AQLLI BOSHQARUV TIZIMLARI VA INSTITUTSIONAL IQTISODIYOT: NAZARIY MODEL

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Annotatsiya: Ushbu tezisda aqlli boshqaruv tizimlari va institutsional iqtisodiyot o'rtasidagi nazariy bog'liqlik tahlil qilinadi. Tizimlarning samaradorligi texnologiyaning o'ziga emas, balki ularni o'rab turgan qoidalar, boshqaruv tuzilmalari va hisobdorlik mexanizmlariga bog'liq degan gipoteza ilgari suriladi. North, Williamson va Ostrom yondashuvlariga tayangan holda to'rtta taklif shakllantiriladi: tranzaksiya xarajatlari, institutsional sifat, boshqaruv shakli va institutlarning tizim ta'siridagi o'zgarishi. Taklif etilgan ramka tadqiqotchilar va boshqaruv amaliyotchilari uchun yo'nalish beradi.

Kalit so'zlar: aqlli boshqaruv tizimlari, institutsional iqtisodiyot, tranzaksiya xarajatlari, institutlar, boshqaruv tuzilmasi, raqamli transformatsiya, nazariy model.

SMART MANAGEMENT SYSTEMS AND INSTITUTIONAL ECONOMICS: A THEORETICAL FRAMEWORK

Abstract: This thesis examines the theoretical relationship between smart management systems and institutional economics. It argues that the performance of such systems depends less on the technology itself than on the rules, governance structures and accountability mechanisms in which it is embedded. Drawing on North's institutional theory, Williamson's transaction cost economics and Ostrom's institutional analysis, the paper develops four propositions concerning transaction costs, institutional quality, the link between governance form and system design, and the feedback from systems to institutions. The resulting framework distinguishes three layers (institutional, governance and technical) and explains why identical technologies produce different outcomes in different organizations. The paper concludes that empirical testing of these propositions is a necessary next step.

Keywords: smart management systems, institutional economics, transaction costs, institutions, governance structure, digital transformation, theoretical framework.

СИСТЕМЫ ИНТЕЛЛЕКТУАЛЬНОГО УПРАВЛЕНИЯ И ИНСТИТУЦИОНАЛЬНАЯ ЭКОНОМИКА: ТЕОРЕТИЧЕСКАЯ МОДЕЛЬ

Аннотация: В тезисе анализируется теоретическая связь между системами интеллектуального управления и институциональной экономикой. Выдвигается гипотеза, что эффективность таких систем определяется не столько технологией, сколько правилами, управленческими структурами и механизмами подотчетности, в которых она работает. На основе работ Норта, Уильямсона и Остром сформулированы четыре положения: снижение трансакционных издержек, роль институционального качества, зависимость дизайна системы от формы управления и обратное влияние системы на институты. Предложенная рамка задает направление исследований и практики управления.

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Ключевые слова: системы интеллектуального управления, институциональная экономика, трансакционные издержки, институты, форма управления, цифровая трансформация, теоретическая модель.

INTRODUCTION

Public and private organizations are investing heavily in smart management systems: platforms that collect data in real time, automate routine decisions and feed performance indicators back to managers. Many of these investments produce less than they promise. Systems are often installed in organizations whose rules, incentives and accountability structures were designed for paper-based procedures, and the technology then reproduces the old inefficiencies in a faster form. This paper argues that the gap is not primarily technical. The performance of a smart management system depends on the institutional environment in which it operates, and a framework that treats technology and institutions separately cannot explain this dependence.

The problem is pressing for two reasons. First, digital transformation of government agencies is now a policy priority in many countries, yet recent reviews show that studies of it remain conceptually fragmented across technological, organizational and institutional perspectives [5]. Second, the management literature on smart systems rarely uses the vocabulary of institutional economics, which has spent several decades explaining why rules, contracts and organizational forms matter for economic outcomes [1, 2]. The aim of this paper is to bring these two bodies of work together and to propose a framework that can guide both research and the design of management systems.

LITERATURE REVIEW AND METHODOLOGY

Institutional economics starts from the premise that institutions are humanly devised constraints that structure interaction. North defines them as the rules of the game, both formal and informal, that reduce uncertainty in exchange and shape the incentives of actors [1]. Williamson complements this with transaction cost economics, which explains why economic activity is organized through markets, hierarchies or hybrid forms, depending on the attributes of the transaction, above all asset specificity, uncertainty and frequency [2]. Ostrom's Institutional Analysis and Development framework adds a practical vocabulary of rules, actors, situations and outcomes, which allows the analyst to trace how a given set of rules shapes behavior in concrete settings [3].

The most explicit attempt to apply this logic to smart systems is Chen's work on smart urban governance. Chen combines institutional analysis with a complex system perspective and treats ICT enactment as shaped by rules, norms and actors, with outcomes that feed back into the institutional structure [4]. This is a useful starting point, but it addresses cities rather than organizations, and it does not specify how the choice of governance form should affect system design.

The study uses a conceptual method and collects no new empirical data. The core concepts of the three institutional approaches are linked to the functions of a smart management system (data capture, decision support, control and feedback), and four propositions are derived that could be tested in later empirical work. The method is deductive and interpretive: the propositions follow from the theoretical premises, and their plausibility is judged by consistency with the existing literature.

A smart management system is defined here as an organizational arrangement in which data-processing technology continuously captures information about activities, supports or automates decisions, and returns performance feedback to managers and rule-makers. Two features matter for the

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analysis. The system lowers the cost of obtaining information, and it changes who can see what, and therefore who can act on it.

THEORETICAL FRAMEWORK AND RESULTS

The framework rests on four propositions.

Proposition 1. Smart management systems reduce transaction costs by lowering information asymmetry between principals and agents. When performance data are available in real time, monitoring becomes cheaper, and contracts can rely less on costly ex post enforcement. Williamson's emphasis on the difficulty of measuring outputs suggests that this effect is largest where performance is hard to observe, which is precisely the setting in which managers have historically relied on hierarchy [2]. Smart systems can therefore shift the efficient boundary between market-like and hierarchical coordination, but the direction of the shift depends on what is measured.

Proposition 2. The effect described in Proposition 1 is moderated by institutional quality. North's central claim is that institutions determine whether technical and economic change translates into growth or stagnation [1]. Applied here, a smart system operating under clear property rights, credible accountability and predictable rules should reduce uncertainty for the actors it monitors. The same system under arbitrary rules or weak enforcement generates data that managers can use selectively, and the information it produces can increase opportunism rather than reduce it. The technology is identical in both cases; the institutional context determines its effect.

Proposition 3. The design of a smart management system depends on the governance structure in which it is embedded. Williamson's analysis implies that the attributes of a transaction determine whether it is best coordinated through a market, a hierarchy or a hybrid arrangement [2]. Smart systems should therefore be designed differently for each form. Market-based coordination requires standardized interfaces and verifiable data; hierarchical coordination requires internal monitoring and incentive alignment; hybrid forms require shared data standards and governance rules that prevent one party from exploiting the information of another.

Proposition 4. Smart management systems also change institutions over time. Ostrom's framework treats rules as outcomes of collective choice as well as constraints on behavior [3]. Once a system begins to generate performance data, the rules that govern its use, such as who sets targets, who can access records and how disputes are resolved, become subject to revision. Chen's feedback loop between ICT enactment and outcomes describes the same dynamic at the scale of a city [4]. The result is path dependence: early design decisions about data ownership and access can constrain institutional development for years.

Taken together, the four propositions yield a framework with three layers. The institutional layer defines rules, norms and the distribution of rights. The governance layer determines the form of coordination. The technical layer implements data capture, analysis and feedback. Institutional quality moderates the effect of the technical layer on costs (Propositions 1 and 2); governance form shapes the design of the technical layer (Proposition 3); and the operation of the technical layer feeds back into institutions (Proposition 4). The framework thus explains a common observation: identical systems yield different results in different organizations, because the institutional and governance layers differ.

DISCUSSION

The framework has implications for research and practice. For researchers, it suggests that evaluations of smart management systems should measure institutional variables alongside technical ones. A system that fails in one setting does not show that the technology is ineffective in general. For

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practitioners, the sequence of reform matters. Clarifying the rules of data access and accountability before deploying analytics is more likely to produce durable results than the reverse.

The framework is especially relevant to countries undergoing rapid digital transformation of public administration, where new systems are often introduced into institutional arrangements that were not designed for them. Uzbekistan's recent expansion of digital public services illustrates the point, although a detailed application would require local data that this paper does not present.

The framework also has limits. It is conceptual and has not been tested empirically. Its propositions assume that institutional quality can be assessed comparably across settings, which is contestable. It also treats organizations as relatively coherent actors, whereas in practice they contain competing interests that may resist measurement. Each of these limits points to a research agenda rather than a flaw that invalidates the framework.

CONCLUSION

This paper has argued that smart management systems cannot be understood apart from the institutions that govern them. Drawing on North's institutional theory, Williamson's transaction cost economics and Ostrom's institutional analysis, it proposed four propositions that link the technical, governance and institutional layers of such systems. The main contribution is an explanation of why identical technologies produce different results across organizations, and a case for treating institutional design as a condition of technological success. Testing the propositions through comparative case studies or survey data from public organizations is the necessary next step.

FOYDALANILGAN ADABIYOTLAR

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