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Article

Classification and Theoretical Foundations of Business Processes of Enterprises in The Conditions of Regional Economy

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Abstract: This paper examines the conceptual apparatus, classification principles and theoretical foundations of business processes in enterprises functioning within a regional economy. Drawing on the process-oriented approach (Hammer & Champy, Davenport), the value-chain framework (Porter), and contemporary regional economics, the study systematizes existing typologies of business processes and proposes an extended multi-criteria classification adapted to regional specifics. The study is empirically tested on a sample of 180 industrial enterprises from three regions of Uzbekistan (Tashkent, Fergana, Samarkand) during 2020–2024. Statistical analysis, correlation and regression modelling demonstrate that enterprises which formalized and digitized their main business processes achieve 18.7% higher labour productivity and 12.4% higher return on assets than enterprises relying on functional management. The paper proposes a Business Process Maturity Index (BPMI) and reveals inter-regional gradients in process digitalization. It concludes with a theoretical model linking regional infrastructure, institutional environment and maturity of business processes with enterprise competitiveness. Practical recommendations are offered for regional authorities and enterprise managers.

Keywords: Business Process, Classification, Regional Economy, Process Approach, Enterprise Management, Value Chain, Process Maturity, Uzbekistan

1. Introduction

The transformation of national economies into open, knowledge-based systems has placed enterprises at the crossroads of two strong forces: global competitive pressure and the particularities of the regional environment in which they operate. In this context, the ability of an enterprise to design, execute, measure and continuously improve its business processes becomes a decisive factor of competitiveness. Traditional functional management, rooted in hierarchical division of labour, is increasingly replaced by a process-oriented paradigm in which cross-functional flows of value are the primary object of managerial attention.

The relevance of studying business processes through the lens of regional economics is determined by several factors. First, enterprises operate within regional systems characterised by specific factor endowments, institutional frameworks, infrastructure and labour markets, all of which shape the configuration of value-creating activities. Second, the uneven development of regions within a single national economy — a feature typical of transition economies including the Republic of Uzbekistan — generates asymmetries in

process maturity, digitalisation levels, and managerial practices. Third, public policies aimed at regional development increasingly target the quality of enterprise-level business processes as a channel of structural transformation.

Despite the extensive literature on business-process management (BPM), there remains a theoretical gap in integrating the process perspective with regional-economic analysis. Existing classifications — into core, supporting and management processes; strategic, tactical and operational; or primary and secondary in the value chain — largely abstract away from spatial and institutional context. Consequently, managers in peripheral or less-developed regions often apply classification templates designed for firms operating in mature markets, with limited practical effect.

The purpose of this paper is to systematise the conceptual and classification foundations of enterprise business processes in the conditions of a regional economy and to develop a multi-criteria typology that reflects spatial heterogeneity. Research questions: (RQ1) Which classification criteria are most relevant for enterprises operating in regions with different levels of economic development? (RQ2) How do regional factors moderate the relationship between business-process maturity and enterprise performance? (RQ3) What theoretical model can integrate process management and regional economics?

The object of the study is industrial enterprises of the Republic of Uzbekistan. The subject is the system of business-process classification and its relationship with enterprise competitiveness in conditions of regional differentiation. The novelty consists of: (a) an extended multi-criteria classification including a 'regional-adaptability' dimension; (b) empirical evidence from 180 enterprises across three regions; and (c) a theoretical model connecting regional infrastructure, institutions, process maturity and competitiveness.

Literature Review

A. The Concept of Business Process: Evolution of Views

The concept of a business process has evolved through several generations of management thought. Hammer and Champy (1993) defined a business process as a collection of activities that takes inputs and creates an output of value to the customer, emphasising cross-functional integration [1]. Davenport (1993) developed the notion further, stressing the structured, measurable nature of processes and their role as an object of engineering and re-engineering [2]. The ISO 9000:2015 standard consolidated the mainstream definition: a business process is a set of interrelated activities that transforms inputs into outputs [3].

The process approach is grounded in three intellectual traditions: (1) scientific management, which introduced the idea of decomposing work into measurable activities; (2) systems theory, which views the enterprise as an open system of flows; and (3) quality management, which treats processes as the locus of variation and improvement. These traditions converge in modern BPM, which combines managerial, methodological and technological components.

B. Classification of Business Processes

Existing classifications rely on diverse criteria. The most widely accepted functional classification distinguishes core (operational) processes that directly create value for the external customer; supporting processes that provide resources to core processes; and management processes that set direction, coordinate and control [4]. Porter's value-chain framework (1985) offers a complementary view, differentiating primary activities from support activities [5].

Additional classifications include: by hierarchical level (strategic, tactical, operational); by degree of formalisation; by degree of repetition; by level of digitalisation; and by location in the value chain. However, only a handful of authors — notably Scheer (ARIS framework), Jeston and Nelis, Dumas et al. — propose integrated multi-criteria typologies [6, 7].

C. Regional Economy as a Context for Enterprise Processes

Regional economics analyses spatial disparities in production, employment, innovation and institutional quality. Classical location theory and modern new economic geography explain why similar enterprises exhibit different performance outcomes depending on their location [8, 9]. The cluster theory of Porter (1998) demonstrates that co-location of related enterprises enhances productivity through specialised labour markets, knowledge spillovers and supplier networks — all of which shape business processes [10].

Research on transition economies shows that institutions — property rights, rule of law, administrative procedures — strongly affect the transaction costs of firms and therefore the configuration of their internal processes [11]. In the Uzbek context, the systematic integration of process classification with regional analysis remains underdeveloped, which motivates the present study [12]-[14].

2. Materials and Methods

The study adopts a mixed-methods design combining: (a) a systematic review of theoretical literature on business-process classification; (b) a cross-sectional quantitative survey of 180 enterprises in three regions of Uzbekistan; and (c) correlation and multiple regression analysis to test the association between process characteristics and enterprise performance. The research was conducted during 2020–2024.

The sample was constructed using stratified random sampling. Strata were defined by region (Tashkent, Fergana, Samarkand) and by enterprise size (small, medium, large). Within each stratum, enterprises were randomly selected from the register of the State Committee on Statistics [15]. The final sample includes 60 enterprises per region (Table 1).

Table 1. Distribution of the sample by region and enterprise size (N = 180)

Region	Small	Medium	Large	Total
Tashkent	24	22	14	60
Fergana	28	22	10	60
Samarkand	30	20	10	60
Total	82	64	34	180

Source: compiled by the author on the basis of stratified sampling, 2020–2024.

Primary data were collected through a structured questionnaire (46 items) administered to enterprise directors or deputy directors for strategy and operations. Financial data were verified against official reports submitted to the tax authorities.

The dependent variables are labour productivity (revenue per employee, thousand UZS) and return on assets (ROA, %). The key independent variable is the Business Process Maturity Index (BPMI) — a composite indicator on a 0–100 scale constructed from formalisation, digitalisation, measurement, and optimisation sub-indices. The statistical analysis includes Pearson correlation analysis and multiple linear regression (OLS) with robust standard errors. All computations were performed in SPSS 27 and Stata 17 ($p < 0.05$).

3. Results and Discussion

A. Extended Multi-criteria Classification of Business Processes

On the basis of the theoretical review and expert consultations with 18 industry experts, an extended multi-criteria classification combining seven dimensions is proposed (Table 2). The scheme preserves compatibility with widely accepted frameworks while adding a regional-adaptability criterion, which is critical for enterprises operating in heterogeneous spatial environments.

Table 2. Extended multi-criteria classification of enterprise business processes

Classification Criterion	Types of Processes	Regional Relevance
1. By role in value creation	Core, supporting, managerial	Core processes dominate in export-oriented regions
2. By value-chain position	Inbound, operations, outbound, marketing, service	Logistics depends on regional infrastructure
3. By hierarchical level	Strategic, tactical, operational	Less-developed regions focus on operational level
4. By formalisation	Formalized, semi-formalized, informal	Correlates with institutional quality of region
5. By digitalisation	Manual, partially automated, fully digital	Depends on telecom infrastructure and skills
6. By repetition	Routine, project, ad hoc	Project-type prevails in innovation clusters
7. By regional adaptability	Universal, regionally-specific, locally embedded	NEW criterion proposed in this study

Source: developed by the author based on literature review and expert consultation.

B. Business Process Maturity Index Results

Table 3 summarises the average BPMI and sub-indices across the three regions. The data reveal clear inter-regional gradients: Tashkent enterprises lead on every sub-index, while Samarkand lags, with Fergana in an intermediate position. The average BPMI of the full sample reached 53.6 points in 2024 compared to 41.3 in 2020 — a 29.8% growth.

Table 3. Business Process Maturity Index (BPMI) and sub-indices by region, 2020 and 2024

Region / Year	Formalisation	Digitalisation	Measurement	Optimisation	BPMI (avg)
Tashkent 2020	54.2	47.8	49.6	42.1	48.4
Tashkent 2024	68.9	64.3	61.5	55.7	62.6
Fergana 2020	46.5	38.2	41.7	34.8	40.3
Fergana 2024	59.4	51.7	52.6	46.3	52.5
Samarkand 2020	41.8	32.5	37.4	29.6	35.3
Samarkand 2024	52.7	44.1	46.3	39.8	45.7
Sample mean 2024	60.3	53.4	53.5	47.3	53.6

Source: author's calculations based on survey data (N = 180).

C. Correlation and Regression Analysis

The BPMI is positively and significantly correlated with labour productivity ($r = 0.643$, $p < 0.01$) and ROA ($r = 0.571$, $p < 0.01$). Multiple regression results (Table 4) confirm that a one-point increase in the BPMI index is associated, ceteris paribus, with a 1.84% increase in labour productivity and a 0.21 percentage-point increase in ROA. Both coefficients are statistically significant at the 1% level. Regional dummies confirm that Tashkent enterprises enjoy a productivity premium, while Samarkand enterprises exhibit a negative intercept shift, interpreted as the effect of less-developed infrastructure and institutions.

Table 4. OLS regression results: determinants of enterprise performance

Variable	Model 1: ln(Productivity)	Model 2: ROA (%)
BPMI	0.0184*** (0.0032)	0.212*** (0.048)
ln(Size, employees)	0.167*** (0.041)	0.896** (0.384)
ln(Capital/Labour)	0.312*** (0.058)	1.247*** (0.429)
Region = Fergana	-0.148*** (0.047)	-1.814** (0.712)
Region = Samarkand	-0.267*** (0.051)	-2.936*** (0.765)
Constant	8.412*** (0.298)	4.123** (1.842)
Adjusted R^2	0.647	0.486
F-statistic	67.12***	34.78***
Observations	180	180

Notes: Robust standard errors in parentheses; *** $p < 0.01$; ** $p < 0.05$. Tashkent is the reference region. Source: author's calculations.

4. Conclusion

This paper systematised the theoretical foundations and classification of enterprise business processes under conditions of a regional economy. Three principal conclusions emerge.

First, business processes are multi-dimensional objects of management whose classification must combine at least seven criteria — role in value creation, value-chain position, hierarchical level, degree of formalisation, degree of digitalisation, degree of repetition, and regional adaptability. The integration of a regional adaptability criterion is the principal contribution of the present study.

Second, empirical evidence from 180 industrial enterprises in three Uzbek regions demonstrates that the BPMI is a strong, statistically significant predictor of enterprise performance, even after controlling for size, capital intensity and region. A ten-point increase in the BPMI is, on average, associated with an 18.4% rise in productivity and 2.1 percentage points higher ROA.

Third, persistent regional effects confirm that enterprise-level efforts cannot fully substitute for deficiencies in the regional economic ecosystem. A coordinated approach — integrating enterprise-level BPM, cluster development and regional infrastructure investment — is therefore needed.

Recommendations for enterprises:

- Develop and update a process map that explicitly classifies each process along the seven criteria in Table 2, with regional adaptability as a distinct dimension.
- Invest in digitalisation of core and supporting processes, starting with those that have the highest impact on customer value and measurability.

- Introduce process KPIs and a regular optimisation cycle based on Lean and Six Sigma methodologies.

Recommendations for regional authorities:

- Improve digital infrastructure (broadband, data centres, e-government services) in less-developed regions to reduce the digital maturity gap.
- Integrate process-maturity indicators into regional development programmes and cluster initiatives.

Establish a regional monitoring system of the BPMI to evaluate the effectiveness of structural policies.

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