and reconcile discrepancies manually. Connecting these records can reduce administrative labour and make it easier to track product availability. Its effect on enterprise performance depends on whether staff use the system in routine work and whether improvements in one process carry through to the rest of the business.

The Oslo Manual defines business process innovation by a significant change from the firm’s previous process and its implementation in practice (OECD and Eurostat 2018). A standard inventory application can therefore support an innovation if it substantially changes how a firm manages replenishment. This definition directs attention to workflow changes and supports comparison across firms using different products or suppliers.

This article asks under what conditions digital process innovation can raise labour productivity in small enterprises and how those effects could be measured in Uzbekistan. It focuses on retail and routine service businesses, where orders, stock movements, appointments and payments can often be observed over time. The contribution is to link three mechanisms to indicators that managers can monitor and to a design that researchers can use to evaluate adoption.

2 Literature and analytical approach

2.1 Digital innovation and organisational capabilities

Studies of information technology and firm performance show that organisational arrangements can influence the returns to technological investment. Brynjolfsson and Hitt (2000) describe how information technology can support changes in work organisation. Bloom et al. (2012) link differences in productivity from information technology among multinationals to differences in people management. Those firms differ from small Uzbek enterprises in scale and resources, but their results motivate measuring training, responsibilities and work routines alongside technology use.

Using European firm and industry data, Gal et al. (2019) find that digital adoption is associated with higher firm productivity and that estimated gains differ across firms and sectors. Skill shortages are associated with weaker gains. OECD (2021) identifies gaps in skills, resources and the ability to integrate digital tools as barriers for smaller businesses. Taken together, these studies suggest that a productivity evaluation should record whether staff can use the tools effectively and whether data pass between functions that previously operated separately.

2.2 Distinguishing adoption, use and outcomes

An activation date records when a tool became available. The share of eligible transactions processed through it records how much of the workflow actually changed. The gap between these measures matters when businesses maintain parallel paper and digital records or adopt selected functions first. Local broadband provision can influence access to digital tools, while the economic effects of broadband availability can vary with firm and place characteristics (DeStefano et al. 2023).

This paper uses a narrative review of selected peer-reviewed studies and policy reports. It compares how each source defines exposure to technology, identifies complementary capabilities and measures business outcomes. The framework uses these distinctions to specify measures for small retail and service firms. The review is selective and supports a conceptual synthesis.

3 A framework for measuring productivity gains

3.1 Mechanisms and indicators

Table 1 connects each mechanism to a practical workflow change and to observable indicators. The same system may activate several mechanisms. For example, integrating invoicing with inventory records can reduce duplicate entry and improve coordination between sales and purchasing.

Table 1 Mechanisms and indicators of digital process innovation

Mechanism	Workflow change	Indicators
Reduced duplicate work	Orders, payments and stock records update from one transaction.	Minutes per order, repeat entries and reconciliation errors.
Better coordination	Sales, procurement and service staff share current information.	Stockout rates, order fulfilment time and missed appointments.
More timely decisions	Owners use up-to-date sales, stock or booking records for operating decisions.	Stock turnover, write-offs and idle service hours.

Indicators should be measured on comparable transactions. Retail order preparation time may change with order size or delivery method. A repair business may complete fewer jobs in a month because its mix shifts towards complex repairs. Comparing similar orders or service categories helps distinguish workflow improvements from changes in the work being performed. Service quality can be tracked through returns, order errors, missed appointments or repeat work.

3.2 Productivity and financial viability

The primary outcome is real gross value added per hour worked. Value added equals the value of output less intermediate consumption. For retailers, output is measured on a trade-margin basis, with

goods bought for resale treated consistently so that their cost is not deducted twice. Price changes should be accounted for when comparing periods. Labour hours should include time worked by employees and working owners, including time spent training, correcting records and maintaining the system. A monthly series alongside a measure based on comparable tasks allows short-term adjustment costs to be seen.

Consider a hypothetical retailer producing UZS 48 million in monthly real value added with 800 hours of work. Its initial productivity is UZS 60,000 per hour. If real value added remains UZS 48 million and hours fall to 720, productivity rises to approximately UZS 66,667 per hour, an increase of 11.1%. The example illustrates the calculation. Financial returns still depend on subscription fees, equipment, onboarding, support and whether the freed time reduces costs or enables other productive work. When valuing savings, the same freed hours should not be counted both as avoided wages and as labour used to generate additional revenue.

4 Application to small enterprises in Uzbekistan

4.1 What to record at the enterprise level

UNDP (2025) describes Uzbekistan's digital entrepreneurship ecosystem and highlights uneven digitalisation and gaps in information about firms' capabilities and needs. This context favours collecting comparable enterprise-level evidence. For a retailer, the first workflow to examine could be the transfer of sales records into inventory and accounting. For a service enterprise, it could be the connection between scheduling, work completion and payment. Adoption can be recorded separately for each function, supported by the share of transactions completed through the system and the amount of parallel manual work.

A monthly record would include working hours, trade margins or service output, purchases of intermediate inputs, digital operating costs and a small set of operational indicators. Transaction records should be reconciled against accounts to check whether a measured increase reflects more complete reporting following adoption. Firms should also record major events, such as changes in location, staffing, operating hours or business model. Enterprises in different districts may face different access to providers, training and broadband. Recording those differences helps assess where implementation support could affect adoption and use.

4.2 Prospective evaluation design

A study could follow comparable firms for several periods before and after adoption. Define the primary exposure by the date a specified workflow begins operating consistently under a prespecified criterion, and record software purchase, training and pilot dates separately. Recruit comparison firms in the same or comparable markets and record initial productivity, firm size, line of business and seasonal demand patterns. Preserve records of firms that stop operating or drop out of the study.

Where adoption dates vary and comparable untreated observations exist, group-time difference-in-differences methods could estimate average effects for adoption cohorts under conditional parallel trends and appropriate limits on anticipation (Callaway and Sant'Anna 2021). Training and preparations may themselves affect outcomes, so the pre-adoption period should be checked for anticipatory changes. Results should account for the level at which adoption decisions or support are coordinated. If implementation coincides with wider business changes, or if untreated firms exhibit materially different prior trends, changes can be presented descriptively and interpreted with those limitations in view.

5 Discussion and conclusion

Digital process innovation can improve productivity when everyday tasks require fewer labour hours, when better coordination reduces repeated work, or when timely information improves routine

decisions. Evaluating these channels requires documented use of the technology and indicators specific to the process it changes. Small enterprises can monitor productivity alongside quality and implementation costs to determine whether an operational gain is financially meaningful.

For entrepreneurship support programmes, tracking purchases or subscriptions provides a measure of reach. Monitoring workflow use, staff capability and outcomes adds evidence on whether supported enterprises obtained measurable improvements. Comparing firms across districts can also help identify where implementation is limited by training, provider access or infrastructure.

The proposed framework is based on selected literature and policy evidence. The productivity example is illustrative, and the data collection and evaluation design remain prospective. Linked operating and accounting records from Uzbek enterprises would make it possible to test the mechanisms and assess how results vary across industries and places.

Data availability

No original dataset was generated or analysed. The study draws on the public sources listed in the references.

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