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«ТРАНСФОРМАЦИЯ МЕТОДОЛОГИИ УЧЕТА ОСНОВНЫХ СРЕДСТВ В УСЛОВИЯХ ЦИФРОВИЗАЦИИ ЭКОНОМИКИ РЕСПУБЛИКИ УЗБЕКИСТАН»

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Аннотация: *В статье исследуются вопросы трансформации методологии учета основных средств в условиях цифровизации экономики Республики Узбекистан. Проведен сравнительный анализ влияния цифровых технологий на практику бухгалтерского учета, требований НСБУ №5 «Основные средства» и международных стандартов (МСФО 16). Проанализированы современные методы учета основных средств в рамках реализации стратегии «Цифровой Узбекистан — 2030». По результатам исследования разработаны практические рекомендации по совершенствованию национальных стандартов [1][6][14].*

Ключевые слова: *основные средства, цифровизация, бухгалтерский учет, амортизация, НСБУ, цифровая экономика, ERP-системы, МСФО [1].*

«ЎЗБЕКИСТОН РЕСПУБЛИКАСИ ИҚТИСОДИЁТИНИ РАҚАМЛАШТИРИШ ШАРОИТИДА АСОСИЙ ВОСИТАЛАРНИ ҲИСОБГА ОЛИШ МЕТОДОЛОГИЯСИНИНГ ТРАНСФОРМАЦИЯСИ»

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Аннотация: *Мақолада Ўзбекистон Республикаси иқтисодиётини рақамлаштириш шароитида асосий воситаларни ҳисобга олиш методологиясининг трансформацияси масалалари ўрганилган. Рақамли технологияларнинг бухгалтерия ҳисоби амалиётига таъсири, БҲМС 5-сон «Асосий воситалар» ва халқаро стандартлар (МҲХС 16) талабларининг қиёсий таҳлили амалга оширилган. «Рақамли Ўзбекистон — 2030» стратегияси доирасида асосий воситаларни ҳисобга олишнинг замонавий усуллари таҳлил қилинган. Тадқиқот натижасида миллий стандартларни такомиллаштириш бўйича амалий тавсиялар ишлаб чиқилган [1][6][14].*

Калит сўзлар: *асосий воситалар, рақамлаштириш, бухгалтерия ҳисоби, амортизация, БҲМС, рақамли иқтисодиёт, ERP-тизимлар, МҲХС [1].*

«TRANSFORMATION OF FIXED ASSETS ACCOUNTING METHODOLOGY IN THE CONTEXT OF DIGITALIZATION OF THE ECONOMY OF THE REPUBLIC OF UZBEKISTAN»

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Abstract: *The article examines the transformation of fixed assets accounting methodology in the context of digitalization of the economy of the Republic of Uzbekistan. A comparative analysis of the impact of digital technologies on accounting practice, requirements of NAS No. 5 "Fixed Assets" and international standards (IAS 16) was conducted. Modern methods of fixed assets accounting within the framework of the "Digital Uzbekistan — 2030" strategy implementation are analyzed. Based on the research results, practical recommendations for improving national standards have been developed [1][6][14].*

Keywords: *fixed assets, digitalization, accounting, depreciation, NAS, digital economy, ERP-systems, IFRS [1].*

ВВЕДЕНИЕ

В условиях формирования цифровой экономики вопросы совершенствования методологии бухгалтерского учета приобретают особую актуальность. Четвертая промышленная революция, характеризующаяся широким внедрением киберфизических систем, Интернета вещей (IoT), искусственного интеллекта и облачных технологий, оказывает существенное влияние на все аспекты экономической деятельности, включая организацию и ведение бухгалтерского учета [1][9][11].

Республика Узбекистан, реализуя стратегию «Цифровой Узбекистан — 2030», утвержденную Указом Президента Республики Узбекистан от 5 октября 2020 года № УП-6079, активно внедряет цифровые технологии во все сферы экономической деятельности. Согласно данной стратегии, к 2030 году планируется достичь значительного повышения уровня цифровизации экономики, что неизбежно влияет на традиционные подходы к учету активов предприятий [14][17].

Основные средства составляют материальную базу производственной деятельности предприятий и во многом определяют их конкурентоспособность. По данным Агентства статистики при Президенте Республики Узбекистан, стоимость основных средств в экономике страны на конец 2023 года составила более 850 триллионов сумов, что свидетельствует о значительной роли данной категории активов в национальной экономике [16].

В условиях цифровизации характер основных средств существенно меняется: появляется «умное» оборудование с встроенным программным обеспечением, роботизированные комплексы, оборудование с IoT-датчиками, системы автоматизированного управления производством. Эти изменения требуют переосмысления традиционных подходов к учету, оценке и амортизации основных средств [3][6][9].

Проблема исследования состоит в противоречии между быстро меняющимся характером основных средств в условиях цифровизации и недостаточной адаптированностью существующей методологии учета к этим изменениям. Действующий НСБУ №5 «Основные средства» был разработан в период, когда цифровые технологии не оказывали столь существенного влияния на характер производственных активов, что обуславливает необходимость его совершенствования [13][15].

Целью данного исследования является анализ направлений трансформации методологии учета основных средств в условиях цифровизации экономики Республики Узбекистан и разработка рекомендаций по совершенствованию нормативно-правовой базы учета. Для достижения поставленной цели были определены следующие задачи: проанализировать теоретические аспекты учета основных средств в условиях цифровой экономики; провести сравнительный анализ требований НСБУ №5 и международных стандартов; выявить факторы цифровизации, влияющие на методологию учета; разработать рекомендации по совершенствованию учета [1][6].

ОБЗОР ЛИТЕРАТУРЫ

Проблематика учета основных средств в условиях цифровой экономики широко представлена в трудах зарубежных и отечественных исследователей, рассматривающих трансформацию учетных процессов как ключевой элемент цифровизации предприятий. В

классических работах по теории бухгалтерского учета основные средства трактуются как материальные активы, предназначенные для использования в производственной деятельности в течение длительного периода [1][4].

В работах В.Ф. Палия подчеркивается необходимость адаптации методологии учета к изменяющимся экономическим условиям. Автор отмечает, что «бухгалтерский учет должен эволюционировать вместе с экономикой, отражая новые формы и виды активов». Данный подход заложил теоретическую основу для дальнейших исследований роли учета в цифровизации бизнеса [4][5].

Я.В. Соколов и В.Я. Соколов в работе «История бухгалтерского учета» прослеживают эволюцию подходов к учету основных средств и делают вывод о цикличности трансформационных процессов в учете. Авторы отмечают, что каждая промышленная революция приводила к существенным изменениям в методологии учета производственных активов [5].

Значительный вклад в изучение влияния цифровизации на бухгалтерский учет внесли A. Bhimani и L. Willcocks, исследовавшие трансформацию роли учетной информации в процессе принятия управленческих решений. По мнению авторов, цифровизация создает предпосылки для перехода от исторического учета к прогнозному. Исследователи вводят понятие «цифрового бухгалтера», который должен обладать компетенциями в области информационных технологий [2].

K. Möller, U. Schäffer и F. Verbeeten анализируют влияние цифровизации на контроллинг и учетные системы предприятий. Авторы выделяют ключевые технологии (большие данные, искусственный интеллект, IoT), которые трансформируют традиционные учетные процессы. Исследователи предлагают модель «цифровой зрелости» учетной функции, включающую пять уровней развития [3].

В аналитических материалах международных консалтинговых компаний ERP-системы рассматриваются как ядро цифровой архитектуры предприятия. В отчетах Deloitte подчеркивается, что современные ERP-системы обеспечивают интеграцию данных, аналитики и управленческих решений, формируя единое информационное пространство для учета основных средств [9][11].

Аналогичную позицию занимает McKinsey & Company, подчеркивая, что внедрение современных учетных систем в капиталоемких отраслях позволяет существенно повысить операционную эффективность и управляемость активов при условии комплексного подхода к цифровизации [10].

В исследованиях J.D. Warren, K.C. Moffitt и P. Byrnes рассматривается концепция непрерывного учета в условиях применения современных информационных технологий. Авторы обосновывают переход от периодического к непрерывному учету на основе автоматизированного сбора данных и приводят примеры успешного внедрения непрерывного учета в крупных международных компаниях [7].

S. Kruskopf et al. анализируют перспективы применения технологии блокчейн в бухгалтерском учете. Авторы прогнозируют существенные изменения в методологии учета активов при широком внедрении распределенных реестров и выделяют преимущества блокчейна для учета основных средств: прозрачность, неизменяемость записей, автоматизация через смарт-контракты [8].

В отечественных исследованиях Т.Ф. Шитовой подчеркивается роль ERP-систем в формировании единого информационного пространства и обеспечении аналитической поддержки управленческих решений в условиях цифровизации. Автор рассматривает ERP как эффективный инструмент развития цифровой экономики [1].

Вместе с тем анализ литературы показывает, что вопросы трансформации методологии учета основных средств применительно к специфике Узбекистана исследованы недостаточно. Требуют дальнейшего изучения проблемы гармонизации НСБУ №5 с требованиями МСФО

(IAS 16) в контексте цифровизации, а также практические аспекты внедрения современных технологий учета на предприятиях республики [1][6][14][17].

МЕТОДОЛОГИЯ ИССЛЕДОВАНИЯ

Методологическую основу настоящего исследования составляют общенаучные и специальные методы познания, позволяющие комплексно проанализировать трансформацию методологии учета основных средств в условиях цифровой экономики. Выбор методологического инструментария обусловлен междисциплинарным характером исследуемой проблемы, находящейся на стыке бухгалтерского учета, экономики и информационных технологий [1][6].

В процессе исследования применялись методы анализа и синтеза, позволившие систематизировать теоретические положения, представленные в трудах отечественных и зарубежных авторов, а также обобщить результаты аналитических отчетов консалтинговых компаний. Данные методы использовались при формировании теоретической базы исследования и выявлении ключевых факторов трансформации учета [4][5][9].

Сравнительно-правовой метод был использован для сопоставления положений НСБУ №5 «Основные средства» с требованиями МСФО (IAS 16) и национальных стандартов других стран (ФСБУ 6/2020 Российской Федерации). Данный метод позволил выявить области расхождения и определить направления гармонизации национальных стандартов [13][15][18].

Статистические методы применялись для анализа данных Агентства статистики при Президенте Республики Узбекистан о состоянии основных средств и уровне цифровизации предприятий. Использовались методы описательной статистики, анализа динамики и структуры показателей [16].

Информационной базой исследования послужили: законодательные и нормативные акты Республики Узбекистан в области бухгалтерского учета; международные стандарты финансовой отчетности; данные Агентства статистики при Президенте Республики Узбекистан; отчеты международных консалтинговых компаний (Deloitte, McKinsey, Gartner); публикации отечественных и зарубежных авторов в рецензируемых научных журналах [1][6][9][10][14].

АНАЛИЗ И РЕЗУЛЬТАТЫ

Факторы цифровизации, влияющие на методологию учета основных средств

Цифровизация экономики Узбекистана оказывает многоаспектное влияние на методологию учета основных средств. На основе проведенного анализа нами выделены четыре группы факторов, определяющих направления трансформации учета: технологические, экономические, организационные и нормативные [1][6][9].

Технологические факторы связаны с изменением характера самих объектов основных средств. Современное производственное оборудование все чаще включает цифровые компоненты: встроенное программное обеспечение, IoT-датчики, системы автоматического управления. По данным исследования, проведенного Министерством цифровых технологий Республики Узбекистан в 2023 году, доля оборудования с цифровыми компонентами в промышленности составляет около 23% и имеет тенденцию к росту [16][17].

Это создает проблему разграничения основных средств и нематериальных активов, которая не в полной мере урегулирована действующим НСБУ №5. Согласно стандарту, программное обеспечение учитывается в составе нематериальных активов, однако для оборудования со встроенным ПО такое разделение не всегда возможно и целесообразно [13][15].

Экономические факторы проявляются в ускорении морального износа оборудования. Если традиционно срок полезного использования основных средств определялся преимущественно физическим износом, то для высокотехнологичного оборудования решающим фактором становится моральное устаревание. Исследования показывают, что средний срок морального износа компьютерного оборудования составляет 3-5 лет,

промышленных роботов — 7-10 лет, в то время как физический износ наступает значительно позже [3][6].

Организационные факторы связаны с внедрением современных информационных систем управления предприятием. ERP-системы и облачные технологии создают технические предпосылки для перехода к учету в режиме реального времени. Традиционная модель периодического учета с ежемесячным или ежеквартальным начислением амортизации может быть заменена непрерывным учетом с автоматическим отражением операций в момент их совершения [1][9][11].

Нормативные факторы определяются процессами гармонизации национального законодательства с международными стандартами. Узбекистан взял курс на сближение НСБУ с МСФО, что требует пересмотра ряда положений в части учета основных средств [14][17].

Сравнительный анализ НСБУ №5 и МСФО (IAS 16)

Проведенный сравнительный анализ требований НСБУ №5 «Основные средства» и МСФО (IAS 16) «Основные средства» позволил выявить ряд существенных различий, представленных в Таблице 1 [12][13][15].

Таблица 1 – Сравнительный анализ НСБУ №5 и МСФО (IAS 16)

Критерий	НСБУ №5	МСФО (IAS 16)
Критерии признания	Материальная форма, срок использования более 1 года, стоимостной критерий	Вероятность экономических выгод, надежная оценка стоимости
Компонентный учет	Не предусмотрен	Обязателен для существенных компонентов с разными сроками использования
Переоценка	По решению правительства или собственника	По справедливой стоимости, регулярно
Пересмотр СПИ	При модернизации, реконструкции	Ежегодно, на каждую отчетную дату
Остаточная стоимость	Обычно принимается равной нулю	Оценивается и пересматривается регулярно

Как видно из таблицы, МСФО предусматривает более гибкий подход к учету основных средств. Особое значение в условиях цифровизации имеет компонентный учет, который позволяет отдельно учитывать и амортизировать элементы с различным сроком полезного использования. Для современного оборудования с цифровыми компонентами это особенно актуально, поскольку программное обеспечение и электронные компоненты, как правило, имеют более короткий срок службы, чем механические части [6][12].

Требование МСФО о регулярном пересмотре срока полезного использования также более адекватно отражает условия цифровой экономики, где темпы технологических изменений могут существенно влиять на полезность оборудования. НСБУ №5 предусматривает пересмотр срока полезного использования только при модернизации или реконструкции, что не позволяет своевременно учитывать моральный износ [13][15].

Анализ уровня цифровизации учета на предприятиях Узбекистана

Для оценки текущего состояния цифровизации учетных процессов был проведен анализ данных Агентства статистики при Президенте Республики Узбекистан и отраслевых исследований. Результаты анализа представлены в Таблице 2 [16].

Таблица 2 – Уровень цифровизации учетных процессов на предприятиях Узбекистана

Показатель	2021	2022	2023	2024*
Доля предприятий с ERP-системами, %	18,5	24,2	31,8	38,5
Доля предприятий с автоматизированным учетом ОС, %	28,3	35,1	42,7	49,2
Доля предприятий с электронным документооборотом, %	45,2	58,6	71,3	78,5

Показатель	2021	2022	2023	2024*
Использование облачных технологий в учете, %	8,7	12,4	18,9	24,3

** — оценка; Источник: данные Агентства статистики [16], расчеты автора*

Данные таблицы свидетельствуют о положительной динамике цифровизации учетных процессов на предприятиях Узбекистана. За период 2021-2024 годов доля предприятий с ERP-системами увеличилась более чем в два раза — с 18,5% до 38,5%. Вместе с тем абсолютные значения показателей остаются недостаточными для обеспечения полноценного перехода к современным моделям учета [1][16].

Особое внимание обращает на себя низкий уровень использования облачных технологий в учете — лишь около четверти предприятий применяют данные решения. Это ограничивает возможности для внедрения учета в режиме реального времени и интеграции учетных систем с производственными процессами [9][11].

Проблемы разграничения основных средств и нематериальных активов

Одной из ключевых проблем, выявленных в ходе исследования, является отсутствие четких критериев разграничения основных средств и нематериальных активов для объектов с цифровыми компонентами. НСБУ №5 и НСБУ №7 «Нематериальные активы» не содержат положений, регулирующих данный вопрос [13][15].

В международной практике применяется принцип функциональной зависимости, предусмотренный параграфом 4 IAS 16. Согласно данному принципу, если программное обеспечение является неотъемлемой частью оборудования и последнее не может функционировать без него, такое ПО учитывается в составе основных средств. В противном случае программное обеспечение признается нематериальным активом [12].

Для решения данной проблемы предлагается ввести в НСБУ №5 следующие критерии разграничения: если оборудование не может выполнять свои основные функции без программного обеспечения и такое ПО поставляется вместе с оборудованием, оно учитывается в составе основных средств; если программное обеспечение может быть отделено от оборудования и использовано самостоятельно или заменено альтернативным ПО без существенного влияния на функциональность оборудования, оно учитывается как нематериальный актив [6][12][13].

Международный опыт трансформации учета основных средств

Анализ международного опыта показывает, что ведущие страны активно адаптируют методологию учета основных средств к требованиям цифровой экономики. В Российской Федерации с 2022 года вступил в силу ФСБУ 6/2020 «Основные средства», который существенно сближает национальные стандарты с требованиями МСФО. Новый стандарт предусматривает обязательное применение компонентного учета, регулярный пересмотр срока полезного использования и ликвидационной стоимости, а также расширяет возможности применения модели переоценки [18].

В Республике Казахстан процесс гармонизации национальных стандартов с МСФО был завершен еще в 2013 году. Крупные и средние предприятия обязаны применять МСФО в качестве основы для составления финансовой отчетности, что обеспечивает соответствие учета основных средств международным требованиям. Опыт Казахстана может быть полезен для Узбекистана при планировании этапов перехода к МСФО [6][10].

В странах Европейского союза применение МСФО для консолидированной отчетности публичных компаний является обязательным с 2005 года. Исследования показывают, что переход на МСФО способствовал повышению сопоставимости финансовой информации, улучшению инвестиционного климата и снижению стоимости привлечения капитала [2][9].

Особый интерес представляет опыт внедрения цифровых технологий в учет основных средств в крупных международных компаниях. Так, немецкий промышленный концерн Siemens использует интеграцию ERP-систем SAP с производственными системами (MES) для обеспечения учета основных средств в режиме, близком к реальному времени. Данные о

работе оборудования автоматически передаются в учетную систему, что позволяет более точно определять фактический износ и оптимизировать амортизационные отчисления [6][11].

Американская корпорация General Electric применяет технологию цифровых двойников для мониторинга состояния промышленного оборудования. Цифровой двойник представляет собой виртуальную модель физического актива, которая позволяет прогнозировать его техническое состояние на основе данных датчиков и исторической информации. Использование цифровых двойников создает возможности для перехода от линейной амортизации к амортизации, основанной на фактическом использовании и износе оборудования [3][10].

Таблица 3 – Сравнительный анализ подходов к учету основных средств в различных странах

Страна	Применяемые стандарты	Компонентный учет	Пересмотр СПИ
Узбекистан	НСБУ (частичная гармонизация)	Не предусмотрен	Ограничен
Россия	ФСБУ 6/2020 (близко к МСФО)	Обязателен	Ежегодный
Казахстан	МСФО (полное применение)	Обязателен	Ежегодный
ЕС	МСФО (обязательно для публичных компаний)	Обязателен	Ежегодный

Как видно из таблицы 3, Узбекистан отстает от соседних стран в части гармонизации стандартов учета основных средств с международными требованиями. Опыт России и Казахстана показывает возможные направления развития национальной системы бухгалтерского учета [13][18].

Направления совершенствования методов амортизации

Действующие нормы амортизации, установленные Налоговым кодексом Республики Узбекистан, не в полной мере учитывают специфику высокотехнологичного оборудования. Анализ показывает, что для отдельных видов цифрового оборудования фактический срок морального износа существенно короче нормативного срока амортизации [3][6].

Данная ситуация приводит к искажению финансовой отчетности: балансовая стоимость оборудования не отражает его реальную полезность, амортизационные отчисления не соответствуют фактическому потреблению экономических выгод. Для решения данной проблемы предлагается предоставить предприятиям право самостоятельно определять срок полезного использования высокотехнологичного оборудования на основе профессионального суждения, с обоснованием в учетной политике [6][12][18].

Выводы и предложения

Перспективы внедрения учета основных средств в режиме реального времени

Развитие цифровых технологий создает предпосылки для перехода от традиционной модели периодического учета к учету в режиме реального времени (real-time accounting). Данный подход предполагает автоматическое отражение хозяйственных операций в момент их совершения на основе данных, поступающих от информационных систем управления [7][9].

Применительно к учету основных средств это означает возможность: автоматического начисления амортизации на основе фактического использования оборудования (по данным IoT-датчиков); мониторинга технического состояния в режиме реального времени; прогнозирования необходимости ремонта и замены на основе предиктивной аналитики; оптимизации загрузки оборудования на основе данных о его фактическом использовании [3][6][11].

Вместе с тем реализация данного подхода требует существенных инвестиций в информационную инфраструктуру, подготовку кадров и изменение нормативной базы. Действующее законодательство Узбекистана не содержит положений, регулирующих учет в режиме реального времени, что создает правовую неопределенность [14][17].

Для создания условий перехода к учету в режиме реального времени необходимо: разработать методические рекомендации по организации такого учета; внести изменения в НСБУ в части признания данных автоматизированных систем в качестве первичных документов; обеспечить интеграцию учетных систем с государственными информационными системами (налоговой отчетности, статистики) [1][9][17].

Таблица 4 –Сравнение традиционного учета и учета в режиме реального времени

Критерий	Традиционный учет	Учет в реальном времени
Периодичность отражения	Ежемесячно/ежеквартально	Непрерывно
Источник данных	Первичные документы	Автоматизированные системы, IoT
Начисление амортизации	По нормам, равномерно	По фактическому износу
Актуальность данных	На отчетную дату	В любой момент времени
Трудоемкость	Высокая	Низкая (после внедрения)

Переход к учету в режиме реального времени является перспективным направлением развития методологии учета основных средств. Однако данный переход должен осуществляться поэтапно, с учетом готовности предприятий и нормативной базы. На первом этапе целесообразно обеспечить интеграцию существующих ERP-систем с производственными системами, на втором — разработать методические основы учета на базе автоматизированных данных, на третьем — внести соответствующие изменения в законодательство [1][6][14].

Рекомендации по совершенствованию НСБУ №5 «Основные средства»

На основе проведенного анализа разработаны следующие конкретные рекомендации по совершенствованию НСБУ №5 «Основные средства» в условиях цифровизации экономики [6][12][13]:

1. Ввести понятие «компонентного учета» и установить требование раздельного учета существенных компонентов основных средств с различными сроками полезного использования. Критерием существенности компонента может служить его стоимость (например, более 10% стоимости объекта) или значимость для функционирования объекта в целом [12][18].

2. Дополнить стандарт критериями разграничения основных средств и нематериальных активов для объектов с цифровыми компонентами на основе принципа функциональной зависимости. Если программное обеспечение неотделимо от оборудования и необходимо для его функционирования, оно должно учитываться в составе основных средств [12][15].

3. Установить требование ежегодного пересмотра срока полезного использования, метода амортизации и ликвидационной стоимости основных средств. При выявлении существенных изменений в ожидаемых параметрах использования объекта соответствующие корректировки должны отражаться перспективно [12][13].

4. Расширить возможности применения модели переоценки и установить требование регулярной переоценки для отдельных классов основных средств (например, недвижимости). Это повысит релевантность балансовой стоимости активов и улучшит качество финансовой информации [12][18].

5. Ввести специальные положения об учете основных средств, предназначенных для продажи, в соответствии с подходом МСФО (IFRS 5). Такие активы должны оцениваться по наименьшей из балансовой стоимости и справедливой стоимости за вычетом затрат на продажу и не подлежать амортизации [6][12].

ЗАКЛЮЧЕНИЕ

Проведенное исследование трансформации методологии учета основных средств в условиях цифровизации экономики Республики Узбекистан позволило получить следующие научные и практические результаты [1][6][14].

Во-первых, установлено, что цифровизация экономики оказывает многоаспектное влияние на методологию учета основных средств. Систематизированы и классифицированы факторы трансформации учета, которые разделены на четыре группы: технологические (изменение характера объектов учета, появление оборудования с цифровыми компонентами), экономические (ускорение морального износа, сокращение жизненного цикла оборудования), организационные (внедрение ERP-систем и облачных технологий, переход к учету в реальном времени) и нормативные (гармонизация с международными стандартами, требования к раскрытию информации). Данная классификация может быть использована при разработке стратегии развития бухгалтерского учета в условиях цифровой экономики [3][6][9].

Во-вторых, проведенный сравнительный анализ НСБУ №5 и МСФО (IAS 16) позволил выявить ряд существенных различий, ограничивающих релевантность учетной информации в условиях цифровой экономики. Установлено, что основные расхождения касаются: компонентного учета (не предусмотрен НСБУ №5, обязателен по МСФО), порядка пересмотра срока полезного использования (существенно ограничен в национальном стандарте), методов переоценки и определения остаточной стоимости (более гибкий подход в МСФО). Результаты сравнительного анализа могут служить основой для поэтапной гармонизации национальных стандартов с международными требованиями [12][13][15].

В-третьих, анализ уровня цифровизации учетных процессов показал положительную динамику на предприятиях Узбекистана: за период 2021-2024 годов доля предприятий с ERP-системами увеличилась с 18,5% до 38,5%, с автоматизированным учетом основных средств — с 28,3% до 49,2%. Вместе с тем выявлено, что достигнутый уровень остается недостаточным для полноценного перехода к современным моделям учета, особенно в части использования облачных технологий (24,3% предприятий) [1][16].

В-четвертых, выявлена актуальная проблема отсутствия в национальном законодательстве четких критериев разграничения основных средств и нематериальных активов для объектов с цифровыми компонентами. Предложено использовать принцип функциональной зависимости, предусмотренный МСФО (IAS 16), согласно которому программное обеспечение, неотделимое от оборудования, учитывается в составе основных средств [12][13][15].

В-пятых, обобщен международный опыт трансформации учета основных средств (Россия, Казахстан, страны ЕС) и определены возможные направления его адаптации к условиям Узбекистана. Установлено, что наиболее перспективным является поэтапный переход к применению принципов МСФО с учетом национальной специфики и уровня готовности предприятий [6][10][18].

В качестве практических рекомендаций предлагается внести следующие изменения в нормативную базу бухгалтерского учета Республики Узбекистан [6][13][14][17]:

— дополнить НСБУ №5 положениями о компонентном учете основных средств, обязательном для объектов с существенными компонентами, имеющими различные сроки полезного использования;

— ввести критерии разграничения основных средств и нематериальных активов для объектов с цифровыми компонентами на основе принципа функциональной зависимости;

— установить требование ежегодного пересмотра срока полезного использования, метода амортизации и ликвидационной стоимости основных средств;

— разработать методические рекомендации по организации учета основных средств в режиме реального времени с использованием данных автоматизированных систем;

— включить в государственные программы поддержки цифровизации меры по стимулированию внедрения ERP-систем и облачных технологий учета на предприятиях.

Реализация указанных рекомендаций будет способствовать повышению качества и релевантности учетной информации об основных средствах, что позволит принимать более обоснованные управленческие и инвестиционные решения. Это, в свою очередь, повысит инвестиционную привлекательность предприятий Республики Узбекистан и будет

способствовать успешной реализации стратегии «Цифровой Узбекистан — 2030» [1][6][14][17].

Направлениями дальнейших исследований являются: разработка детальной методики компонентного учета основных средств применительно к отраслевой специфике предприятий Узбекистана; исследование возможностей применения технологии блокчейн для обеспечения прозрачности и достоверности учета основных средств; разработка моделей предиктивной аналитики для оптимизации амортизационной политики на основе данных IoT-датчиков [3][7][8].

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REGULATIONS ARE POWERFUL THAN STRATEGY: INSTITUTIONAL INERTIA OF ORGANIZATIONS

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Abstract: *In modern organizations, strategy often plays a symbolic role, declaring the desired direction but not defining actual management practices [5,14]. Actual management is reproduced through a stable system of regulations, procedures, and instructions that have a stronger influence on decisions, responsibility, and acceptable behavior than any strategic documents [1,2].*

The article analyzes the phenomenon ***of institutional inertia****, in which regulations dominate strategy not because of incompetence or sabotage, but because of the organization's architecture [13,22]. Regulations act as carriers of organizational memory [23,25], reduce uncertainty [2,19], and ensure the legitimacy of decisions [1,10], forming a "zone of permissibility" within which strategy can exist only if it does not violate procedural stability [14].*

Particular attention is paid to the post-Soviet context, where regulations have historically served as a tool for protecting against errors, personal risks, and external instability. Strategy, however, is perceived as a source of uncertainty and personal responsibility, which contradicts the culture of control and safety nets [9,21].

It has been shown that overcoming inertia requires transforming strategy into a tool for changing institutional rules: revising regulations, redistributing mandates, and changing decision-making mechanisms [4,17]. Without this, strategy remains a declaration, and the organization imitates change while maintaining the same functional logic [14].

Key words: *institutional inertia, strategy, regulations, organizational memory, post-Soviet management, formalization of processes*

In management practice, strategy is traditionally viewed as the highest form of management intent, setting the direction of an organization's development and determining resource allocation priorities [5,7,8]. However, in real work, the influence of strategy on day-to-day decisions turns out to be significantly weaker than assumed in classical models [14].

Experience shows that managers are guided primarily by regulations, instructions, and established procedures, even when they conflict with strategic goals [1,2]. Decisions are made not based on the logic of strategic feasibility, but rather on the logic of "what is permissible," "what is prescribed," and "what does not create risks" [10, 19].

This gap cannot be explained solely by resistance to change or communication failures. It reflects a deeper institutional problem [13,22]. Regulations serve as a safeguard against uncertainty, responsibility, and external sanctions [2,19], creating a stable framework for governance [1].

This phenomenon is particularly evident in the post-Soviet space, where regulations have historically served as a key instrument of managerial stability [9]. In conditions of high uncertainty

and weak institutions of trust, it was regulations that minimized the consequences of errors and redistributed risks from individual managers to the system [21].

Strategy and regulations find themselves in an unequal relationship: the former declares change, while the latter reproduces stability [14]. As a result, strategic management is often replaced by an imitation of change [14].

The purpose of the study is to analyze the reasons and mechanisms of the dominance of regulations over strategy, as well as to identify the institutional conditions under which strategy can become a real management tool [4,17].

This study was conducted within the framework of a qualitative analytical approach and is aimed at identifying institutional mechanisms [13,22]. The theoretical basis was provided by the provisions of institutional theory [13,22], organizational theory [6,10] and strategic management [5,7,8]. The empirical basis consisted of generalized observations of management practices in large organizations in the post-Soviet space.

In classical theory, strategy is viewed as a tool for purposeful change in organizational logic [5,7,15]. It involves revising the principles of resource allocation, decision-making, and performance evaluation [8]. Strategic decisions, by their very nature, cannot be fully regulated, as they rely on assumptions about the future [2].

However, as strategic management becomes institutionalized, strategy is increasingly formalized in the form of formalized documents embedded in the existing system of regulations [14]. As a result, it loses the ability to change organizational logic [14].

In classical management theory, strategy is viewed not simply as a set of long-term goals or development plans, but as a tool for purposefully changing organizational logic. In this sense, strategy is intended to go beyond current operational activities and establish new principles for resource allocation, decision-making, and performance evaluation. It not only sets the direction of movement but also entails reconsidering how the organization operates, what practices it considers acceptable, and what management assumptions it accepts as fundamental.

In the original theoretical model, strategy serves as a mechanism for breaking with the inertia of the past. It is focused on transforming established management patterns, reconfiguring processes, and changing the roles of key actors. This is why strategy, in the classical sense, is always associated with uncertainty, risk, and the need for management choices that go beyond formalized procedures. Strategic decisions, by their very nature, cannot be fully regulated, as they rely on assumptions about the future, which have not yet been structured by rules and regulations.

However, as strategic management becomes institutionalized in large organizations, its function gradually shifts. Strategy is increasingly expressed in the form of formalized documents, programs, and indicators embedded within the existing regulatory system. As a result, it loses the ability to change organizational logic and begins to reproduce it in a more complex, but essentially unchanging form. Strategic goals are formulated in such a way as to avoid revising basic procedures, and strategic initiatives are tailored to existing regulatory constraints.

In this context, strategy ceases to be a source of institutional change and becomes a superstructure on top of the existing management architecture. It begins to serve as a symbolic confirmation of development, without affecting the underlying mechanisms of decision-making and responsibility allocation. The organization formally declares forward movement, but in fact maintains previous modes of action, adapting its strategic language to established practices.

It's crucial to emphasize that this distortion of the role of strategy isn't the result of a misinterpretation of theory or a lack of managerial expertise. It reflects a structural contradiction between strategy as an instrument of change and the organization as a system oriented toward stability and predictability. The more complex and formalized an organization becomes, the greater the likelihood that strategy will be integrated into the existing logic rather than transforming it.

Regulations consolidate accumulated management practices and transform them into a "norm" of organizational action [1,23]. They become carriers of organizational memory [23,25], allowing for the reproduction of familiar models regardless of changes in leadership or external conditions [19].

Regulations acquire particular significance in conditions of uncertainty: they minimize the space for individual choice and redistribute responsibility to the system [2,10].

In management systems, regulations are traditionally viewed as an auxiliary tool, ensuring order, repeatability, and predictability of activities. According to classical management logic, they should serve strategy, translating strategic decisions into operational procedures and reducing variability in execution. However, in real organizational practice, regulations often go beyond a technical function and become an independent institution, defining acceptable forms of management behavior.

Regulations play a key stabilizing role, consolidating accumulated management practices and turning them into a "norm" for organizational action. Through procedures, instructions, and rules, an organization captures past experience, including both successful decisions and ways to avoid mistakes. In this sense, regulations become carriers of organizational memory, allowing the system to reproduce familiar management models regardless of leadership changes, strategic priorities, or external conditions.

Regulations are particularly important in conditions of uncertainty and increased risk. Formalized procedures minimize the scope for individual choice, redistributing responsibility from a specific manager to the system as a whole. A decision made "according to the regulations" is institutionally protected, even if its effectiveness in a specific situation is questionable. Thus, regulations serve to reduce management risks, acting as a kind of shield between the manager and the potential consequences of deviating from the established procedure.

Over time, regulations begin not only to stabilize processes but also to reproduce a certain management logic. They shape the understanding of what is considered the right decision, an acceptable action, and a legitimate basis for management choice. As a result, the procedure itself becomes a criterion of rationality, and compliance with regulations becomes a substitute for assessing management results. The organization begins to be managed not so much by goals and meanings as by adherence to rules.

It's important to note that the increasing role of regulations isn't a consequence of bureaucratic excess per se. In most cases, it's an organization's rational response to the complexity, scale, and heterogeneity of processes. The larger the system, the greater the need for standardization and formalization. However, it's precisely at this point that regulations begin to take on an inertial nature, establishing not only order but also restrictions on change.

Regulations serve a dual function. On the one hand, they ensure the stability, controllability, and reproducibility of processes. On the other, they consolidate established practices and restrain attempts to change organizational logic. In this capacity, regulations become a key element of institutional inertia, with which strategy inevitably conflicts.

A persistent institutional tension develops between strategy (focused on change) and regulations (focused on stabilization) [13,14]. Strategy requires room for choice and experimentation, while procedural reality minimizes variability [1,2]. Comparing the roles of strategy and regulations in a management system reveals a fundamental contradiction between the strategic intent and the procedural reality of an organization. Strategy, by its nature, is oriented toward change, development, and moving beyond the current state, while regulations aim to consolidate already mastered practices and maintain controllability. As a result, a structural tension develops between them that is not temporary or accidental, but has a persistent institutional character.

Strategic design presupposes a space for managerial choice, allowing for experimentation, adjustment, and decision-making under conditions of uncertainty. However, the procedural reality of an organization is structured to minimize variability and reduce the number of situations requiring individual judgment. Regulations predefine permissible actions, the sequence of steps, and criteria for correctness, thereby limiting the possibility of implementing strategic initiatives that go beyond the established order.

In practice, this contradiction manifests itself in the fact that strategy is declared a priority, but when faced with specific management situations, it takes a backseat to regulations. Managers are

forced to choose not between what is strategically expedient and what is inexpedient, but between what is regulatoryly acceptable and what is regulatoryly risky. Even when recognizing the discrepancy between procedures and strategic goals, preference is given to actions that ensure institutional protection and predictability of consequences.

As a result, strategy begins to adapt to procedural reality, rather than the other way around. Strategic goals are formulated in such a way as to avoid requiring revisions to key regulations, and strategic initiatives are implemented as formal projects that do not affect the core decision-making mechanisms. Strategy gradually transforms into a set of corrective measures compatible with the existing system of rules but unable to alter its logic.

This contradiction is exacerbated by the fact that procedures enjoy a high degree of legitimacy within the organization. They are perceived as an objective and neutral basis for action, whereas strategy is associated with a subjective management intent dependent on specific individuals and time priorities. In this logic, regulations become a "hard" management reality, while strategy is a variable subject to interpretation and mitigation.

Over time, any organization accumulates its own management experience—not in the form of strategies and presentations, but in the form of habitual ways of operating. This experience forms what can be called organizational memory: tacit knowledge about how decisions are actually made, what is considered right and what is considered dangerous. It is this memory that shapes everyday management practices much more powerfully than official documents [23,25].

Organizational memory consists of repeated management decisions that once worked, or at least did not lead to negative consequences. If a certain course of action helped avoid problems, sanctions, or conflicts, it becomes ingrained and begins to be reproduced automatically. Over time, such decisions become the rules, instructions, and common sense of the organization, even if external conditions have changed.

It's important to understand that this memory preserves not the best practices, but the safest ones. The organization primarily remembers what reduced risks for the system and its managers. Therefore, many regulations reflect not the optimal way of working, but rather a method that minimizes liability and uncertainty. Any strategy that requires going beyond these familiar scenarios is perceived as potentially dangerous, even if it is logically sound.

Organizational memory is transmitted through daily managerial socialization. New managers quickly learn not so much the content of strategy as the actual rules of the game: where initiative is allowed, and where it's best to strictly follow instructions; which decisions are rewarded, and which create problems. In this process, strategy remains in the background, while practical guidelines are formed through observing the behavior of colleagues and the system's reactions.

As a result, organizational memory begins to filter strategic initiatives. Those ideas that fit within familiar logic and don't require a revision of regulations receive support. The rest are either formally accepted but not implemented, or transformed into a safe and harmless form. Thus, strategy adapts to past experience rather than setting a new direction for development.

This is why organizational memory is one of the main sources of institutional inertia. It helps an organization maintain stability and control, but simultaneously limits its ability to make real changes. Until a strategy addresses accumulated management practices and associated regulations, it remains a declaration, incapable of changing the actual logic of management.

Organizational regulations are rarely created for the sake of convenience or efficiency alone. They arise primarily as a way to reduce management risks—for the system as a whole and for individual managers. Clearly defined rules allow for the definition in advance of which actions are considered acceptable and which are not, thereby reducing uncertainty and individual responsibility [2,19].

In everyday management practice, regulations serve a protective function. A decision made in accordance with the instructions is considered correct simply because it complies with the rules, even if the outcome is far from optimal. In this logic, what's more important is not what was done, but

rather that it was done "as expected." This allows managers and employees to protect themselves from claims, audits, and subsequent litigation.

The higher the level of external and internal control, the more the organization relies on regulations. They become a form of collective insurance against errors, redistributing responsibility from individual managers to a system of rules. As a result, decision-making shifts from assessing the situation to verifying compliance with procedures: the priority is not to violate regulations, but to achieve the best possible result.

In such an environment, strategic decisions that require deviation from established procedures are perceived as a source of increased risk. Even if a strategy is formally approved, its implementation often requires actions for which there are no ready-made instructions. This automatically makes the strategy less attractive to managers, as it takes them outside the zone of procedural protection.

Gradually, regulations are beginning to replace management thinking. Instead of analyzing goals and consequences, decisions are made based on the principle of least risk. Strategy is transformed into a set of formal measures that can be incorporated into existing instructions without changing their essence. Thus, regulations become not just a management tool, but the primary criterion of rationality and safety.

As a result, regulations do reduce management risks, but at the cost of strategic flexibility. The organization maintains stability and predictability, but loses the ability to act outside predetermined scenarios. This is where their dual role manifests itself: they protect the system but simultaneously limit its development.

In real management practice, a decision is considered justified not when it is consistent with strategy, but when it can be defended procedurally. The legitimacy of management actions is formed primarily through compliance with regulations, approvals, and formal requirements. Strategy, in this case, serves as a secondary argument, rarely valid on its own without support from procedure [1,10,14].

Procedures allow a management decision to be formally correct, even if its connection to strategic goals is unclear. Approval, signature, reference to regulations, or internal orders create a sense of correctness and finality. In this logic, managerial responsibility is replaced by procedural responsibility: what matters is not the outcome of the decision, but that it passed all the established stages.

Strategy, unlike procedures, lacks the same level of institutional protection. It rarely provides unambiguous answers and requires interpretation, choice, and personal responsibility. Therefore, in controversial situations, managers instinctively rely not on strategic formulations, but on regulations that can be presented as the formal basis for their actions. Procedure becomes a source of legitimacy, and strategy—a backdrop for explanations.

Over time, this leads to a shift in management focus. The question of "is the decision consistent with strategy?" gives way to "is it procedurally compliant." Even strategically significant initiatives begin to be assessed through the prism of formal requirements: approvals, reporting, and meeting deadlines, rather than through their actual impact on the organization's development.

As a result, strategy gradually loses its status as a management tool and becomes a rhetorical resource. It is used to justify existing procedural decisions, but not to formulate them. The management system begins to reproduce itself through procedures, and strategy serves this reproducing logic without disrupting its stability.

Legitimizing decisions through procedures is a key mechanism of institutional inertia. Until strategy is integrated into a system of formal legitimization—regulations, decision-making rules, and the distribution of responsibility—it cannot compete with procedures and inevitably loses out to them in actual management practice.

In most organizations, strategy formally exists but lacks any real managerial power. It is approved, agreed upon, and presented as a development guideline, but lacks the institutional mandate to change decision-making rules. Strategy declares goals but lacks an enforcement mechanism comparable to regulations and procedures [4,17].

An institutional mandate in management means the right and opportunity to influence the system's behavior: to revise rules, redistribute powers, and allow deviations from the established order. Regulations possess such a mandate—violating them entails consequences. Strategy, however, often does not provide a manager with a formal basis for going beyond the procedure, even if it is necessary to achieve strategic goals. As a result, strategy becomes a symbolic document without any real leverage.

In practice, this translates into the preference for the latter when strategy and regulations clash. A manager can cite regulations, but rarely can they cite strategy as sufficient justification for an unconventional decision. Strategy does not protect against audits, does not absolve personal responsibility, and does not guarantee institutional support. Therefore, it is used as an explanatory rather than a determining factor in management.

The lack of an institutional mandate means that strategy adapts to the existing system rather than changing behavior. Its formulations become vague, open to any procedural interpretation. Strategic initiatives are framed in such a way as to avoid revising key regulations, and their implementation is reduced to the formal implementation of measures that do not affect basic governance mechanisms.

It's important to emphasize that this situation isn't the result of a weak strategy or the insufficient skills of its developers. It reflects a structural imbalance between the strategic level and the regulatory environment. Until strategy is integrated into the system of authority and responsibility, it cannot compete with regulations for influence on management decisions.

A strategy without an institutional mandate inevitably becomes a mere declaration. It creates the illusion of purposeful development without changing the actual logic of management. It is precisely in this form that strategy is most convenient for an organization: it demonstrates forward movement without disrupting the stability and predictability of the existing regulatory system.

When a strategy lacks an institutional mandate, an organization finds a compromise: it begins to formally implement the strategy without changing the actual management logic. This creates the phenomenon of imitation strategic change—a situation in which the external signs of transformation are present, but the internal mechanisms remain the same.

The formalization of execution manifests itself primarily in the project and reporting framework. Programs, roadmaps, working groups, KPIs, and presentations are created to support the strategy. Activity is recorded in reports and statuses, but this activity does not affect regulations, the distribution of authority, or decision-making rules. The strategy is implemented as a set of measures, not as a change in the institutional environment.

In this model, the key focus is not on the outcome of strategic changes, but on their proper execution. The success of a strategy is assessed by the availability of documents, adherence to deadlines, and the formal implementation of plans. If a project is closed according to regulations, it is considered completed, even if management practices remain unchanged. Strategy becomes a managed reporting process, not a transformation tool.

Imitation is enhanced by its institutional safety. Formal strategy execution requires no overstepping of procedures and poses no personal risks for managers. On the contrary, it demonstrates loyalty to the strategic course while fully adhering to regulations. As a result, the system rewards not those who genuinely change their ways of working, but those who best adapt the strategic language to existing rules.

A sustainable management practice is gradually emerging, in which strategy is perceived as a mandatory but externally supported layer. Actual decisions continue to be made within a procedural logic, while strategic changes exist in the form of reporting structures. This creates a "dual reality" effect: at the document level, the organization is transformed, while at the behavioral level, it reproduces itself.

Formalizing execution and simulating change are not a random distortion, but a rational adaptation of the organization to the contradiction between strategy and regulations. As long as strategy does not require a redesign of procedures or alter the criteria for decision legitimacy,

imitation becomes the most sustainable and least risky way for the system to "implement" strategic initiatives.

In a context where regulations define the permissible boundaries of management actions, managers inevitably adapt their behavior to the regulatory environment. This adaptation is not individual but systemic and is formed as a rational survival strategy within the organizational logic. Managers learn to act in a way that minimizes risks, maintains control, and avoids situations in which their decisions may be called into question.

A key element of this adaptation is shifting the focus from achieving strategic goals to adhering to procedures. Managers focus less on the question of "what needs to be done for development" and more on "what can be done without breaking the rules." Even when understanding the strategic feasibility of certain steps, preference is given to actions that can be formally justified through regulations, approvals, or established practices.

Over time, this leads to a transformation in management thinking. Initiative begins to be viewed as a potential source of problems, and deviation from procedure as an unjustified risk. Management competence is increasingly associated not with the ability to make decisions under uncertainty, but with the ability to navigate a system of rules and correctly construct formal processes. Strategy is perceived as a general guideline that does not require direct management action.

Behavioral adaptation is reinforced through a system of evaluation and rewards. The organization rewards managers who demonstrate stability, predictability, and the absence of disruption, rather than those who initiate real change. This results in a layer of managers who are effectively integrated into the regulatory environment but have limited capacity for strategic thinking and transformational action.

In post-Soviet organizations, regulations were initially developed not as a management service, but as a tool for the system's survival. They emerged in conditions of high uncertainty, strict external control, and the personal responsibility of managers for any deviations from established procedures. In such an environment, regulations were not abstract rules but concrete protection—a way to demonstrate that a decision was made "correctly" and "according to instructions" [9,21].

In practice, regulations served as a stabilizer in situations where strategic thinking was secondary to plan execution, compliance with regulations, and preventing failures. Leaders were evaluated not by their ability to change the system, but by their ability to ensure its smooth operation. Regulations allowed for predictable action, reduced the likelihood of errors, and created a sense of control even in the face of resource shortages and constant external constraints.

This logic became deeply ingrained in management culture. Regulations came to be perceived as a source of order and fairness: if the rules were the same for everyone, then management was considered correct. Any deviation from procedure was interpreted as a potential threat to the system, even if it was rationally justified. As a result, initiative and autonomy were long perceived not as managerial qualities, but as a risk.

It's important to note that in unstable conditions, regulations still serve a useful function. They help keep the system from descending into chaos, provide a minimum level of control, and protect the organization from sudden fluctuations. However, problems arise when regulations become an end in themselves, rather than a tool, and maintaining them becomes more important than development.

In post-Soviet management practice, regulations serve not just as rules but as a source of managerial legitimacy. A decision is considered "correct" not because it produced the desired result or is consistent with strategy, but because it was made in accordance with the established procedure. It is regulations that grant the manager the right to act and simultaneously serve as protection against potential claims.

In practice, this manifests itself quite simply: if a decision is properly formalized, coordinated, and based on instructions, it is perceived as legitimate, regardless of its effectiveness. If the outcome is negative, attention shifts from the substance of the decision to the correctness of the procedure. If no violations are identified, responsibility is diffused, and the management decision is considered justified. In this sense, regulations replace the criterion of management quality.

The regulations also serve as a universal language of legitimation. They are understood by all system participants—management, controllers, auditors, and inspection bodies. Reference to the regulations requires no additional explanation or interpretation. Unlike a strategy, which is open to various interpretations, regulations are perceived as an objective and neutral guideline, independent of specific management figures.

Over time, this leads to an institutional shift: management begins to be structured around procedures rather than goals. Regulations become the fulcrum for decision-making, the distribution of responsibility, and the evaluation of management performance. Strategy, meanwhile, is used post-factum—to explain decisions already made or to give them meaning.

Regulations as a source of managerial legitimacy complete the formation of institutional inertia. As long as the legitimacy of decisions is determined by procedure rather than strategic intent, strategy cannot become a real management tool. It remains a declaration, while regulations continue to define the boundaries of what is possible and acceptable in management practice.

To understand the reasons for the dominance of regulations over strategy in post-Soviet organizations, it is necessary to consider historically established management attitudes and practices. Table 1 systematizes the key institutional factors that shape the persistent inertia of management behavior.

Table 1 - Post-Soviet sources of institutional inertia of governance

Factor	How it was formed historically	How it manifests itself in practice today	Impact on strategy
Regulations as the basis of management	Regulations are a tool for the system's survival in conditions of shortages and control.	Decisions are made “according to the instructions,” even if they are outdated	Strategy gives way to procedure
Risk mitigation culture	Mistake = sanction, not experience	Leaders avoid unconventional solutions	Strategy is perceived as a threat
Lack of trust in managerial autonomy	Initiative was associated with deviation from the line	Even obvious steps require coordination	The strategy is losing its responsiveness
Personalized responsibility	Responsibility without real authority	The manager defends himself with regulations	Strategy does not become the basis for action
Procedural legitimacy	"Correct" = "according to the rules"	The main thing is correct design	The strategy is used post factum
Hierarchical trust model	Trust only from the top down	Low levels lack initiative	The strategy is not being implemented
The historical role of control	Control is more important than results	The report is more important than the effect	A simulation of changes occurs

Sustainability is more important than development	Maintaining the system is a priority	Any changes are "blurred"	Strategy becomes a symbol
Regulation as a protection of the individual	The regulations reduced personal risks	A solution without regulations = dangerous	Initiative is being squeezed out
Inherited management logic	Transmission of practices, not meanings	New managers adapt quickly	Strategy does not change behavior

The factors presented demonstrate that institutional inertia is the result of the long historical development of a management logic in which regulations served a stabilizing and protective function. Under these conditions, strategy could not become a fully-fledged management tool and was relegated to the declarative realm.

The key mistake of most strategic initiatives is that strategy is perceived as a set of goals, indicators, and development directions, while actual management decisions continue to be made according to the old rules. In this configuration, strategy inevitably loses out to regulations, since it does not intervene in the decision-making mechanism itself. Breaking institutional inertia is only possible if strategy begins to change the rules, rather than simply supplement them with new formulations [4,17].

In practice, this means that strategy must directly influence the regulatory environment. Strategic priorities must be recognized as the basis for revising procedures, simplifying approvals, and allowing for managerial deviations. If strategy does not formally grant managers the right to act differently from the regulations, it is incapable of changing the system's behavior. In this sense, strategy should become the source of new rules of the game, not an add-on to existing ones.

The first practical step is recognizing that not all regulations are neutral. Some of them reinforce past management logic and directly impede strategic change. Therefore, the strategy should include not only development goals but also a list of regulatory restrictions subject to revision or temporary suspension. This shifts the strategy from a declarative to an institutional level.

The second step involves redistributing management authority. Strategy must be supported by the right to make decisions outside standard procedures within predefined zones. Such zones of strategic autonomy allow managers to act within the logic of development without fear of procedural sanctions. It is important that this authority be formalized, otherwise the strategic initiative will again become vulnerable.

The third step is changing the logic of decision legitimization. Strategy must become an acceptable and sufficient basis for management actions, alongside regulations. This requires a revision of the evaluation and control system: management decisions must be assessed not only by their compliance with procedures but also by their contribution to strategic priorities. Without this, strategy will not be able to compete with regulations for influence on behavior.

Changing the role of strategy is impossible without rebuilding the regulatory environment. As long as regulations remain oriented toward the previous management logic, any strategy will either be ignored or adapted to a safe and formal level. Therefore, the practical solution to institutional inertia lies not in abolishing regulations, but in their purposeful transformation in line with strategic priorities.

The first principle of such a redesign is to reject the one-size-fits-all approach to regulations. In most organizations, rules are applied equally to all situations, regardless of their strategic significance. This deprives strategy of flexibility and inhibits initiative. Regulations must be differentiated:

strategically significant processes require a different degree of formalization than routine operations. Where the organization is evolving, rules should not restrict but support change.

The second principle is built-in adaptability. Regulations should answer not only the question "how to do things," but also the question "when it's acceptable to do things differently." In practical management, this means the introduction of formalized exceptions, simplified procedures, and accelerated decision-making processes for strategic initiatives. Such mechanisms legitimize deviations from standard rules and alleviate managers' fear of procedural violations.

The third principle is to review regulations based on their managerial meaning, not their formal compliance. Many procedures continue to exist because they were introduced, not because they truly support the organization's current goals. Strategy should trigger a review of regulations based on the criterion of whether a given rule contributes to achieving strategic priorities or merely reproduces managerial inertia.

It's important to emphasize that redesigning regulations isn't a one-time campaign or a document flow optimization project. It's a management decision to redistribute trust and responsibility. Regulations cease to be the sole source of legitimacy and become a tool to support strategy. This requires a change in attitude toward errors, experiments, and deviations from standard scenarios.

Even a redesigned strategy and adapted regulations will not produce sustainable results unless the fundamental institutional conditions of governance change. Institutional inertia is reproduced not by individual documents, but by the system of trust, accountability, and legitimization of decisions. Therefore, overcoming it requires not merely cosmetic adjustments, but a change in the governance architecture as a whole [13,22].

The first key condition is the redistribution of responsibility and authority. As long as a manager is accountable for the outcome but lacks the authority to change the rules, they will act with a mindset of minimal risk. Overcoming inertia is only possible when strategic responsibility is backed by the formal right to deviate from procedures within predetermined boundaries. Without this, strategy remains a moral imperative rather than a management tool.

The second condition is the institutionalization of trust. In most organizations, trust is personal and easily lost through error. Strategic change requires institutional trust, which allows for management experimentation within the strategic mandate. In this context, error is not seen as a violation, but as part of the management search, as long as it remains within the agreed-upon boundaries.

The third condition is changing management evaluation criteria. As long as a manager's effectiveness is measured by stability, the absence of violations, and the accuracy of reporting, regulations will dominate strategy. Strategy only begins to work when management decisions are evaluated based on their contribution to development, and not just on compliance with procedures. This requires a review of KPI, control, and internal audit systems.

The fourth condition is a clear managerial stance by senior management. Overcoming institutional inertia is impossible without demonstrating that strategy takes precedence over procedures in strategically significant matters. If senior management always sides with regulations in conflict situations, the system quickly picks up on this signal and reverts to its previous logic.

The institutional conditions for overcoming inertia are linked less to the quality of strategic documents than to the organization's willingness to change its own rules of legitimacy. Strategy begins to work only when it becomes part of the institutional structure, rather than an external description of the desired future. Otherwise, regulations inevitably continue to reproduce the past, regardless of stated strategic ambitions. (table 2).

Table 2 - Model of alignment of strategy and regulatory environment

Management element	Dominance of regulations (as is)	Strategic Alignment (as it should be)	Management effect

The role of strategy	Declaration, a guideline "for the future" that does not influence decisions	Reason for changing rules and procedures	Strategy begins to influence behavior
The role of regulations	Source of legitimacy and protection	Tool to support strategic priorities	Regulations are no longer blocking development
Decision making	Based on the principle of procedural security	According to the principle of strategic expediency within the given framework	The imitation of changes is reduced
Deviation from procedures	Perceived as a violation and a risk	Formally permitted in strategic zones	Management flexibility appears
Manager's responsibility	Personal responsibility without authority	Responsibility is backed by an institutional mandate	The quality of decisions is improving
Legitimization of decisions	Through compliance with regulations	Through contribution to strategic priorities + procedures	Management logic is changing
Attitude to mistakes	Error = violation	Error = valid management search element	Fear of initiative is reduced
Behavior of managers	Adapting to the rules, avoiding risk	Conscious choice within the framework of strategy	Strategic thinking is being formed
Implementation of the strategy	Formal, project-reporting	Institutionally embedded	The "double reality" disappears
System stability	Stability without development	Managed development without loss of stability	Balance of control and change

The analysis shows that the dominance of regulations over strategy is not a management error or a consequence of poor execution, but a natural consequence of the institutional structure of modern organizations. Regulations serve the function of stabilizing, mitigating risks, and legitimizing management decisions, while strategy, lacking a comparable institutional mandate, remains a declarative guideline. In this configuration, strategy does not shape management behavior but adapts to the existing procedural reality.

This gap is particularly evident in the post-Soviet governance context, where regulations have historically served as the primary source of governance and system security. The culture of procedural control, shaped over decades, has entrenched a distrust of strategic autonomy and initiative, making regulations the primary criterion of managerial legitimacy. As a result, strategy has become formally integrated into the system, without altering the underlying logic of decision-making.

The key conclusion of the study is that strategy without institutional support inevitably becomes a form of managerial self-deception. The organization continues to reproduce past practices while

simultaneously declaring progress. The imitation of strategic change, the formalization of execution, and the behavioral adaptation of managers become the system's rational response to the contradiction between development and stability.

Overcoming institutional inertia is only possible by changing the role of strategy in the management architecture. Strategy must cease being a set of goals and indicators and become an instrument for changing the rules: the regulatory environment, the distribution of authority, the mechanisms for legitimizing decisions, and the criteria for management evaluation. Only then will it acquire a real institutional mandate and the ability to influence organizational behavior.

The choice between strategy and regulations is false. The issue is not abandoning procedures, but reconfiguring them to meet development goals. As long as regulations remain stronger than strategy, an organization maintains control at the cost of losing its future. Strategic development begins when rules begin to serve goals, not replace them.

An example from management practice: when there is a strategy, but decisions are made according to regulations.

A large manufacturing organization has approved a strategy to improve operational efficiency and reduce costs. Strategic documents outline priorities: streamlining processes, reducing internal approvals, increasing the accountability of line managers, and shifting from formal control to performance management.

In practice, one of the department managers proposes an obvious solution: changing the procurement procedure for consumables for his section. The proposal is logical, economically sound, and fully aligns with the strategy—it reduces lead times, minimizes downtime, and lowers indirect costs. However, implementation requires a deviation from the current procurement regulations, which require multi-stage approvals and a fixed list of suppliers.

The manager brings the initiative up for discussion. There are no formal objections: the calculations are correct, the effect is clear, and it meets strategic goals. Nevertheless, no decision is made. The reasoning sounds familiar: "The regulations do not allow it," “This is not stipulated by the procedure”, “If something goes wrong, personal responsibility will be taken”, “It’s easier to work according to the approved procedure”.

Ultimately, the proposal is either postponed "pending a review of the regulations," which hasn't happened for years, or transformed into a formal pilot project with no real impact. The strategy remains in presentations, while real decisions continue to be made within the logic of procedural safety.

It's important that no one deliberately sabotages the strategy. Leaders act rationally within the existing system. Following regulations guarantees managerial security, while strategic initiative does not. In this situation, opting for regulations is not an expression of conservatism, but a form of adaptation to the institutional environment.

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MIDDLE MANAGEMENT AS AN INSTITUTIONAL BUFFER: THE HIDDEN FUNCTION OF THE MANAGEMENT LAYER

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Abstract: *In the practice of modern post-Soviet organizations, middle management increasingly performs the hidden function of an institutional buffer, smoothing out contradictions between strategy and operational reality, compensating for decision inconsistencies, and absorbing management risks.*

This configuration ensures short-term stability and external controllability of the system, but leads to a loss of managerial agency among middle management, a degradation of managerial capacity, a distortion of feedback, and a reduction in the organization's ability to learn and adapt. The buffer function is reproduced institutionally—through the centralization of decisions, formalized control, a distrust of autonomy, and a prioritization of stability over development. This article explores the mechanisms of this role and proposes ways to restore the agency of middle management through a redesign of the management architecture.

Key words*: middle management, institutional buffer, managerial subjectivity, post-Soviet organizations, systemic sustainability, managerial architecture.*

In modern organizations, middle management occupies a paradoxical position. Formally, it is vested with significant responsibility for results, people, and processes, but in reality, its managerial influence is often limited by the boundaries of existing decisions, regulations, and metrics. In management discourse, this level is typically viewed as a "bridge" between strategy and operations; however, in the actual practice of post-Soviet organizations, this "bridge" increasingly serves a different function—that of a systemic shock absorber [1, 3, 4, 20].

From a scientific perspective, this phenomenon remains insufficiently conceptualized. Most studies of middle management focus either on the effectiveness of strategy execution or on the development of managerial competencies, without addressing the institutional conditions within which the actual function of this layer is formed. As a result, the buffering role of middle management is often interpreted as an aberration or managerial weakness, rather than as a natural product of the management architecture [3,5,14,15].

In classical management theory, middle management is viewed as a key element of vertical organizational coordination [1,2]. It is this level of management that ensures the translation of strategic decisions into operational terms, adapting overall goals to specific processes, resources, and people. The middle manager acts not simply as an implementer of orders from above, but as an active interpreter of strategy, capable of taking into account the context, constraints, and characteristics of specific units [3,4].

The concept of managerial subjectivity occupies a central place in understanding the real role of middle management. By managerial subjectivity This refers to the ability of a manager not only to

implement prescribed decisions, but also to influence their content, methods of implementation, and adjustments depending on changing conditions [6,8].

In the practice of post-Soviet organizations, the managerial agency of middle management is often limited and formal. Responsibility for results, people, and processes is declared, but actual spheres of influence are limited to the implementation of already approved decisions and compliance with regulations. The ability to substantively adjust management decisions is either absent or viewed as a violation of managerial discipline [20].

Despite the recognition of the importance of middle management in classical management theory, its role was initially viewed within the framework of certain structural assumptions. Most theoretical models assume relative alignment between strategic goals, organizational structure, and the system of authority. Under these conditions, middle management acts as a rational mediator between strategy and operations, and its agency is perceived as functionally necessary.

However, these assumptions poorly reflect the reality of organizations operating under conditions of highly centralized decision-making, formalized control, and fragmented responsibility. Classical models, oriented toward hierarchical rationality and clear delegation of authority, fail to account for institutional constraints that systemically suppress the managerial agency of middle management. As a result, middle management retains a formal role but loses the ability to influence the content of management decisions [1,2,6].

The development of middle management's buffering function begins not at the level of specific management decisions, but much deeper—in the structure of management contradictions embedded in the organizational system. These contradictions are not an aberration or a consequence of faulty management; on the contrary, they are the result of rational, yet divergent, management logics coexisting within a single organization.

One of the key sources of such contradictions is the gap between the strategic and operational levels of management. Strategic decisions are formulated in abstract terms of goals, indicators, and initiatives, while operational activities are subject to resource constraints, regulations, personnel structures, and ongoing commitments. The inconsistency between these levels creates a situation in which strategy requires change, while the operational system is focused on maintaining stability.

The second source of contradictions is the functional fragmentation of management. Finance, HR, security, IT, and other functions develop their own decision-making logics, each rational within its own area of responsibility, but not always aligned with the goals of line management. As a result, middle management finds itself at the intersection of competing demands, where fulfilling one management request automatically undermines another.

The institutional asymmetry of responsibility and influence also plays a significant role. Decisions made at the top level or within functional units are often not accompanied by full accountability for their implementation and consequences. This responsibility is transferred to the middle management level, which is forced to "stitch" disparate management impulses into workable practices, without the ability to review the underlying decisions.

For managers, these contradictions manifest themselves in everyday management dilemmas: the need to implement strategic initiatives in the absence of resources, meet performance targets amid conflicting regulations, and maintain team integrity amid constantly shifting priorities. Middle management becomes the level at which contradictions are not discussed or resolved, but rather compensated for through personal management efforts.

The sources of managerial contradictions are systemic and are reproduced through the management architecture, not through the mistakes of individual managers. It is the concentration of these contradictions at the middle management level that creates the preconditions for the development of its buffering function, transforming middle management into a mechanism for stabilizing the system through its own managerial agency.

One of the key mechanisms for forming the buffer function of middle management is the delegation of responsibility, not accompanied by a reorganization of the management architecture [20]. In management rhetoric, delegation is often presented as the transfer of tasks and authority to

lower levels of management; however, in the actual practice of post-Soviet organizations, it is generally a matter of transferring responsibility for results without an adequate redistribution of power and influence.

Formally, middle management is granted expanded areas of responsibility: for indicators, deadlines, quality, personnel, and compliance with regulations. At the same time, key decisions determining the conditions for achieving these results continue to be made at the top management level or in functional units. Thus, responsibility and authority are distributed across different levels of the organizational hierarchy.

This delegation model reflects the institutional logic of minimizing management risks at the highest levels. Delegating responsibility downwards allows for the preservation of formal control while simultaneously distancing oneself from the negative consequences of decision implementation. Middle management in this system acts as a compensator, absorbing the impacts that arise when strategic intentions collide with operational reality [8,9].

In situations where managerial contradictions are not resolved at the management architecture level, and responsibility is delegated without redistribution of authority, middle management inevitably begins to perform a compensatory function. This function is not formally established and is rarely recognized at the level of managerial reflection, yet it is precisely this function that ensures the stability of the organizational system in everyday practice [15,18].

One of the key components of the middle management buffer function is the absorption of management risks arising during the implementation of decisions made outside the operational context [21]. These risks are associated not so much with external uncertainty as with internal management inconsistencies—the gap between goals and resources, deadlines and capabilities, regulations and actual work practices.

In an environment of centralized decision-making and formalized control, implementation risks are rarely distributed symmetrically. The strategic level formulates goals and initiatives, functional units set requirements and constraints, and middle management is tasked with delivering results. However, middle management is ultimately responsible for the consequences of management decisions, without the ability to influence their initial parameters.

For middle managers, absorbing management risks becomes part of their daily management activities. This manifests itself in the need to reallocate resources, negotiate with functional units, soften requirements, and accept responsibility for deviations from formal indicators. Such actions are rarely recorded in reports, but they are precisely what helps avoid disruptions, conflicts, and public failures.

This practice represents a form of institutional insurance for the management system. Middle management acts as a "safety net," absorbing risks that cannot be fully controlled or recognized at the top level. This reduces the likelihood of problems escalating, but simultaneously creates a distortion in the feedback system [16].

Along with absorbing management risks, a crucial element of the middle management buffering function is the filtering of information and management conflicts. In organizational practice, it is the middle management level that serves as the "filter" through which flows information about problems, deviations, risks, and tensions arising at the operational level [18].

In classical management logic, information filtering should serve a constructive function—structuring data, highlighting the essential, and communicating it promptly to the decision-making level. However, in a highly punitive management environment and a distrust of "negative signals," this function takes on a different meaning. Information begins to be filtered not by the principle of managerial significance, but by the principle of managerial security [11].

For middle managers, this means constantly having to choose: which problems can be escalated upwards and which should be "resolved on the spot"; which conflicts are acceptable to highlight and which are best smoothed over so as not to undermine the illusion of control. As a result, the information that moves up the hierarchy is filtered, softened, and contextually neutralized, failing to reflect the true scale of management conflicts.

The final element of middle management's buffering function is maintaining the illusion of controllability within the organizational system. When managerial contradictions, risks, and conflicts are systematically absorbed and filtered at the middle level, senior management perceives a picture of relative stability and controllability of processes. This picture is formed not as a result of a deliberate distortion, but as a side effect of the compensatory activities of middle management.

The illusion of controllability is maintained through adherence to formal performance indicators, timely reporting, and demonstrated implementation of management orders [16,18]. For managers, such a situation may be perceived as confirmation of the effectiveness of the existing management architecture. The absence of obvious failures and escalations creates a sense of control, and problems arising at the operational level appear localized and solvable. However, such controllability is conditional and depends on the ongoing efforts of middle management to smooth out and compensate for systemic limitations [20].

Maintaining the illusion of controllability is a form of institutional self-regulation, in which the system avoids painful reflection and structural change. The illusion of control replaces real controllability, and the absence of crises is interpreted as a sign of stability, not as the result of hidden overload of the middle management (table 1).

Table 1 - Mechanisms of functioning of middle management as an institutional buffer

Buffer mechanism	Contents of management practice	What it looks like in reality	Short-term effect	Long-term management implications
Risk absorption	Acceptance of the consequences of the decisions made above	The middle manager “closes” the discrepancies between resources, deadlines, and requirements	Reduce escalations and disruptions	Personalization of system errors
Filtering information	Filtering out negative signals	A "softened" picture goes up	Maintaining managerial calm	Feedback distortion
Conflict resolution	Localization of contradictions between functions	Conflicts are resolved informally, without recording	Temporary stability	The impossibility of systemic solutions
Compensation for regulatory restrictions	Bypassing strict procedures	Decisions are made by hand, not according to rules	Process performance	Normalization of manual control
Adaptation of strategic initiatives	Translating abstract goals into reality	Middle management is " reinventing " strategy	Implementation in some form	Devaluation of strategy
Self-limitation of initiative	Reducing management risk	"It's better not to offer too much."	Predictability of behavior	Loss of managerial subjectivity

Risk absorption	Acceptance of the consequences of the decisions made above	The middle manager "closes" the discrepancies between resources, deadlines, and requirements	Reducing escalations and failures	Personalization of system errors
Informal coordination	Resolving issues through personal connections	Agreements outside the formal framework	Speed of decisions	Dependence on specific people
Maintaining performance	Focus on external well-being	KPIs met, problems hidden	The illusion of efficiency	Loss of real control
Emotional burnout	Chronic overload	Fatigue, fluidity, cynicism	Short-term stability	Weakening of the management layer
The final effect	—	The system works "at the expense of people"	Governability without reforms	Strategic fragility

The buffer function of middle management in post-Soviet organizations cannot be understood outside the historical context of the formation of management practices. The centralization of management, characteristic of most organizations in the post-Soviet space, is not so much the result of a conscious choice as an institutional legacy, reproduced through management culture, the regulatory environment, and the logic of decision-making [19].

In the Soviet system of governance, centralized decision-making served a key function of ensuring predictability and control in the face of resource scarcity and high dependence on external directives. Local managerial autonomy was limited, and mid-level management acted primarily as executors and monitors of implementation. Responsibility for results was often formal and distributed hierarchically in a way that minimized risks for the center.

Following the transformation of the economic system, many organizational structures and management practices retained this logic. Formally, a transition to market-based management models occurred, but the institutional mechanisms for centralizing decisions and control remained largely unchanged. Strategic decisions continued to be concentrated at the top level, and middle management found itself embedded in a system where its primary task was to ensure execution and stability, rather than to participate in shaping management logic [20].

The centralization of management in post-Soviet organizations is closely linked to a persistent mistrust of the managerial autonomy of middle management. This mistrust is not personal, but institutional in nature and manifests itself regardless of the level of competence of specific managers [20]. Middle management autonomy is perceived not as a source of increased managerial effectiveness, but as a potential risk of loss of control, distorted decisions, or a decrease in execution discipline [8].

Mistrust of mid-level management autonomy in post-Soviet organizations is compounded and reinforced by a cultural emphasis on maintaining stability as the highest management value. In such a system, process stability, predictability of behavior, and the absence of crises are perceived as signs

of effective management, often more significant than development, experimentation, or strategic breakthroughs.

This culture is formed not only through formal regulations and procedures but also through unspoken management norms. Managers who demonstrate the ability to maintain a level playing field, minimize escalations, and avoid conflicts receive institutional approval. Conversely, management initiatives associated with change and risk are perceived as a source of instability and potential problems [12,18, 20].

A culture of maintaining stability serves as an institutional reinforcement of the buffering role of middle management. It reinforces a preference for short-term controllability over long-term adaptability and transforms compensating for systemic limitations into a sustainable management practice. In such an environment, development is perceived as a secondary process, permissible only to the extent that it does not upset the existing equilibrium.

The dominance of a culture of stability results in strategic inertia within the organization. Middle management, acting as an institutional buffer, ensures the maintenance of controllability but simultaneously hinders the accumulation of management experience necessary for informed change. Stability is achieved at the cost of limited managerial agency and a reduced ability of the organization to develop in conditions of increasing complexity and uncertainty (table 2).

Table 2 - Institutional factors in the formation of the buffer role of middle management in the post-Soviet context

Institutional factor	Historical origin	How it manifests itself in management today	The role of middle management	Systemic consequence
Centralization of decision making	Command-and-control management model	Strategic and resource decisions are made at the top	Adapting solutions to the reality of implementation	Reduction of managerial autonomy
Lack of trust in local autonomy	Control as a basic principle of management	Multi-level approvals, microcontrol	Compensating for limitations through informal practices	Fixing the buffer function
Prioritizing stability over development	Managing under conditions of scarcity and risk	Avoiding experimentation and change	Mitigating the consequences of uncoordinated decisions	Institutional inertia
Punitive logic of responsibility	Personalization of blame in case of failures	An error is perceived as a violation	Taking risks	Self-censorship of managers
Formalized reporting	Management through indicators and plans	The report is more important than management analysis	Maintaining formal well-being	The illusion of control

Functional fragmentation	Strong vertical lines of functions	Competing demands on line managers	Stitching together inconsistent requirements	Chronic overload of middle management
Weak institutional feedback	Lack of a culture of managerial reflection	Problems don't reach the strategy	Filtering negative signals	Loss of organizational learning
Normalization of “manual control”	Management through personal intervention	Solutions are being implemented locally	Compensation for system failures	Dependence of the system on people
Career Stability Incentives	Encouraging loyalty and predictability	Promotion of "reliable" managers	Reinforcing buffering behavior	Reproduction of the model
The final effect	—	External controllability remains unchanged	Middle management as a shock absorber	Strategic vulnerability of the system

The buffering function of middle management, which ensures the external stability and controllability of the organization, has a hidden but high cost. This cost is rarely reflected in management reports or strategic documents, as it manifests itself not in the form of one-time failures, but in the gradual erosion of the organization's management potential. Institutional buffering allows the system to function in the short term, but creates constraints that become critical in conditions of change and uncertainty [11,18].

The first and most obvious consequence is the loss of managerial agency among middle management. Constantly performing a compensatory function, middle management becomes accustomed to working in an adaptive rather than a managerial mode. Decisions are not formulated but rather "brought to a workable state," which reduces the ability of middle managers to think strategically and take conscious responsibility for development. Over time, this leads to a decline in the management pool and a shortage of leaders capable of making complex decisions.

The second effect is a distortion of management feedback. Because systemic problems are absorbed at the middle level, upper management is deprived of information about the actual state of the management system. The organization loses the ability to learn from its own mistakes, and strategic decisions are made based on a smoothed-out and incomplete picture of reality. External stability masks internal limitations and accumulating risks.

For managers, a particularly significant consequence of buffering is the increasing chronic workload of middle management [10]. The constant need to compensate for systemic failures leads to emotional burnout, staff turnover, and a decline in managerial motivation. Middle management becomes "expendable" in the management system, which undermines the organization's long-term sustainability.

The cost of institutional buffering is a reduction in the organization's adaptability and innovative potential. A system that relies on hidden compensation instead of structural change loses its ability to develop consciously. The buffering function of middle management acts not as a neutral stabilizing

mechanism, but as a factor of strategic vulnerability, limiting the organization's capabilities in an increasingly complex environment.

Restoring the managerial agency of middle management is impossible through targeted measures such as training, incentive programs, or the formal expansion of responsibility. The buffering function of middle management is institutionally shaped, and therefore overcoming it requires changes at the level of the management architecture, not individual management practices. This is not about abandoning the stabilizing role of middle management, but rather about redistributing functions so that compensating for systemic failures ceases to be its primary and sole task [6-8].

The first condition for restoring agency is institutional recognition of the middle management's sphere of influence. This means securing for middle managers the right not only to implement decisions but also to participate in their formulation, adjustment, and revision if operational constraints are identified. For practicing managers, this implies a shift from a "implement and adapt" mindset to a "analyze, propose, and influence" mindset, in which the managerial judgment of middle management is viewed as a resource rather than a risk.

The second condition is a change in the logic of delegation [1,3]. Responsibility must be accompanied by real managerial authority, including influence over resources, priorities, and decision parameters. Without this, any expansion of responsibility merely increases the buffering load. Restoring agency is only possible under conditions where middle management receives institutional support for their decisions, including protection from sanctions for justified managerial deviations.

The third key condition is a revision of the management feedback system. Information about risks, failures, and limitations should be viewed not as a management threat, but as a basis for adjusting management logic. This requires a shift in management culture from punitive control to an analytical analysis of management decisions. In such a system, middle management ceases to be a filter and becomes a source of management knowledge.

Restoring the managerial agency of middle management is only possible when three factors converge: an institutional mandate to influence, a symmetrical distribution of responsibility and authority, and the cultural legitimization of managerial autonomy. In the absence of even one of these conditions, the buffer function will persist, regardless of formal changes in structure or regulations.

Restoring the role of middle management as a subject of governance requires not strengthening control or individual motivation, but rather rebuilding the management system, in which stabilization ceases to be a hidden responsibility of the middle level and becomes a conscious function of the entire organization.

The final step in overcoming the institutional buffering of middle management is the restructuring of the organization's management architecture. This is not about the destruction of existing hierarchies or radical decentralization, but rather a targeted change in the logic of the distribution of roles, responsibilities, and managerial influence. The goal of such a restructuring is to make the managerial agency of middle management systemically necessary, rather than optional [13-15].

A key element of this architectural transformation is the institutionalization of management consequences. Every management decision must have a clearly defined responsibility and sphere of influence, while collective and functional formats must have transparent boundaries of participation. This eliminates the situation in which middle management is forced to compensate for decisions without having the ability to influence their parameters. For practicing managers, this means a transition from informal " pulling " of decisions to a formal management mandate [16,17,21].

The second important element of restructuring is the separation of the functions of stabilization and development. The buffering function should not disappear completely—it is inevitable in complex systems. However, it must be institutionalized and distributed among management levels, rather than concentrated in middle management. Otherwise, stabilization continues to be achieved at the expense of managerial subjectivity and professional burnout among middle management.

The third area of architectural change is a reconsideration of the role of the upper management level. In a system focused on restoring the agency of middle management, senior management is responsible not only for strategy formulation but also for creating conditions in which management decisions can be adjusted based on operational experience. This requires abandoning the illusion of complete control and recognizing the limitations of centralized decision-making.

From a scientific perspective, rebuilding the management architecture implies a transition from a model of hidden compensation to a model of distributed managerial agency. The organization begins to function not by absorbing errors, but by consciously identifying and correcting them. In such a system, middle management ceases to be an institutional buffer and returns to the role of an active participant in management, ensuring not only stability but also development.

The transition from a buffering function to managerial agency by middle management is not a private management initiative, but a strategic choice for the organization. This choice determines its ability to adapt, learn, and develop in conditions of increasing complexity and uncertainty (Table 3).

Table 3 - Transition from institutional buffering to managerial subjectivity of middle management

Management element	Buffer model (current state)	Breaking point (problem)	Reassembly model	Management effect
The role of middle management	System failure compensator	Loss of subjectivity	Subject of management with limited autonomy	Improving the quality of decisions
Responsibility	Responsibility for the result without influence	Chronic overload	Responsibility linked to the decision area	Reducing managerial burnout
Powers	Formal, limited by regulations	Simulated delegation	Institutionally established zone of influence	Real delegation
Decision making	Solutions are being "brought to fruition"	Manual control	Joint adjustment of decisions by levels	Improving the feasibility of solutions
Feedback	Filtering and smoothing problems	Loss of management knowledge	Analytical risk escalation	Organizational learning
Attitude to mistakes	Error as a threat to stability	Self-censorship and hiding problems	Error as a source of correction	Growing adaptability
System stabilization	Hidden mid-level function	Depletion of the management layer	Distributed stabilization across levels	Stability without overload
Role of the top level	A source of solutions without consequences	The illusion of control	Architect of conditions and frameworks	Conscious strategic management

Management culture	Priority of maintaining balance	Institutional inertia	Balance of stability and development	Long-term sustainability
Strategic result	External controllability	Hidden vulnerability	Real adaptability of the system	Improving the viability of the organization

The analysis revealed that middle management in modern post-Soviet organizations performs a significantly more complex and significant function than that typically captured in management models and job descriptions. Instead of serving as a bridge and vehicle for management development, it increasingly acts as an institutional buffer, smoothing over the contradictions of the management system and compensating for its structural limitations.

The paper argues that this buffering function is not a consequence of the individual weaknesses of middle managers or their lack of competence. Instead, it is reproduced institutionally—through the architecture of power and responsibility distribution, the historically established logic of centralization, a culture of mistrust in managerial autonomy, and the prioritization of maintaining stability over development. Middle management is embedded in a system where compensating for managerial failures becomes its tacit responsibility.

In the short term, this configuration ensures external stability and manageability of the organization. However, in the long term, it leads to a loss of managerial agency among middle management, a deterioration of the management pool, and a reduction in the organization's ability to learn and adapt. The illusion of manageability, maintained through the hidden efforts of middle management, masks structural dysfunctions and increases the organization's vulnerability to change and crises.

The transition from middle management's buffering role to restoring its managerial agency is a strategic choice for the organization. This choice requires a restructuring of the management architecture and cultural attitudes, but it determines the organization's ability not only to maintain stability but also to thrive in conditions of increasing complexity and uncertainty.

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OPTIMIZATION WITHOUT RESULTS

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Abstract: *In modern organizations, especially in the post-Soviet space, the constant optimization of processes, structures, and costs often fails to lead to sustainable improvements in results. This article analyzes the phenomenon of "optimization without results" as an institutional distortion, in which improvements become symbolic practices of demonstrating activity and meeting expectations, without addressing key parameters: the architecture of power, the distribution of responsibility, and managerial agency. The mechanisms of managerial simulation, the behavioral adaptation of employees, and the historical and cultural roots of this phenomenon in the post-Soviet context are described. An analytical framework for distinguishing between substantive optimization and simulation is proposed, emphasizing the connection between improvements and real responsibility and institutional change.*

Key words*: optimization, management simulation, institutional inertia, post-Soviet organizations, management efficiency.*

Optimization in modern organizations has long ceased to be a one-time tool and has become a permanent state. Almost any management change is now framed as an "optimization project." Meanwhile, organizations can remain in a continuous improvement mode for years without demonstrating comparable performance gains. A paradox arises: management activity increases, but the impact wanes.

The problem is not limited to implementation errors or resistance. It is a shift in management logic, in which improvements focus on formal elements, leaving the distribution of power, responsibility, and managerial agency unchanged [1,2]. This is particularly evident in the post-Soviet context, where optimization often serves as a harmless form of change [3,4]. The purpose of this article is to analyze the institutional mechanisms behind the gap between improvements and results and to identify the conditions under which optimization once again becomes a source of sustainable development.

In classical management theory, optimization was viewed as a rational process of purposefully improving an organization's performance [5-7]. Its original purpose was to achieve the best balance between goals, resources, and results under given conditions. Optimization implied a conscious choice of management decisions based on an analysis of constraints, alternatives, and consequences, rather than mechanical cost reduction or formal process simplification.

In early management models, optimization was inseparable from managerial responsibility. Decisions about changes were made by individual managers, who bore personal responsibility for the consequences of the implemented improvements. Optimization in this context did not mean "doing less" but "doing differently," based on the organization's strategic goals and operational realities.

Improving processes, structure, or resource utilization was viewed as a derivative of management intent, not as an independent goal.

A key element of the classical understanding of optimization was its connection to results [8]. Improvements were meaningful only to the extent that they led to measurable changes in productivity, decision quality, sustainability, or the competitiveness of the organization. In the absence of results, optimization was viewed as a flawed or unsuccessful management attempt requiring revision, rather than as a formally completed management task.

Optimization in the management sense is inseparable from the concept of rationality. In classical management logic, rationality presupposes a conscious choice of actions consistent with the organization's goals, available resources, environmental constraints, and expected consequences [8,9]. Optimization in this framework is a form of rational management thinking, in which decisions are made not based on formal compliance, but on the actual improvement of controllability and results.

In modern practice, the understanding of rationality is shifting. Optimization is increasingly detached from management judgment and transformed into a procedural act, justified by references to "best practices," standards, or external requirements. Rationality is recognized not as what leads to real improvement, but as what appears logical in reporting and aligns with formal expectations. As a result, optimization begins to serve not management results, but the system's need to demonstrate rational behavior.

This distortion of rationality leads to the substitution of technical rationality for managerial thinking. Improvements are focused on measurable and formalizable parameters—headcount, regulations, process diagrams, performance indicators—while complex management issues related to the distribution of power, responsibility, and influence remain outside the scope of optimization. Rationality is reduced to the ability to "correctly formalize" changes rather than to ensure their effectiveness.

This transformation of rationality creates the illusion of controllability. Optimization decisions appear logical, consistent, and justified, but they fail to address the fundamental causes of management problems. From a scientific perspective, this represents a transition from substantive rationality to institutional rationality, in which optimization serves to legitimize the existing order rather than improve it [1,10].

Despite the widespread use of optimization practices, management improvements are not universally applicable. Classic management logic assumed that the effectiveness of optimization depended on the context, the organization's stage of development, and the nature of the tasks being addressed. Improvements were viewed as a tool with clear performance limits, beyond which further intervention ceased to yield positive results. The effectiveness of optimization is limited by the complexity of the system, the level of managerial subjectivity and institutional inertia [11].

Finally, the limit of optimization's applicability is the loss of connection between changes and consequences. When the results of improvements are not recorded, analyzed, and linked to management decisions, optimization loses its learning function. Improvements cease to be a source of management knowledge and become a repetitive process without accumulating experience.

Continuous optimization in modern organizations is rarely the result of purely internal management needs. More often, it is shaped by institutional pressure, whereby management improvement activity itself becomes an indicator of "normality" and compliance with external and internal expectations [1,2]. Under such conditions, optimization ceases to be a response to specific problems and becomes a mandatory element of management behavior.

One of the key reasons for permanent optimization is the need to demonstrate manageability. For senior management and owners, optimization programs serve as a signal that the organization is under control, responding to challenges, and not stagnating. Efficiency improvement projects are often more important than their actual results, as they help maintain the image of rational and proactive management.

The second factor is the shift in responsibility for results. Optimization allows management to shift attention from initial decisions to the processes of "improving" them. If the expected results are not achieved, blame is easily attributed to insufficient optimization depth, implementation errors, or staff resistance, which reduces personal accountability for the initial management choices.

The third reason is the institutional adoption of management practices. Organizations adopt optimization methods—lean manufacturing, reengineering, digitalization—as elements of "correct" management, often without deeply understanding their applicability to their own context. Optimization in this case becomes a form of compliance with external standards, rather than a tool for solving internal problems.

Finally, continuous optimization serves as a means of maintaining internal management momentum. In a context of limited opportunities for strategic change, process and structural improvements become a relatively safe form of management activity. They allow for a sense of movement and development without affecting the fundamental foundations of management.

In many organizations, optimization serves as a public signal of controllability rather than a tool for real improvement. The launch of efficiency improvement programs, reorganizations, and transformation projects becomes a way to demonstrate that management is in control, responding to challenges, and acting rationally. In this context, optimization addresses not so much internal management issues as external hierarchical and institutional observers—owners, regulators, and higher-level management [10].

The demonstrative nature of optimization is reflected in the emphasis on the visibility of changes. Priority is given to measures that are easily documented and presented: new structures, updated regulations, reduced or redistributed staff positions, implemented systems and methodologies. The managerial value of such changes is determined not by their impact on results, but by their visibility and reportable expressiveness.

In conditions of uncertainty and limited managerial autonomy, demonstrating controllability becomes a rational strategy for managers' survival. Optimization allows them to demonstrate proactiveness without having to reconsider key management decisions or take additional risks. Even in the absence of tangible results, the mere fact of improvements serves as an argument for managerial competence: "work was done," "measures were taken," "processes were optimized."

At the same time, management logic shifts from results to process. Successful optimization is not one that changes performance indicators, but one that was properly planned, implemented, and documented. A gap arises between management action and its consequences: optimization is formally completed, regardless of whether actual performance has changed.

Optimization as a demonstration of controllability is a form of institutional rationality. It allows an organization to maintain legitimacy and internal stability without conflicting with established structures of power and accountability. However, it is precisely this function that makes optimization a self-sufficient management practice, divorced from development.

One of the key mechanisms of optimization without results is the shift in management attention from the content of decisions to the procedures for their execution and support. In this configuration, optimization ceases to be a tool for reconsidering management choices and is transformed into a process of improving formal frameworks—regulations, process maps, indicators, and reporting forms. Managerial rationality is replaced by procedural correctness [12].

In practice, this manifests itself in problems being interpreted not as the result of erroneous or limited management decisions, but as flaws in their implementation procedures. In response, the organization launches projects to "fine-tune" processes, clarify roles, revise instructions, and strengthen execution controls. Meanwhile, the decisions themselves—their goals, priorities, and assumptions—remain outside critical analysis. Optimization is focused on how to execute, not on what was decided and why.

Shifting the focus to procedures has strong institutional appeal. Procedures are easier to formalize, measure, and demonstrate in reporting. They create a sense of control and reduce uncertainty, as they allow for progress to be demonstrated even in the absence of substantive results.

For managers, this means a reduction in personal risks: a properly designed procedure is perceived as proof of rational management, regardless of the achieved results.

However, this approach has systemic consequences. Procedural optimization fragments management, severing the connection between decisions and their consequences. Performers focus on following rules rather than achieving results, since the procedure itself becomes the evaluation criterion. A paradox arises: the more thoroughly processes are optimized, the weaker the organization's ability to reconsider its own management assumptions.

This shift reflects the transition from substantive rationality to institutional rationality. Procedures begin to serve the function of legitimizing decisions rather than verifying them. Optimization in this form reproduces the existing management logic, failing to create conditions for learning and adaptation. As a result, improvements accumulate at the formal level, while managerial constraints remain.

One of the key mechanisms of optimization without results is implementing changes without reconsidering the distribution of managerial authority and responsibility. Under such conditions, optimization initiatives affect the organization's form—structures, processes, staffing levels, and indicators—but do not address its management core. Decisions are made at the same centers, responsibility remains diffuse or asymmetrical, and optimization functions as a superstructure over an unchanged system of authority.

In practice, this manifests itself in the fact that optimization is implemented "down the system." Middle and line management are asked to improve efficiency, reduce costs, and speed up processes, without receiving additional authority to change the conditions for achieving results. The managerial workload increases, but the scope for managerial influence remains the same. As a result, optimization is perceived as a demand to "do more with the same" rather than a conscious revision of management logic.

The lack of accountability reinforces this effect. Optimization decisions are often formulated collectively or at the highest level, while responsibility for their implementation and consequences is effectively delegated downwards. Accountability is thus purely formal: while it's possible to document the completion of actions, linking them to actual results is difficult. A management asymmetry arises, with decision authority and the burden of consequences being at different levels.

For managers, this configuration appears rational in the short term. It allows for change to be initiated without addressing complex and sensitive issues of power redistribution. However, in the long term, optimization that is not supported by a reorganization of management responsibility loses its transformative effect. The organization adapts to change formally, maintaining previous management dependencies.

This mechanism reflects the institutional limitation of management reforms. Changes that are not accompanied by a redistribution of power and responsibility are unable to alter the behavioral patterns of managers. Optimization in this case becomes a form of institutional compromise: the system demonstrates a willingness to change without changing its substance.

Optimization without redefining authority and responsibility creates the illusion of managerial development. Improvements accumulate at the structural and procedural levels, but fail to address the fundamental conditions of decision-making, leading to a persistent gap between optimization efforts and actual results [4,11].

In the context of optimization without results, performance indicators increasingly begin to act as a surrogate for management achievements. Instead of assessing the real impact of changes on the organization's operations, attention shifts to achieving formal indicators that are supposed to demonstrate the success of optimization measures. As a result, indicators cease to be a measurement tool and become an independent management goal [10].

In practice, this manifests itself in optimization being designed around predetermined metrics. Improvements are focused on parameters that can be quickly and clearly demonstrated: headcount reduction, cost reductions by line item, growth in individual KPIs, and improvements in process

indicators. However, the impact of such changes on decision quality, system stability, and long-term results remains outside the focus of management analysis.

Indicators have a strong institutional appeal because they formalize success and reduce uncertainty. Achieving targets is perceived as proof of effectiveness, regardless of whether it is accompanied by actual improvement. For managers, this creates a convenient management framework: optimization is considered successful if indicators are met, even if operational problems persist or worsen.

However, substituting indicators for results has systemic consequences. Performers begin to focus not on improving performance, but on optimizing indicators, which encourages formal compliance with requirements, distorted data, and localized decisions to the detriment of the system as a whole. This leads to a "management by numbers" effect, in which management thinking is reduced to working with indicators rather than addressing real management issues.

This mechanism reflects the institutionalization of measurement as a form of control. Indicators begin to serve not a diagnostic but a legitimizing function, confirming the correctness of management actions post-factum. Optimization in this form reproduces management activity without accumulating management knowledge or adjusting initial decisions. When metrics replace actual results, optimization loses its meaning as a development tool. Improvements are documented in reports, but they don't transform management practices, perpetuating the gap between formal performance and the organization's actual state.

Repeated optimization initiatives without tangible results inevitably lead to behavioral adaptation among employees and managers. When improvements are not accompanied by a genuine revision of management decisions and the conditions for achieving results, staff begin to perceive optimization as a mere backdrop rather than a significant management event. A persistent pattern of adaptation emerges, in which the key objective is not achieving results, but minimizing the risks and costs of participating in the next wave of change [13].

At the behavioral level, this manifests itself in the development of rational conformity. Employees and middle managers learn to correctly fulfill the requirements of optimization projects without investing in their substantive content. Improvement proposals become safe, not challenging key management assumptions. Initiative is gradually replaced by formal participation, and professional judgment by adherence to procedures.

At the same time, a specific attitude toward the results of optimization develops. Since previous improvements failed to produce noticeable changes, employees lose their expectation of real impact from new initiatives. This reduces motivation for meaningful participation and increases the focus on short-term compliance. Optimization begins to be perceived as a temporary campaign to be "survived" rather than a development process worth participating in.

For managers, this behavioral adaptation creates the illusion of control. Optimization projects are implemented without overt resistance, formal targets are met, and reporting appears positive. However, behind this outward loyalty lies a loss of trust in the very ideas for improvement. Management energy is directed not toward changing the system, but toward stabilizing it in the face of constant demands for optimization.

From a scientific perspective, behavioral adaptation to permanent optimization is an indicator of institutional exhaustion. The organization loses the ability to utilize improvements as a source of learning and development. Optimization becomes a routine practice, reproducing the existing order and perpetuating the gap between management activity and actual results.

Behavioral adaptation of employees ends the optimization cycle without results. Improvements continue, but their impact is limited to formal compliance, while management constraints and causes of inefficiency remain unchanged, (table 1).

Table 1 - Mechanisms for simulating efficiency in the optimization process

Simulation mechanism	What does it look like in management practice?	What is being formally optimized?	What remains unchanged	Systemic consequence
Changes without redistribution of power	Structures and processes change, but decision centers do not.	Forms of governance	Architecture of power	Improvements do not affect the result
Blurring of responsibility	Decisions are made collectively and implemented downwards.	Execution procedures	Bearer of consequences	Responsibility disappears
Substitution of results with indicators	KPIs are met, but problems persist	Metrics	Quality of decisions	The illusion of efficiency
Procedural overloading	Regulations and controls are added	Formal processes	Management thinking	Management is replaced by administration
Local optimization	A separate section is being improved	Private indicators	System integrity	Growing internal imbalances
Reporting rationality	Success is determined by the accuracy of the report	Documents and presentations	Actual effect	Legitimation without changes
Staff adaptation	Formal participation without initiative	Employee behavior	Motivation and trust	Cynicism and burnout
Repeatability of optimizations	New improvements without analyzing old ones	Number of initiatives	Management training	Accumulation of fatigue
Avoiding difficult decisions	Goals and priorities remain untouched	Execution	Management assumptions	Maintaining the status quo

The final effect	—	Visibility of changes	Real management	Development simulation

The phenomenon of permanent optimization in post-Soviet organizations cannot be understood without examining the historical foundations of management culture. Managerial hyperactivity the constant initiation of reforms, restructuring, and improvements is not so much a consequence of modern challenges as a continuation of the management logic formed under the administrative-command system [3,14].

In the Soviet management tradition, management effectiveness was measured not by results, but by activity. Planning, reporting, and campaigns for "improvement," "strengthening," and "promotion" were the primary forms of management action. The mere launch of a new initiative was seen as a confirmation of management control and loyalty to the system, while the actual consequences of these initiatives were of secondary importance. Management activity was more important than management results.

After the collapse of the planned system, this logic didn't disappear, but rather transformed. In conditions of uncertainty and institutional vacuum, managerial hyperactivity became a way to compensate for the loss of previous control mechanisms. Optimization, reforms, and restructuring began to serve as symbolic management, demonstrating the ability to "get things done" in a situation where sustainable management decisions were either absent or risky.

A lack of managerial accountability for long-term results played a key role in the perpetuation of this model. Frequent leadership turnover, blurred strategic horizons, and a weak connection between decisions and consequences contributed to a focus on short-term management activity. Launching an optimization project became a rational move: the impact could be demonstrated quickly, while the consequences could be delayed or postponed.

As a result, a persistent link between manageability and continuous change has developed in the post-Soviet management context. The absence of an optimization agenda has come to be perceived as managerial passivity, while constant improvements are seen as a sign of control and professionalism. This logic is reproduced regardless of the actual effect of optimization and forms the institutional basis for optimization without results.

In post-Soviet organizations, optimization is often perceived as the least risky way to demonstrate change. In conditions of high uncertainty, limited managerial autonomy, and rigid hierarchies, any substantive transformations affecting the distribution of power and responsibility are accompanied by significant personal and institutional risks. Against this backdrop, optimization becomes a compromise form of management action, allowing for the imitation of transformation without overstepping the bounds of what is acceptable [4].

The safety of optimization lies in its formal neutrality. Process reorganization, cost reduction, and the introduction of methodologies or digital tools are rarely perceived as a threat to established management positions. Such changes can be justified by external requirements, "best practices," or economic feasibility, without calling into question the original management decisions and centers of influence. As a result, optimization allows for forward movement without conflicting with the existing distribution of power.

For managers, optimization in this form becomes a rational strategy. It provides an opportunity to demonstrate initiative, alignment with expectations, and a willingness to change without assuming responsibility for radical management consequences. Even if there is no tangible effect, optimization measures can be explained by objective limitations or insufficient implementation depth, further mitigating personal risks.

However, the safety of optimization comes at a systemic cost. Since the changes don't address the fundamental management foundations, the organization maintains its previous behavioral and structural patterns. Improvements are implemented on top of the existing management logic and therefore don't transform it. Moreover, the frequent use of optimization as a safe form of change

reinforces the expectation that any reforms should be painless and not upset the established equilibrium. Optimization as a safe form of change reflects institutional risk aversion. The organization chooses management practices that minimize uncertainty and threats to the status quo, even if this limits its ability to develop. As a result, optimization becomes a tool for maintaining stability rather than a mechanism for adaptation.

The consolidation of optimization as a safe form of change over time creates a unique management culture in which improvements exist independently of development. In such a culture, the optimization process itself—its regularity, scale, and formal correctness—is valued, while the question of whether it leads to qualitative changes in management and results fades into the background. Improvements become a familiar part of organizational life, requiring no reflection or reassessment.

In management practice, this is reflected in the institutionalization of optimization as a routine responsibility. The launch of the next efficiency improvement project is perceived as a normal management cycle, similar to planning or reporting. However, the completion of optimization does not mark a transition to a new management logic—the organization simply prepares for the next round of improvements. Development is replaced by the repetition of changes.

A culture of improvement without development is also fostered by management expectations. Managers are evaluated on their ability to initiate and support optimization processes, rather than on the long-term consequences of these processes. As a result, managerial careers depend less and less on actual results and more on the ability to correctly integrate into the cycle of continuous improvement. This reinforces a focus on the form rather than the content of change.

For employees, such a culture fosters a persistent skepticism toward optimization initiatives. Improvements are perceived as temporary campaigns that don't change the fundamental working conditions. This reduces engagement, weakens trust in management intentions, and fosters behavioral adaptation, where the primary goal is to survive the next optimization with minimal losses. The organization constantly changes to avoid fundamental change. Optimization in such a system serves the function of relieving tension and maintaining managerial legitimacy, but fails to create the conditions for the accumulation of managerial knowledge and transformation.

A culture of improvement without development is the final element of the post-Soviet model of optimization without results. It explains why, even with high managerial activity, an organization remains structurally inert and weak in its ability to achieve sustainable change, transforming optimization from a development tool into an element of reproducing the existing order. (table 2).

Table 2 - Institutional factors of permanent optimization without results in post-Soviet organizations

Institutional factor	Historical and cultural basis	Manifestation in modern practice	How does it affect optimization?	The final effect
The cult of managerial activity	The Soviet model of "plan and campaigns"	Continuous improvement projects	The process is valued, not the result.	Optimization as a ritual
Prioritize reporting over impact	Administrative control	Formal recording of completed activities	The result is replaced by a report	The illusion of efficiency

Lack of trust in managerial autonomy	Centralization of decisions	The changes do not affect the authorities	Improvements are limited in scope	Cosmetic reforms
Avoiding personal responsibility	Punitive logic of errors	Collective formulation of decisions	The consequences are blurred	Safe optimization
Short-term management horizon	Frequent leadership changes	Focus on quick effects	Long-term changes are ignored	No cumulative effect
Formal borrowing of practices	Pressure of "best practices"	Implementing methodologies without context	The tools are out of touch with reality	Methodological simulation
Fear of mistakes and sanctions	Historical experience of punishments	Conservative solutions	Safe changes are selected	Blocking development
Stability as the highest value	Managing deficits and risk	Changes should not "shake" the system	Optimization without transformation	Institutional inertia
Manual control as the norm	Personalization of power	Compensation for system failures by people	Optimization is not institutionalized	Dependence on persons
Cumulative effect	—	Permanent improvements	Optimization without results	Systemic stagnation

Overcoming the phenomenon of optimization without results is impossible without changing the conditions in which the improvements themselves are designed and implemented. Substantive optimization differs from symbolic optimization not in the set of tools used, but in the institutional framework that links management decisions with their consequences. This is not about adjusting individual methods, but rather about reconsidering the management logic, in which improvements cease to be an end in themselves.

The first and key condition for meaningful optimization is the presence of a managerial entity vested with real influence and responsibility for results. Optimization only makes sense if decisions about changes are made by those capable of influencing system parameters—resources, priorities, deadlines, and constraints. Otherwise, improvements inevitably become mere formal execution and lose their transformative potential.

The second condition is the explicit recording of management consequences. Every optimization initiative must be accompanied by an understanding of what changes are considered results and what management conclusions will be drawn if they are not implemented. The absence of consequences for ineffective improvements makes optimization a safe management activity that does not require reconsideration of decisions.

The third condition is that optimization is limited in time and scale. Substantive improvements have a beginning, end, and evaluation phase. Continuous optimization without pauses for analysis

and consolidation of results hinders learning and the accumulation of management experience. Limiting the number of parallel improvements allows for a focus on the quality of management decisions, rather than their quantitative scope.

Finally, meaningful optimization requires a shift in management focus from formal indicators to real management results. Metrics should be used as a diagnostic tool, not as a substitute for results. This requires management's willingness to acknowledge the limitations of indicators and adjust decisions based on operational experience.

Even with formal adherence to optimization conditions, the key factor in its effectiveness remains managerial agency—the ability of specific managers not only to participate in changes but also to influence their content, course, and consequences. Without restoring this agency, optimization inevitably degenerates into a technical or procedural process that does not engage the organization's core management [8,9].

Managerial agency manifests itself primarily in the right to reconsider initial assumptions. Substantive optimization presupposes the ability to question not only the methods of execution but also the very goals, priorities, and constraints within which activities are carried out. If managers involved in optimization are deprived of the right to influence these parameters, improvements are limited to adaptation within the established framework and are unable to change the outcome.

The second aspect of agency is the ability to make decisions with consequences. Optimization acquires managerial significance only when its results are directly linked to the evaluation of management decisions and their bearers. This means that successful improvements enhance managerial influence, while unsuccessful ones require a reconsideration of decisions rather than the launch of another optimization cycle. Without this connection, improvements do not build managerial experience or improve management quality.

The third element is institutional protection of managerial judgment. Agency is impossible in conditions where any deviation from regulations or templates is interpreted as a managerial error. Meaningful optimization requires space for managerial experimentation and the recognition that not all improvements can be calculated in advance. The absence of such protection encourages managers to make formally correct but safe decisions devoid of transformative potential.

Restoring the connection between optimization and managerial agency means shifting the emphasis from methodologies to roles. The question of "which optimization tool to use" becomes secondary to the question of "who has the right to make decisions and bear the consequences." It is this distinction that separates optimization as a management action from optimization as a management procedure.

The final stage of overcoming ineffective optimization is the transition from efficiency simulation to management development. This transition presupposes a shift in management logic: from reproducing improvements as a form of activity to using optimization as a tool for accumulating management knowledge and changing the organization's management foundations [15,16].

A key characteristic of this transition is the rejection of optimization as a universal answer to any management problem. In a developing system, optimization ceases to be an automatic response and is applied selectively—where it can truly change the outcome. This requires management maturity: the recognition that not all problems can be solved through process improvement and that in some cases, a revision of goals, priorities, or management architecture is necessary.

The second element of this transition is the institutionalization of management reflection. Optimization is now viewed not as a completed project, but as a source of management experience. Not only the achieved indicators are analyzed, but also the assumptions underlying the decisions, the management constraints identified during the change process, and the reasons for deviations from the expected outcome. Without such reflection, improvements do not accumulate as management knowledge and do not lead to development.

The third important aspect is shifting the focus from short-term performance demonstrations to long-term managerial effectiveness. Development requires a willingness to temporarily lower formal performance indicators in order to establish sustainable management mechanisms. In a performance

simulation system, such decisions are impossible, as any deviation from the established metrics is perceived as a managerial failure.

Success is defined not by the number of implemented activities or the achievement of planned targets, but by the organization's increased ability to make better decisions, adapt more quickly, and learn from experience. This makes optimization a means of developing a management system, not an imitation of one.

This transition reflects a shift in the institutional management regime. The organization abandons the logic of maintaining the appearance of rationality and embraces a logic of conscious management, in which improvements become part of the evolution of managerial agency. This shift allows us to overcome the paradox of optimization without results and transform improvements into a source of sustainable development, rather than an element of management ritual (Table 3).

Table 3 - Transition from optimization as a simulation of efficiency to management development

Management parameter	Optimization without results (simulation model)	Content optimization (development model)	The managerial meaning of the transition
The goal of optimization	Demonstration of activity and controllability	Changing management conditions and results	Shifting focus from form to effect
Subject of optimization	Collective, blurred	Specific manager/management role	The return of personal subjectivity
Responsibility	Formal, processual	Tied to the consequences of decisions	Connection between solution and result
The role of indicators	Substitution of results	Diagnostic tool	The indicator again measures, but does not replace
Nature of changes	Local, procedural	Systemic, affecting the foundations of management	Going beyond cosmetic improvements
Attitude to mistakes	The error is hidden or justified	The error is analyzed and used	The emergence of management training
Time horizon	Short-term, reporting	Medium and long term	Break with the logic of the campaigns
Frequency of optimizations	Permanent	Limited and targeted	Reducing management noise
Employee behavior	Formal participation, adaptation	Meaningful inclusion	Restoring trust
Management effect	The illusion of efficiency	Increased managerial competence	Optimization as development

The conducted analysis showed that the phenomenon of optimization without results is not a consequence of the wrong choice of tools or insufficient managerial competence, but a manifestation of deeper institutional limitations of modern management practice [1-4]. Optimization in such conditions loses its connection with real changes and turns into a stable form of managerial activity, oriented toward maintaining the appearance of rationality and controllability.

The key reason for the gap between improvements and results is the shift in management focus from the content of decisions to procedures, metrics, and the forms of their demonstration. Improvements affect the external elements of the organizational system without addressing the power structure, the distribution of responsibility, and managerial agency. As a result, the organization constantly changes without changing its essence, reproducing optimization cycles without accumulating management experience.

Of particular importance in this context is the post-Soviet management environment, where optimization often serves as a safe form of change. The historically entrenched focus on managerial activity and formal reporting contributes to the institutionalization of improvements as a ritual rather than a development tool. This explains the persistence of the phenomenon of optimization without results, even with a high level of managerial involvement and formal maturity of management systems.

Abandoning permanent optimization in favor of management development requires not strengthening control or introducing new methodologies, but rather restructuring management logic. This shift determines organizations' ability not only to demonstrate effectiveness but also to achieve sustainable results in an environment of increasing complexity and uncertainty.

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THE DUNNING-KRUGER EFFECT IN THE SYSTEM OF MANAGEMENT DECISIONS: ORGANIZATIONAL MANIFESTATIONS AND INSTITUTIONAL CONSEQUENCES

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Abstract: *This article examines the Dunning - Kruger effect not only as an individual cognitive bias but also as an organizational and institutional phenomenon embedded in management systems, personnel selection, and decision-making. It demonstrates that hierarchies, KPI systems, presentation culture, and digitalization often exacerbate the gap between subjective confidence and actual competence, contributing to reverse managerial selection, the suppression of expert knowledge, and the institutionalization of erroneous decisions. Particular attention is paid to the phenomenon of "digital overconfidence" among managers. Management and HR measures to mitigate the effect's impact are proposed: separating status from expertise, institutionalizing doubt, and revising decision evaluation criteria.*

Key words*: Dunning - Kruger effect, cognitive biases, management decisions, backward selection, digitalization, organizational learning.*

With the increasing complexity of organizational systems and the acceleration of management cycles, the ability of managers and experts to adequately assess their own competence and the limitations of their decisions is becoming a critical factor in organizational sustainability. Modern management practices increasingly rely on formalized indicators, digital analysis tools, and standardized procedures, creating the illusion of rationality and manageability of processes [1]. However, in practice, it is precisely under such conditions that the likelihood of systemic management errors increases, associated not with a lack of information, but with distortions in its interpretation and use [2,3].

One of the key, but insufficiently understood in the management context, mechanisms of such distortions is the Dunning - Kruger effect [4,5]. In classical studies, this effect is considered an individual cognitive bias, manifested in the inflated self-assessment of low-competence individuals and the underestimation of their own abilities by highly qualified specialists. Despite the consistent confirmation of this phenomenon in experimental psychology, its application to the analysis of organizational and management processes remains fragmented and, as a rule, is of an illustrative nature [4].

Meanwhile, the management reality of modern organizations demonstrates that distortions in competence assessments rarely remain at the individual level. Mechanisms embedded in organizational structures—hierarchy, status differences, KPI systems, digital dashboards—can not only transmit but also reinforce these cognitive distortions, turning them into persistent institutional practices. As a result, confidence in decision-making often serves as a surrogate for expertise, while doubt and professional caution are interpreted as managerial weakness [6,7].

The Dunning – Kruger effect was introduced into scientific discourse as an empirically confirmed cognitive bias reflecting a systematic discrepancy between the subjective assessment of one's own abilities and their objective level [4,5]. Within the framework of cognitive psychology, this effect is interpreted as a consequence of a metacognitive deficit , in which a lack of knowledge and skills hinders not only the correct completion of tasks but also an adequate assessment of the quality of one's own decisions.

The key feature of this effect is its asymmetry. Individuals with low levels of competence exhibit a persistent tendency toward inflated self-esteem, as they lack the cognitive tools to recognize their own errors and limitations [4]. At the same time, more competent individuals tend to underestimate their capabilities, as they possess a well-developed understanding of the complexity of the subject area, alternative approaches, and potential risks. Thus, confidence in this case is not an indicator of knowledge, but a byproduct of its absence.

In classical psychological interpretation, the Dunning - Kruger effect is viewed primarily as an individual bias manifested in experimental tasks or self-assessment tests. Research focuses on identifying internal cognitive mechanisms—limited feedback, misattribution of success, and a failure of metacognition. This approach allows for a fairly accurate description of the nature and dynamics of the bias at the individual level; however, it suffers from a number of methodological limitations when applying its findings to social and organizational behavior [5].

The individual psychological approach assumes the relative autonomy of the subject and does not consider the influence of external institutional factors such as hierarchy, status, distribution of power, and formal evaluation criteria. Secondly, within the framework of experimental logic, the effect is recorded as a perceptual error, but is not analyzed as a socially reproducible mechanism capable of being reinforced and strengthened in stable systems of interaction. Thirdly, the psychological interpretation practically does not address the question of how the subjective self-confidence of individuals is transformed into collective decisions and management practices.

As a result, a methodological gap arises between the proven validity of the Dunning - Kruger effect at the level of individual thinking and its real-world implications for complex social systems, including modern organizations. Overcoming this gap requires going beyond the classical cognitive paradigm and incorporating into the analysis organizational and institutional conditions in which self-esteem distortion ceases to be an isolated error and begins to fulfill a structural function.

In management, competence rarely manifests itself in the form of unambiguous and quick answers. On the contrary, as professional experience and a deeper understanding of the subject matter grow, managerial thinking acquires characteristics of caution, reflexivity , and sensitivity to uncertainty. This is due to the fact that a competent subject recognizes the complexity of managed systems, the multiplicity of influencing factors, and the limitations of available information, which inevitably reduces subjective confidence in the accuracy of decisions [8,9].

In cognitive psychology and decision theory, uncertainty is viewed not as a sign of weak thinking, but as an objective property of complex systems. For experienced professionals and managers, acknowledging uncertainty becomes an element of professional adequacy, allowing them to consider alternative scenarios, probabilistic risks, and the delayed effects of management actions. In this sense, doubt and caution are not a denial of competence, but rather its functional manifestation [2,10].

However, in management and organizational contexts, this logic is often interpreted distortedly. In the context of hierarchical structures, a focus on results, and pressure from formal metrics, confidence begins to be viewed as a leadership attribute, while doubt is seen as a lack of professional competence. This creates a persistent cognitive conflict: the higher the level of actual competence, the lower the perceived management value of a specialist if they demonstrate reflection and caution.

From the perspective of the Dunning - Kruger effect , this contradiction is fundamental. Individuals with limited competence, who do not face internal cognitive barriers and doubts, are able to form clearer and more categorical managerial positions. In organizational settings, such positions

are often perceived as a manifestation of decisiveness and strategic thinking, which reinforces the asymmetry between subjective confidence and the objective ability to make high-quality decisions.

An additional factor is the specific nature of managerial thinking in conditions of uncertainty, when the lack of clear criteria for decision validity is compensated for by symbolic markers of confidence: harsh rhetoric, simplified models, and appeals to formal metrics. As a result, competence is replaced by management style, and complexity by declarative clarity. This shift contributes to the entrenchment of cognitive biases at the level of collective perception and management culture.

The Dunning - Kruger effect is traditionally explained as an individual thinking error: people with low knowledge not only make mistakes but also fail to recognize them, leading to overestimation of their abilities. This explanation works well at the individual level, but it proves insufficient when trying to understand why such biases persist in organizations and influence management decisions.

In real-life management practices, self-assessment errors rarely remain the private matter of an individual employee or manager. Management decisions are made within formal structures, hierarchies, and approval procedures, where individual confidence or hesitation acquires organizational significance. Overconfident judgments carry greater weight, are accepted more quickly, and are more easily communicated upward, while cautious and complex assessments are often perceived as a sign of unpreparedness for management.

Furthermore, organizations operate a system of rewards and sanctions that directly influences which types of behavior are reinforced. Confidence, even if not backed by deep expertise, can be rewarded with career advancement, expanded authority, and the trust of management. Conversely, professional doubt and a desire to clarify details are often interpreted as a lack of decisiveness. As a result, the Dunning - Kruger effect ceases to be an individual error and begins to function as an organizational filter [11,12].

In organizations, the Dunning - Kruger effect rarely manifests directly as individual overconfidence. Rather, it is reinforced and entrenched through internal organizational mechanisms that shape preferred models of managerial behavior and decision-making. These mechanisms operate unconsciously but systemically, creating an environment in which confidence gains institutional primacy over actual competence.

One key factor is the hierarchical management structure. In multi-level hierarchies, management signals transmitted " bottom-up " are inevitably simplified. Complex, ambiguous, and conditional assessments are poorly communicated through the approval levels, while clear and categorical formulations are perceived as more manageable. As a result, overconfident judgments are more likely to be heard and accepted, regardless of their factual validity [6,7].

A system of formal performance indicators also plays a significant role. KPIs, plans, and target metrics are initially intended to increase management transparency, but in practice, they often encourage demonstrations of confidence in the achievability of set targets. Managers and specialists are forced to present decisions in a simplified and optimistic manner, minimizing mention of risks and uncertainties. This creates the effect of management simulation, in which confidence becomes part of reporting, and doubt becomes a factor in reputational matters. risk [13].

A presentation-based management culture serves as an additional reinforcement. Modern management decisions are increasingly made based on slides, brief reports, and visual models. In this format, simple and compelling narratives are favored, while detailed analysis and critical discussion are secondary. Confidence in the presentation of material is perceived as an indicator of professionalism, even if it is not based on a deep understanding of the subject [14].

Finally, the culture of organizational interaction plays a crucial role. In environments that value speed of decision-making and demonstrated leadership, doubt and questions can be interpreted as weakness or a lack of willingness to take responsibility. This leads to self-censorship by experts and a decline in the quality of feedback. Over time, a persistent pattern of behavior develops in which cognitive biases are not only not corrected but are constantly reinforced.

the Dunning - Kruger effect begins to function as a kind of filter for managerial selection. However, unlike the classical logic of meritocracy, where advancement is based on competence and

performance, a phenomenon of reverse managerial selection emerges, in which advantage is gained by individuals demonstrating high subjective confidence with a limited depth of understanding of the processes being managed [3].

The key feature of this phenomenon is that confidence becomes an interpretable and measurable signal of managerial potential. When evaluating candidates for management roles, preference is often given to those who can quickly formulate positions, offer unambiguous solutions, and demonstrate a willingness to take responsibility. Meanwhile, depth of analysis, the ability to deal with uncertainty, and a tendency toward reflection are less visible and, therefore, less significant in formal selection procedures.

Reverse selection is reinforced by the fact that management decisions are often evaluated based on their external consistency with the expectations of higher-level management, rather than on their long-term results. Overconfident managers tend to reproduce dominant management narratives, avoiding critical questions and complex interpretations. This increases their institutional compatibility with the existing management system and increases the likelihood of career advancement.

At the same time, highly competent specialists and managers tend to exhibit a more cautious decision-making style. They tend to emphasize risks, limitations, and alternative scenarios, which can be perceived as a lack of decisiveness or managerial courage. In a context of speed and formal results-oriented leadership, such qualities reduce their chances of advancement, despite the objective value of their expertise.

Over time, this mechanism leads to the accumulation of managerial positions occupied by individuals with limited capacity for systemic analysis but high self-confidence. This creates a vicious cycle: managers who have undergone reverse selection develop evaluation criteria and expectations that favor similar behavior patterns. Thus, the Dunning - Kruger effect ceases to be a random aberration and becomes a stable element of personnel and management policy.

Reverse managerial selection leads to cognitive biases no longer being temporary or random and becoming entrenched at the level of managerial rules and practices. At this stage, the Dunning - Kruger effect extends beyond the behavior of individual managers and becomes an institutional characteristic of the organization.

A key sign of institutionalization is that erroneous decisions are no longer perceived as errors. They are formalized in the form of regulations, strategies, performance indicators, and reporting standards. The formal correctness of documents and procedures creates a sense of rationality and control, even if the decisions themselves were initially made without sufficient expert review. As a result, cognitive biases are given normative cover and become part of "correct" management behavior.

An additional factor is the collective responsibility characteristic of most organizations. Decisions are made collectively, through committees and approvals, which blurs individual responsibility for consequences. In such a system, overconfident but erroneous decisions are not only easier to make but also more difficult to revise. Criticism is perceived not as a professional necessity, but as a threat to the sustainability of established management structures [6].

Over time, a management environment develops in which correcting decisions becomes institutionally difficult. Even when negative results occur, errors are rarely attributed to misjudgments of competence or cognitive biases. The causes of problems are interpreted as external—market changes, regulatory pressure, personnel constraints. This allows for the preservation of initial management principles and avoids reconsidering the logic of decision-making.

In the context of digitalization, this process is further enhanced. Digital systems record indicators, generate reports, and visualize data, lending the appearance of objectivity and technological validity to erroneous management decisions. Thus, the institutionalization of errors occurs not only through management culture but also through the digital management infrastructure, making distortions more persistent and less noticeable.

As a result, the Dunning - Kruger effect transforms from an individual cognitive phenomenon into a systemic management risk embedded in organizational structures and procedures. This transformation significantly reduces organizations' ability to learn, adjust strategy, and adapt to changing conditions, creating the preconditions for the accumulation of management failures over the long term, (Table 1).

Table 1- Organizational mechanisms for reproducing the Dunning - Kruger effect

Element of the organizational system	Description of the mechanism	the Dunning - Kruger effect manifest itself?	Management result	Systemic consequence
Hierarchical management structure	Multi-level coordination and filtering of information	Overconfident and simplified assessments are more likely to rise than cautious and complex ones.	Preference for categorical decisions	Simplifying the management picture of reality
KPI and formal assessment systems	Focus on achievability and accountability	Showing confidence replaces real analysis	Optimistic but poorly founded plans	The illusion of control
Presentation culture	Making decisions based on briefings and slides	A persuasive presentation is perceived as competence	Choosing solutions based on form, not content	Superficial management decisions
HR procedures and promotion	Assessing management potential through behavioral signals	Confidence is interpreted as leadership	Promoting self-confident managers	Reverse management selection
Collective decision-making formats	Committees, collegial bodies	Blurring of personal responsibility	Wrong decisions are not revised	Institutionalization of errors
Management culture	Negative attitude towards doubt and criticism	Experts are suppressing alternative opinions	Decreased quality of feedback	Suppression of organizational learning

One of the key consequences of the institutionalization of the Dunning - Kruger effect is the distortion of strategic management decisions. In strategic management, self-assessment errors are particularly significant, as the decisions being made are long-term, affect the entire organization, and are difficult to quickly adjust. Moreover, high subjective confidence among executives is often perceived as a prerequisite for strategic leadership, while critical reflection and doubt are seen as obstacles to progress.

In a complex and uncertain environment, strategic decisions are inevitably made with incomplete information. However, the Dunning - Kruger effect leads to this uncertainty being ignored or deliberately simplified. Managers with limited insight into processes tend to formulate overly optimistic strategies, underestimate risks, and overestimate the controllability of external and internal factors. As a result, strategy becomes declarative and begins to reflect not the actual state of affairs, but the management team's self-confidence.

An additional distorting factor is the focus on the formal consistency of strategic documents. Strategies are developed to be logically complete, visually compelling, and meet the expectations of higher management levels or external stakeholders. However, alternative scenarios, critical assumptions, and limitations are often left outside the scope of strategic analysis, as they undermine the integrity and "certainty" of the management narrative.

Experience shows that in such conditions, strategy increasingly becomes a symbolic management tool. It is used to demonstrate control, direction, and decisiveness, but is weakly connected to the operational reality and capabilities of the organization. Strategy execution is replaced by formal reporting on its implementation, and discrepancies between the plan and reality are attributed to external circumstances rather than to flaws in the underlying management assumptions.

The Dunning - Kruger effect promotes strategic decisions in which certainty replaces analysis, and simplicity replaces systemic understanding. This reduces organizations' adaptability, limits their ability to revise strategic objectives, and increases the risk of accumulating long-term management errors, especially in the context of dynamic change and digital transformation.

the Dunning - Kruger effect has a significant impact on organizations' ability to learn and self-renew. One of the most noticeable consequences is the degradation of feedback mechanisms, resulting in the organization losing the ability to promptly identify and correct management errors. Under such conditions, learning ceases to be an integrated management function and becomes formal or declarative.

In organizations where confidence is viewed as a sign of managerial competence, feedback begins to serve a confirmatory rather than a corrective function. Information consistent with dominant management assumptions is perceived as valid and useful, while signals indicating risks, limitations, or alternative interpretations are ignored or marginalized. This leads to a systematic distortion of the managerial picture of reality.

Status asymmetry plays a particularly important role in this process. Feedback from lower levels of management or from experts without formal managerial status carries significantly less weight than the opinions of individuals with power and high subjective confidence. As a result, knowledge and experience accumulated at the operational level are poorly integrated into management decisions, widening the gap between strategic objectives and actual processes.

Over time, a culture of self-censorship develops , in which employees and experts avoid expressing doubts and criticism for fear of negative consequences for their reputation or career prospects. Under such conditions, the organization loses the capacity for collective reflection, and errors are not analyzed but rather concealed. Even when negative results occur, they are interpreted as external or temporary deviations that do not require a revision of management approaches.

The Dunning - Kruger effect contributes to a management environment in which feedback loses its learning value, and organizational learning is replaced by imitation. The loss of the ability to systematically correct decisions reduces organizational resilience and increases the likelihood of repeating the same management mistakes over the long term.

The implementation of digital management tools is initially positioned as a means of increasing the validity and transparency of management decisions. However, in the context of the Dunning - Kruger effect Digitalization often serves the opposite function, reinforcing managerial overconfidence and masking the limitations of real process understanding. This is because digital systems often reflect the results of interpretation rather than the management reality itself.

Digital dashboards, reports, and metrics create the illusion of complete control. Managers see aggregated data, indicator trends, and visual indicators of "normal" or "deviation" levels, creating a

sense of process control without the need for deep immersion in their content. As a result, the ability to interpret the interface replaces the ability to understand causes and relationships, and confidence in decisions is based on access to data rather than on critical analysis [13,2].

Simplifying complex processes through metrics plays a particularly important role. When translating multidimensional management tasks into a set of numerical indicators, context, alternative explanations, and informal factors are inevitably lost. Under the Dunning - Kruger effect , this simplification is perceived not as a limitation of the model, but as an advantage. Managerial confidence is enhanced by formal clarity, while the real sources of problems remain outside the scope of analysis.

An additional factor is the distribution of responsibility between the individual and the system. Digital solutions allow for reference to "data," "algorithms," and "the system," reducing subjective responsibility for management errors. This is especially true for decisions based on KPIs, automated reports, and analytical models. In such conditions, cognitive bias is technologically reinforced and becomes less noticeable to those involved in the management process.

As a result, digitalization, unaccompanied by the development of critical thinking and expert reflection, contributes to the phenomenon of digital overconfidence. Management decisions are made faster, appear more justified and formally correct, but at the same time become less resilient to interpretation errors. Thus, digital tools, instead of reducing the Dunning - Kruger effect, can amplify its influence, transforming cognitive bias into a technologically mediated systemic management risk, (Table 2).

Table 2 - Managerial implications of the Dunning - Kruger effect in organizations

Area of manifestation	Key management mechanism	Typical distortion	Organizational implications	Long-term risks
Strategic management	The dominance of subjective confidence in strategy formation	Underestimation of uncertainty and risks	Declarative strategies, weak connection with operational reality	Strategic failures, loss of adaptability
Decision making	Focus on formal consistency of decisions	Ignoring alternative scenarios	Decisions are made quickly but superficially	Accumulation of management errors
Feedback	Status asymmetry and suppression of criticism	Filtering negative information	Distortion of the management picture of reality	Loss of organizational learning capacity
Organizational learning	Formalization instead of reflection	Errors are not analyzed, but masked.	Simulation of development and improvements	Recurrence of the same management failures
Digital control	Substituting digital metrics for understanding processes	The illusion of control through indicators	Control by screen, not by processes	Digital leadership confidence

Responsibility for decisions	Collective blurring of responsibility	Shifting the causes of failure to external factors	Lack of adjustment of management logic	Systemic management degradation

One of the key factors contributing to the Dunning - Kruger effect in organizations is the institutional conflation of managerial status and expert competence. In traditional hierarchical management systems, the presence of formal authority is automatically interpreted as a sign of professional competence, while the absence of managerial status is interpreted as a limitation on expert value. This conflation creates conditions in which a manager's subjective confidence begins to replace actual knowledge and analysis.

In management practice, decision-making and the formation of expert assessments are processes that differ in nature. The managerial function is associated with resource allocation, coordination, and responsibility for the final choice, while the expert function is focused on analysis, data interpretation, and the identification of limitations of possible solutions. Combining these functions within a single role increases the risk of cognitive biases, since the manager simultaneously acts as both the decision maker and the source of expert justification, significantly reducing the likelihood of critical self-examination [3,12].

The separation of managerial status and expert competence presupposes institutional recognition of the autonomous value of expert knowledge. Expert opinion should be viewed not as an auxiliary element of management decisions, but as an independent source for assessing risks, assumptions, and alternatives. Under such conditions, competence ceases to compete with certainty and acquires a formalized right to participate in the decision-making process, regardless of the hierarchical position of its bearer.

The practical implementation of this approach is possible through the creation of sustainable expert networks and procedures. These include expert councils, cross-functional working groups, mandatory expert opinions on key management initiatives, and formalized roles for internal consultants. A key condition for the effectiveness of these mechanisms is their institutional protection from management pressure and formal approval "by default."

The role of the HR department in implementing this mechanism is particularly important. HR departments have the ability to design HR and management processes so that expertise is not absorbed into the management hierarchy. This includes developing competency models in which expert roles are equal in importance to management roles, implementing career tracks for specialists not oriented toward management positions, and developing procedures for evaluating management decisions with the participation of subject-matter experts.

Separating status and competence helps reduce pressure on experts and legitimizes professional doubt as an element of the management process. Under these conditions, the Dunning - Kruger effect loses institutional support, as confidence without expert justification ceases to be a sufficient condition for managerial influence. This, in turn, improves the quality of decisions, the sustainability of organizational strategies, and the ability of organizations to adapt to uncertainty.

One of the most persistent factors reinforcing the Dunning - Kruger effect in organizations is a negative attitude toward doubt as an element of management thinking. In traditional management cultures, doubt is often interpreted as a sign of insecurity, weakness, or a lack of leadership skills, while categorical and unambiguous decisions are perceived as indicators of professional maturity. This attitude creates an environment in which cognitive biases are not only uncorrected but also institutionally reinforced.

In conditions of high uncertainty, doubt is not an aberration, but an objectively necessary component of high-quality management analysis. The ability to question initial assumptions, consider alternative scenarios, and acknowledge the limitations of information is a key characteristic of expert thinking. However, in the absence of institutional mechanisms for protection, such forms of thinking

are supplanted by simpler and more confident management narratives, which widens the gap between subjective confidence and the actual validity of decisions [8,9].

Institutionalizing doubt involves developing management procedures within which critical discussion and alternative viewpoints are not dependent on the personal courage of individual employees. Doubt should be built into the decision-making process itself—as a mandatory stage of analysis, not as an optional response to an already-made decision. This shifts the focus from the manager's personal confidence to a collective verification of the logic and assumptions of management choices.

The practical implementation of this approach is possible through the formalization of alternative analysis mechanisms. These include the mandatory consideration of multiple scenarios, the recording of key risks and assumptions in management documents, and the assignment of roles responsible for critically evaluating proposed solutions. It is important to emphasize that these mechanisms must be systemic and not be reduced to the formal implementation of procedures devoid of real management significance.

Management culture plays a special role in the institutionalization of doubt. If expressing an alternative position results in reputational or career costs, formal procedures become ineffective. In this context, fostering an environment of psychological safety, in which questions and disagreement are perceived as contributing to the quality of decisions rather than as undermining managerial authority, becomes critical. Human resources departments and senior management play a key role in reinforcing such norms through personnel decisions, performance appraisal systems, and management communications [12].

Dunning - Kruger effect by shifting managerial weight from individual confidence to collective verification and reasoning. In such a system, overconfident but poorly substantiated decisions encounter organizational barriers early on, reducing the likelihood of them being enshrined in strategies, regulations, and metrics. In the long term, this improves organizational adaptability and their ability to learn in the face of uncertainty and change.

A significant factor supporting the Dunning - Kruger effect in organizations is the current management performance appraisal systems. In most cases, these systems are focused on achieving formally defined results, meeting deadlines, and demonstrating managerial decisiveness. This approach focuses on the bottom line, while the quality of the decision-making process and the validity of management assumptions remain outside the scope of systemic assessment.

This logic encourages managers to demonstrate confidence and certainty, even in situations of high uncertainty. The ability to quickly make a decision and present it as the only option becomes a managerial advantage, while caution, pointing out risks, and attempts to clarify initial data are perceived as obstacles to achieving results. As a result, evaluation systems inadvertently encourage behavioral patterns that reinforce cognitive biases.

Revision of management performance criteria involves shifting the focus from solely performance indicators to process decision-making. This includes assessing the quality of analysis, the clarity of logic, and the consideration of risks and alternative scenarios. In this model, managerial maturity is defined not by the absence of errors, but by the ability to recognize the limitations of decisions, adjust them as conditions change, and learn management lessons from failures.

Of particular importance is the rejection of the perception of management errors as purely individual failures. Under the Dunning - Kruger effect , errors are often concealed or rationalized, as admitting to an erroneous decision is perceived as a threat to a manager's reputation. Developing criteria that allow and even encourage the analysis of erroneous decisions helps reduce defensive reactions and improve the quality of managerial reflection.

Practical implementation of this approach is possible through the introduction of post-factum analysis procedures for management decisions, which evaluate not only the achieved results but also the underlying assumptions, prerequisites, and management logic. Such procedures allow for the identification of systemic sources of errors and the reduction of their recurrence without resorting to personalized responsibility.

The role of the HR department in this context is to design management assessment and development systems focused on long-term sustainability rather than short-term demonstrations of confidence. This includes revising competency models, management appraisal criteria, and leadership development approaches that emphasize the ability to reflect, manage uncertainty, and reassess one's own decisions.

Revisiting the criteria for managerial effectiveness reduces institutional support for the Dunning - Kruger effect , as confidence without an analytical foundation is no longer a sufficient condition for managerial success. In such a system, cognitive biases lose their structural reinforcement, and the quality of managerial decisions begins to be determined not by the strength of conviction, but by the depth of understanding and adaptability of managerial thinking, (Table 3).

Table 3 - Management mechanisms for reducing the Dunning - Kruger effect in organizations

Management mechanism	Management risk in the absence of a mechanism	the Dunning - Kruger effect	Implementation tools	The role of the HR department
Separation of managerial status and expert competence	Substitution of expertise by formal authority	Overconfident managers make decisions without sufficient analysis	Expert councils, mandatory expert opinions, cross-functional groups	Designing expert roles, developing non-managerial career tracks
Institutionalization of doubt and alternative points of view	Suppressing critical thinking and feedback	Ignoring risks, lack of alternative scenarios	Formalized procedures for alternative analysis, risk discussion	Formation of a culture of psychological safety, protection of expert disagreement
Revision of criteria for evaluating management decisions	Encouraging confidence over validity	Quick but poorly reasoned decisions	Evaluation of the quality of management analysis, post-factum analysis of decisions	Developing competency models focused on reflection and adaptability
Reducing reliance on formal metrics	The illusion of control through indicators	Substituting numbers for understanding processes	Contextual analysis of KPIs, a combination of quantitative and qualitative assessments	Balancing evaluation systems, HR participation in interpreting indicators
Development of management reflection	Repeating the same management mistakes	Lack of learning from mistakes	Regular management reviews, training in dealing with uncertainty	Management development programs, facilitation of management discussions

The study allows us to consider the Dunning - Kruger effect not only as an individual cognitive bias, but also as a persistent organizational and institutional phenomenon that has a systemic impact on the quality of management decisions. Analysis has shown that under conditions of hierarchical management, formalized performance indicators, and active digitalization, this effect does not weaken; on the contrary, it receives additional structural and technological reinforcement [13,14,6,7].

The study found that organizational mechanisms—hierarchies, evaluation systems, presentation formats, and digital management tools—facilitate a bias in managerial selection toward subjective confidence rather than the depth of expert analysis. This results in the phenomenon of reverse managerial selection, in which cognitive biases become entrenched in HR and management practices and, over time, become institutionalized in the form of strategies, regulations, and metrics.

Particular attention is paid to the role of digitalization, which, contrary to popular expectations, does not guarantee improved management efficiency. In the absence of developed critical reflection mechanisms, digital tools can increase managerial overconfidence, mask the limitations of models, and reduce accountability for data interpretation. This transforms the Dunning - Kruger effect into a technology-mediated risk to managerial sustainability.

The management mechanisms for mitigating this effect outlined in the paper demonstrate that its impact can be limited not by adjusting individual thinking, but by changing the management environment. These mechanisms include institutional separation of status and expertise, the legitimization of doubt and alternative viewpoints, and a revision of the criteria for evaluating management decisions with an emphasis on their validity and adaptability.

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FLYING SHEARS FOR HOT CUTTING OF ROLLED METAL: TECHNOLOGY, EQUIPMENT AND MODERN DEVELOPMENT TRENDS

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Abstract: *This article examines hot rolling shears as a key element in the hot rolling process chain, ensuring high productivity, cutting accuracy, and consistent quality of metal products. The design and technological features of various types of flying shears, including drum, crank, and servo-driven shears, are analyzed, as well as the evolution of control systems from mechanical circuits to intelligent digital solutions. The potential for modernizing the drum shear control system using neural network PI controllers to improve the efficiency of the sheet metal cutting process is explored. The scientific novelty of the study lies in its comprehensive consideration of flying shears as a cyber-physical system combining mechanics, an electric drive, automatic control systems, and digital algorithms for synchronizing motion with the rolling mill. For the first time, a review and analytical approach has been used to systematize current trends in the development of flying shears, focusing on drive dynamics control, optimization of motion cutting profiles, the implementation of variable-frequency and servo drives, and the use of predictive diagnostics and digital twins in hot rolling applications. The practical significance of this work lies in the potential application of the obtained results in the modernization of existing hot rolling mills, the selection and configuration of flying shear equipment, and the design of automated cutting systems for rolled products.*

Key words: *flying shears, rolling, equipment, technology, hot cutting.*

Relevance. The topic of flying shears in hot rolling remains highly relevant in modern metallurgy and mechanical engineering. These devices play a key role in the production of steel bars, sheets, strips, and other products, ensuring continuous cutting of moving rolled products without line interruption. With growing demand for high-quality steel (for automotive , construction, and energy), flying shears help increase productivity by up to 40%, reducing waste and energy costs. According to market reports, the North American market for flying shears is actively growing due to integration into steel mills and the automotive industry. Globally, given trends toward automation and digitalization (Industry 4.0), this technology is evolving to accommodate rolling speeds of up to several meters per second. Its relevance is underscored by patents and upgrades, such as extending the service life of knives to 19 days in drum designs. Flying shears are specialized equipment for dynamic cutting of hot rolled products (temperatures up to 1000–1200°C), where the metal passes through rollers and is cut to specified lengths without interruption. The technology is based on synchronizing the speed of the knives with the movement of the rolled product, achieved through drive mechanisms, sensors, and control systems. Key components include knives made of high-strength alloys to withstand high temperatures and loads; **an** electromechanical or hydraulic drive with uniform speed mechanisms for a clean cut; a guidance system ensures alignment of the rolled product, minimizing defects; control – temperature, speed, and size sensors integrated with PLCs (programmable logic controllers) and HMIs (human-machine interfaces) for real-time monitoring.

The research methods include the analysis and generalization of domestic and foreign scientific publications and technical solutions, a comparative analysis of the designs and control

systems of flying shears, methods of automatic control theory and electric drives, as well as elements of system and functional analysis of hot rolling process equipment.

Results 1. Features of the hot-rolled product cutting process in flying shears. Cutting hot-rolled products in flying shears is one of the most critical operations in continuous hot rolling lines. It is performed at metal temperatures of 850–1150 °C, high rolling speeds (up to 10–25 m/s on modern wide-strip and section mills), and under conditions of synchronous movement of the cutting elements with the material ("on the fly"). This distinguishes flying shears from stationary ones and places strict demands on synchronization accuracy, dynamic structural rigidity, tool wear resistance, and control system performance [1,2].

1.1. Thermomechanical properties of hot cutting. During hot cutting in flying shears, the metal temperature significantly reduces the yield strength and deformation resistance (by 3-10 times compared to the cold state), which facilitates the cutting process itself, but simultaneously sharply increases local plastic flows in the contact zone. This leads to the formation of a characteristic "rolled" deformation zone with a pronounced stress gradient across the thickness: the upper layers of the strip experience compression, the lower layers experience tension, and shear deformation is often observed in the central zone. Heat generation from friction and plastic deformation in the cutting zone can reach several hundred degrees in a fraction of a second, causing localized heating of the edge and promoting secondary oxidation (the formation of secondary scale). At high speeds (especially > 5-7 m/s), the dynamic component of the cutting force increases by 30-60%, and the knife-metal friction coefficient decreases due to the formation of a liquid scale film and molten particles. This requires mandatory consideration of the temperature dependence of properties (including elastic modulus, Poisson's ratio and tensile strength) in finite element models and analytical calculations [1].

1.2. Force Parameters and Metal Fracture Mechanism. Flying shears utilize a rolling (roller or drum) fracture mechanism: the blades engage the strip at a low angle of attack (typically 3–12°), which gradually introduces and progressively propagates a crack along the cutting line. This mechanism reduces peak cutting force by 40–70% compared to a guillotine shear, but makes the process highly sensitive to synchronization accuracy. When phase misalignment (>1–3%) occurs, significant tensile stresses develop in the cutting edge, leading to the formation of burrs up to 5–15 mm high, tears, cracks, and a torn edge. For thick strips (> 20–30 mm), a mixed mechanism is often observed: initially, plastic crushing, followed by shear fracture with elements of brittle cleavage in the center. The specific cutting force usually lies in the range of 150–450 MPa (depending on temperature, speed and steel grade) [3-6].

Figure 1 shows the relative positions of the drum and the strip being cut during elastic deformation of the metal. The following notations are used in Figure 1: $h$is half the height of the metal strip; the full height of the strip is processed by two drums, m; R_{DRUM}, $R_0$are the drum radius and the cutting edge radius (taking into account the protruding part of the knife), respectively, m; $\varphi$is the angle characterizing the current position of the drum, rad; $X$and $Y$are the axes of the coordinate system in which the drum motion is considered; $O$is the position of the cutting edge of the knife at a rotation angle of φ; $b$is the height of the destruction zone; F_{CUT}, $F_{\mathrm{CUT}\tau}$is the cutting force and its projection onto the tangent to the drum surface at point O.

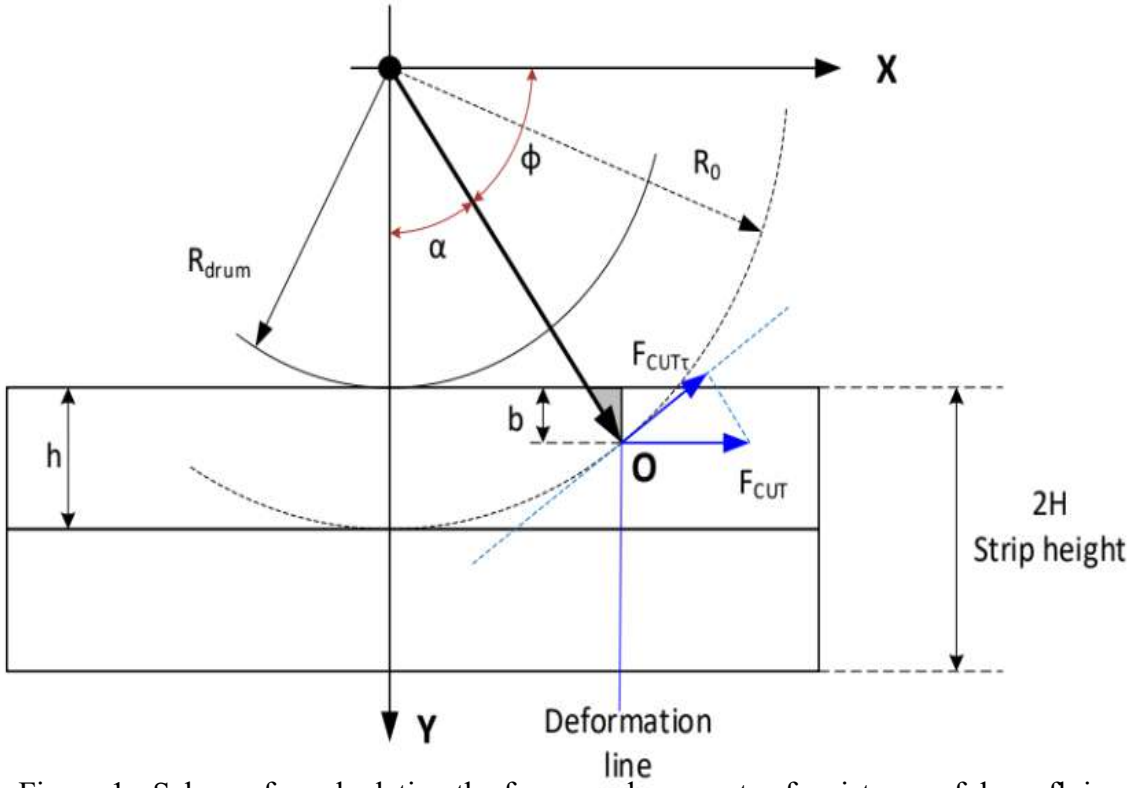

Figure 1 - Scheme for calculating the forces and moments of resistance of drum flying shears.

1.3. Kinematics and dynamics of flying shears. The key requirement is the precise coincidence of the tangential velocity of the knives with the rolling speed at the moment of contact (desynchronization ≤ 0.3–1%). Deviations cause impact loads (2–5 times higher than the nominal value), vibrations, fatigue damage to bearings, shafts and the frame. The main types of kinematic schemes: drum (simple, reliable, for strips up to 30–50 mm); crank-lever and planetary (better trajectory, lower dynamic loads); pendulum and combined (for high speeds and thick rolled products). Optimized trajectories (close to rectilinear or epicycloidal) reduce inertial loads by 25–45%, increase the stability of the cutting length (±5–20 mm) and the service life of the equipment [7,8].

1.4. Drives and cutting process control. Modern flying shears are equipped with powerful electric drives (500–3000 kW) — most often asynchronous or synchronous with vector/direct torque control. The main objective is to minimize desynchronization in transient modes (acceleration, deceleration, length change) [2]. Adaptive controllers (PID + predictive algorithms), feedback via strip encoders and laser/camera length sensors allow maintaining desynchronization within 0.1–0.5%. Integration with the mill's automated process control system ensures automatic correction of the cutting phase in real time, synchronization with the rolling rhythm, and handling of emergency situations (stuck metal, "cobble") [2,9].

1.5. Design solutions and their impact on cutting quality. Drum and roller (rolling) designs with specially shaped blades (chevron, epicycloidal, variable-angle) are the most effective. They ensure uniform load distribution, minimal crushing, and burrs < 1–3 mm, even at thicknesses of 30–60 mm.

The blades are made of high-alloy steels (5Kh2MNF, 4Kh5MFS1, 5Kh2VS, etc.) with a hot hardness of 40–52 HRC, often with wear-resistant coatings. Intensive thermomechanical wear (thermal fatigue, scale abrasion, oxidation, and chipping) requires [5,6,10]: water cooling of the blades, protective screens, optimized gaps (0.05–0.25 mm per side), and regular resharpening and replacement. Such solutions significantly improve edge quality, reduce defects, and increase yield [11].

1.6. Effect of cutting on the structure and properties of the material. Cutting forms a 0.5–4 mm thick near-surface layer with a gradient structure: strong deformation + rapid heating → partial/complete recrystallization, grain coarsening at the edge, possible formation of martensite/bainite (especially in microalloyed and medium-carbon steels) [12,13]. This reduces edge ductility and increases the likelihood of cracks during straightening, coiling, or further processing. The negative impact is minimized by: controlled edge cooling (water showers immediately after cutting), choosing the optimal cutting temperature, and using rolling patterns with minimal deformation. Thus, flying cutting is not just a separation operation, but an important element of thermomechanical processing, influencing the geometry, surface quality, flatness, and performance properties of the final product.

1.7 Comparison of Hot Rolled Metal Cutting with Flying Shears and Cold Cutting. Hot rolled metal cutting with flying shears and cold cutting (usually guillotine, rotary, or stationary shears) differ significantly in terms of process conditions, equipment, power parameters, cut quality, and impact on the material. A structured comparison of key features is provided below (Table 1).

Table 1 - Comparison of hot cutting in flying shears and cold cutting

Parameter	Hot cutting in flying scissors (hot flying shear)	Cold cutting (cold shearing)
Metal temperature	850–1150 °C (above recrystallization temperature)	Room temperature (20–100 °C, rarely up to 200–300 °C)
Resistance to deformation	Significantly reduced (4–10 times lower than in the cold state) → the metal is ductile, soft	High → the metal is hard, elastic, and subject to hardening (work hardening)
Cutting force	Low specific force (120–450 MPa), peak loads are reduced due to the rolling mechanism	High (up to 800–1500 MPa and higher for high-strength steels), requires powerful equipment
Process speed	High (up to 10–25 m/s and more), cutting “on the fly” without stopping the mill	Low-medium, usually start-stop mode (lane stops or moves slowly)
Equipment type	Flying shears (drum, crank, planetary, pendulum) with speed synchronization	Guillotine, rotary, disc, crank stationary shears; often after machine straightening and cooling
Destruction mechanism	Predominantly rolling (roller): gradual introduction at a low angle of attack, minimal force peaks	Shear or combined: abrupt penetration, often with elements of brittle fracture in high-strength steels
Cutting edge quality	Burrs 1–5 mm (sometimes up to 10–15 mm if out of sync), crushing, possible “torn” edge, secondary scale; edge geometry is worse	High: minimal burrs (<1–2 mm), smooth edge, high precision; but cracks and chips on the VPS are possible

Cutting length accuracy	±5–20 mm (depending on synchronization and speed)	High: ±1–5 mm, easily achievable with stationary mode
Influence on the structure of the material	Localized heating + plastic deformation → recrystallization, possible martensite/bainite at the edge; affects subsequent operations	Hardening (work hardening) in the cutting zone (0.5–3 mm), increased hardness and decreased ductility; risk of hydrogen cracking in the VPS
Tool wear	Intensive: thermal fatigue, scale abrasion, oxidation → water cooling required, special steels (H13, 5Х2МНФ, etc.)	Lower abrasive and fatigue wear; standard tool steels (D2, M2, etc.)
Performance	Very high: continuous process in the hot rolling line, without stops	Medium-high: often requires lane stops or loopers
Main applications	Wide-strip, section, and beam mills; cutting of rolled products to cooling lengths, commercial lengths, end trimming	Cooling lines, cross-cutting and longitudinal cutting of rolls, sheet cutting, precision cutting of finished products
Advantages	High productivity, reduced effort, integration into continuous processes, energy savings during shutdowns	High edge quality and precision, minimal work hardening, better for thin and high-strength rolled products
Flaws	Complex synchronization, vibration, impact loads, poor edge quality, severe tool wear	High forces, limited speed, impossibility of cutting "on the fly" in a hot mill

Hot cutting in flying shears is optimized for high productivity and integration into the continuous hot rolling process . It allows for cutting metal while moving with minimal effort, but requires complex kinematics, precise synchronization, and intensive blade cooling. While the edge quality is lower, it is acceptable for intermediate operations (rolling, blanks). Cold cutting is aimed at achieving maximum quality and precision in finished products. It is simpler to implement, but requires significantly more effort and is typically performed on stationary or slowly moving material. The choice between the two is determined by the production stage: hot flying cutting is for rough cutting in the flow of a hot mill, while cold cutting is for finishing, where geometry, edge quality, and the absence of defects are critical. Modern combined lines often combine both cutting methods.

Result 2. Examples of hot cutting equipment in flying shears. Modern hot rolling lines employ various types of flying shears, differing in kinematic design, productivity, and application area (wide-strip, section, rail and beam, wire, etc.) [14; 15]. Typical designs and real-life examples from leading global manufacturers and suppliers are provided below.

Flying shears are a key component of the process line for wide-strip hot rolling mills (type 1700 and similar), enabling transverse cutting of the moving strip without interrupting the process. They are used for trimming the front and rear ends of the strip, emergency cutting, and cutting into measured lengths. The main purpose is to increase mill productivity, minimize waste, and ensure

cutting accuracy under high speeds (up to 20–25 m/s) and temperatures (900–1200 °C) [16, pp. 245–250; 17].

2.1. Drum flying shears. This is one of the most common types for hot rolling. The design includes two rotating drums (upper and lower) with radially mounted knives (one or more per drum). The drums are synchronized in speed with the strip (vn = vp , where vp is the strip speed). Shearing occurs when the knives meet [14, pp. 312–318; 18].

Advantages: Simple design and high reliability. Suitable for thick strips (up to 30–50 mm) and high temperatures. Low dynamic loads in continuous rotation mode. Figure 2 shows the electromechanical equipment layout of the drum shears at Qarmet JSC.

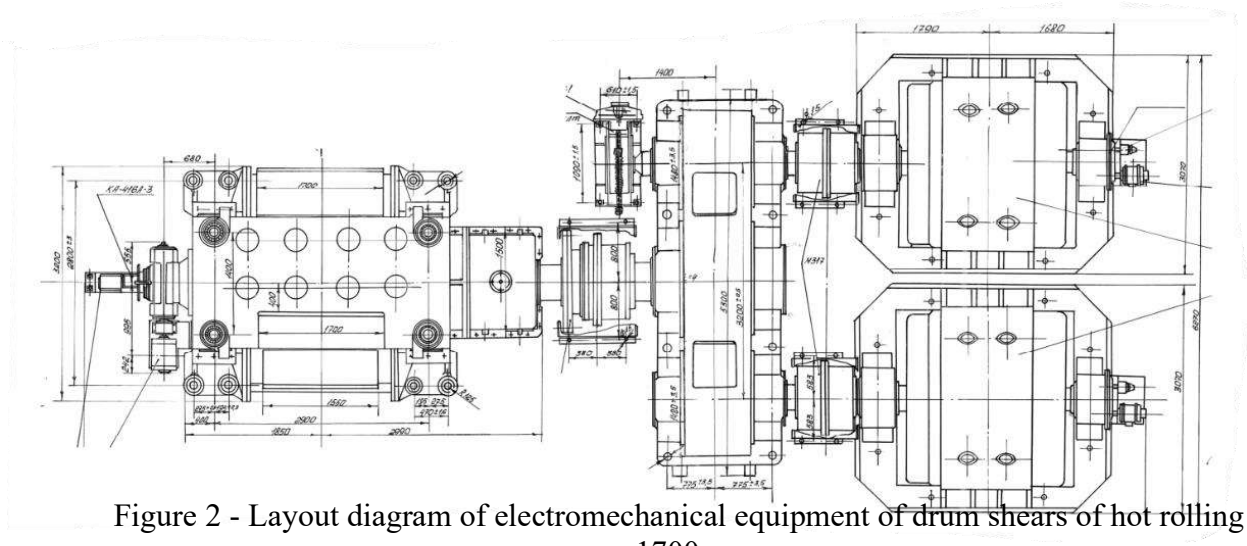

Figure 2 - Layout diagram of electromechanical equipment of drum shears of hot rolling mill 1700.

Disadvantages: Limited cutting accuracy at high speeds (>10–15 m/s) due to the curvature of the knife trajectory. Inclined cutting is possible, which requires optimization (e.g., using rotary shears with differential knife rotation speed). Application in hot rolling: often used as trimming shears before the finishing group of stands for trimming the ends of the blank. In 1700–2000 type mills (NLMK, MMK) — for transfer blanks [16, pp. 256–260;19].

2.2. Crank flying shears [20;21, pp. 120–135]. The crank-lever (or crank-connecting rod) mechanism ensures the movement of the knives along an elliptical trajectory, close to parallel at the moment of cutting. The knives move perpendicular to the strip, minimizing wear.

Advantages: High cutting precision and quality (perpendicular cut) for strips >3 mm thick. Minimizes blade wear and dynamic loads. Ideal for trimming shears in hot rolling of high-strength steels.

Disadvantages: Complex design, large dimensions and cost. Speed limitations (<5–30 m/s) due to inertia. Application: Recommended by SMS group and Primetals for transfer rolls in hot rolling mills [17; 22].

2.3. Rotary/disc flying shears. Continuously rotating disc knives (two or more pairs). The axis of the discs is synchronized with the strip speed [14, pp. 320–325; 18].

Advantages: High cutting speed (up to 10–20 m/s and higher). Suitable for thin strips and high-production lines. Continuous operation.

Disadvantages: Oblique cut, additional pressure on the strip. Less suitable for thick strips. Application: For dividing into measured lengths in wire rod mills or thin strip; in wide-strip hot rolling mills - as dividing shears [15; 23].

2.4. Pendulum flying shears. Oscillating mechanism: the frame with knives oscillates, synchronizing with the speed of the strip [14, pp. 330–335; 20].

Advantages: Adapts to variable speeds and thick stripes. Wide speed range (from low to high).

Disadvantages: High impact loads without synchronization. Difficulty handling very high speeds. Application: For heavy sections or in combination with other types.

2.5. Crank-rotary and combined. Hybrid systems combine the advantages of crank (precision) and rotary (speed). They are used for a wide range of thicknesses and speeds. Application in type 1700 mills (NLMK, MMK and similar) [21, pp. 140–150; 24].

In wide-strip hot rolling mills of the 1700–2000 type (e.g., mill 2000 at NLMK, mill 1700 at Ilyich Iron and Steel Works), drum or crank shears are most often used for trimming the ends before the finishing group of stands [16, pp. 262–268; 19]. This ensures reliable processing of thick rolled blanks at speeds of up to 15–20 m/s. Modernizations (SMS Demag / Primetals) include drum shears with differential knife rotation speed or crank-type shears for increased precision [17; 22; 25].

Result 3. Current trends in the design and control systems of flying shears represent a comprehensive combination of mechanics, kinematics, electric drives, high-performance controls, and Industry 4.0 digital technologies. While previously development focused primarily on the transition from mechanical drum and crank systems to hydraulic and early servo drives, in the last 5-10 years the emphasis has shifted to deep digitalization, intellectualization, and maximum energy efficiency, while simultaneously increasing cutting speeds (up to 100-150 m/s and higher on modern lines). Current development trends.

3.1 Modern Theoretical Approaches to Flying Shear Control. Flying shear control has evolved from mechanical synchronizers to digital systems. Key approaches: synchronization. Speeds: real-time strip speed monitoring using sensors (HMD — hot metal detectors) and knife adaptation (servo drives, Siemens T400 PLC or similar); Adaptive control: knife trajectory correction according to high-order curves, thickness, temperature and wear compensation. Prediction models are used (neural networks for flow stress and heat flux); Cutting accuracy: automatic knife gap adjustment, anti-backlash mechanisms, positioning with an accuracy of ±0.2–0.5 mm; Integration into the mill's automated process control system: full integration with Level 2 systems, including microstructure prediction and cooling optimization.

Theoretical models focus on minimizing dynamic loads and energy consumption (reduction of 18–22% due to adaptive servo drives).

Innovative solutions over the past 10 years (2015–2025). This period has seen a shift toward servo-driven and AI-based systems:

Servo-controlled and high-speed shears: Danieli HSS (high-speed shears) for speeds up to 130 m/s with automatic head/tail trimming [26].

Adaptive motion curves: quintic /high order curves for synchronization (patents [27,28].

AI and Machine Learning: Primetals Contour and Flatness (contour and flatness optimizer) with neural networks for prediction and correction [29].

Energy-efficient drives: 1/10th the power consumption compared to start-stop systems (rotary pruning shears).

Hybrid systems: combination of hydraulic/electromechanical for accuracy of ±0.2 mm (Table 2).

Table 2 – Comparative overview of four innovative solutions

No.	Solution	Manufacturer	Key Benefits	Cutting accuracy	Reducing energy consumption
1	Differential-speed rotary crop shear	Primetals	Automatic synchronization, high reliability	±0.5 mm	Up to 20%

2	HSS High-Speed Shear	Danieli	Cutting speeds up to 130 m/s, high cutting repeatability	±0.2 mm	18–22%
3	Servo-based T400 control	Siemens	Adaptive length optimization, fragmentation minimization	±0.12 mm	High (specific % not specified)
4	Eco Slide Disc (side guides integration)	Primetals	Self-cleaning guides, significantly reduced wear	Improved (not specified in mm)	Up to 25%

Table 2 presents a comparative overview of four modern innovative solutions in the field of rotary (flying) metal cutting (mainly for continuous rolling lines for hot-rolled strip and rolled products). It compares the systems by manufacturer, main advantages, achievable cutting accuracy , and level of energy consumption reduction compared to traditional shears. Conclusions for Table 2: Leader in accuracy → Siemens T400 (±0.12 mm) — the most accurate system among those presented [30]. Leader in cutting speed → Danieli HSS (up to 130 m/s) — aimed at ultra-high-speed lines. Greatest declared energy savings → Primetals Eco Slide Disc (up to 25%), although this solution relates more to the integrated side guides rather than the scissors themselves [31]. The most balanced solution → Danieli HSS [26]: Very good precision + a significant energy savings rate + extreme speed operation. Primetals offers two different technologies , each addressing a specific issue (cut synchronization/guide wear and energy savings). The table clearly highlights the advantages of modern servo-driven and differential rotary cutting systems over traditional fixed-speed mechanical shears.

Patent Developments (2015–2025) CN104950802A (2015): Thickness- and Speed-Aware Dynamic Shear Compensation. CN103157851B: Integrated Servo System for Reliability. CN102441569B: T400-Based Control for Start-Stop Scissors with Optimization. CN104570933A: High- Order Curve for Adaptive Trajectory. Others: Focus on FPGA, Self-Learning, and Hybrid Drives.

Implemented systems from leading manufacturers Siemens / Primetals: Cross-shift mills with twin roll trimming shears (Usiminas, Brazil – 29% productivity/throughput increase). Integration into Level 2 automation, ChatterBlock system for vibration suppression. Danieli : High-speed shears (HSS shear) in rod rolling mills, automation upgrade. (Huaigang) Special Steel, China — minimizing downtime/ downtime). Other: VEICHI servo systems for ±0.12 mm accuracy. [32,33] Special attention: Technologies for improving accuracy (real-time sensors, AI-based error detection), reliability (anti-backlash, self-cleaning systems) and adaptation (to variable conditions - thickness, speed, temperature) [34-36]. Integration into the overall mill control system ensures seamless/continuous operation.

Industrial Application Examples: International: Usiminas (Brazil) – Primetals trimming shears in hot strip rolling mill #2: improved cut quality, reduced waste. Midwest Plant steel Plant (USA) — 29% productivity increase after implementing intelligent control. Domestic (Russia): NLMK (Mill 2000) — modernization of drum shears for slab separation, shielding for temperature protection. MMK — integration of rotary shears with hydraulic automatic width control (HAWC) for width control. Implementations on 1700–2000 mills include a Siemens PLC for adaptive control, increasing accuracy by 10–15%. Innovations in recent years have significantly improved accuracy (up to ±0.2 mm), reliability, and integration, reducing waste by 5–10% and energy consumption.

Leading manufacturers and suppliers (examples of installations). Primetals Technologies (Japan/Germany/UK): supplies complete solutions for wide-strip hot rolling mills, including flying shears for end trimming and strip splitting (often in combination with MIDA and other technologies).

Danieli (Italy): specializes in high-speed bar and wire rod mills; flying shears are integrated into continuous rolling systems (e.g. ERT-EBROS + flying shear). SMS group (Germany): drum and crank models for heavy lines, often in modernization projects (ThyssenKrupp, ArcelorMittal, etc.). Indian manufacturers (Preet Group, Steefo Group, GMB Heavy) Industries, Kathuria Rollmill, etc.): widely supply crank / flying shears, crops & cobble Shears for TMT bars and profiles are most common in emerging markets (India, China, the Middle East). Russian/CIS suppliers often use imported components or equivalents (e.g., from Intech). GmbH, SKET — crank and pendulum models). The choice of a specific model depends on the mill type (wide-strip, section, rail and beam), rolling speed, rolled product thickness/section, and the required cutting accuracy. Modern mills (since 2010–2020) predominantly utilize combined systems with adaptive drives and integration into the process control system to minimize downtime and defects.

The development of flying shears is aimed at increasing speed, precision, and stability. Historically, the technology has evolved since the late 19th century from disk and drum designs to crank and eccentric designs, with a focus on cut quality through gap adjustment mechanisms and uniform speed. Current trends include: Automation and mechatronics: Integrating AI and machine learning for predictive maintenance, cutting optimization, and adaptation to changing rolling speeds. This is necessary for lines with speeds above 20 m/s, where manual control is impossible.

Modernization**:** Improving designs to extend service life (e.g., new blade materials), energy efficiency, and vibration reduction. In Russia and the CIS, the emphasis is on kinematic calculations and force analysis to minimize the shortcomings of existing models. Environmental friendliness: Using energy-efficient drives and materials that reduce waste, in accordance with global sustainability standards. Smart manufacturing integration: Systems with synchronous feeding and cutting, compatible with carbon steel, stainless steel, and sheet metal production lines. Future innovations include full digitalization with sensors for online adjustments. Overall, this topic remains in demand due to the industry's transition to high-tech processes, where flying shears are key to competitiveness.

Comparison of flying shears with other rolling mill cutting systems. Flying shears are the primary type of equipment for cross-cutting moving rolled products in modern continuous and high-speed rolling lines. They differ fundamentally from stationary (non-moving) cutting systems in that they perform the cut without stopping the material, synchronizing with the strip/bar speed.

Below is a comparison of flying shears with the main alternative cutting systems in rolling production (hot and cold rolling of grades, strips, blanks, TMT/ rods) (Table 3).

Table 3 – Comparison of flying shears with alternative cutting systems

Parameter	Flying scissors (Flying shears)	Stationary guillotine/ start-stop shears	Continuous action rotary (drum) shears	Hot saws (hot saws)	Disc flying scissors (a special case of flying scissors)
Cutting type	On the fly, in sync with the rolling speed	Only on stopped/slow rolling stock	Continuous, rotary, often with constant rotation	On the fly, with a circular saw	On the fly, disc knives
Max. rolling speed	Up to 120–150 m/s (modern servo + FPGA)	Typically < 10–30 m/s	Up to 40–80 m/s (depending on type)	Up to 20–40 m/s	10–40 m/s (more common for small varieties)

Cutting accuracy by length	±1–5 mm (modern ones with digital twin ±0.5–2 mm)	±5–20 mm	±5–15 mm	±10–50 mm	±5–20 mm (often bevel cut)
End quality	High (vertical or nearly vertical cut at crank / pendulum)	Very high (parallel knives)	Medium-low (sloping or uneven end in thick ones)	Medium (sawn end)	Low (oblique cut, burrs)
Application	Dividing into measured lengths, cutting head/tail, emergency cutting on high-speed lines (wire rod, bar, section, strip)	Crop & cobble, division after cooling bed, cold cutting of finished products	Crop / tail / head at low-medium speeds, emergency cut	Heads/tails of large grades(beam, channel), where rough cutting is required	Small variety, harvested, thin strips (often before cooling bed)
Advantages	Doesn't stop the line → maximum productivity (+20–40%), energy efficiency in Industry 4.0, precision, PdM	Simplicity, low cost, minimal wear, excellent end quality	Low cost, continuous operation, simple design	Reliability for large sections, no knife-to-metal contact	Very simple design, reliability, speed >10 m/s
Flaws	High complexity (servo, motion-control), high initial cost, high synchronization requirements	Stops/slows down the line → loss of productivity, low speed	Inclined/uneven cut (especially thick rolled products), limited accuracy, high forces on wide strips	Low precision, filing (waste), noise, dust, low speed	Bevel cut, worse end quality, thickness/width limitation

Energy efficiency	High (recuperation, optimized profiles)	Medium-low (frequent starts/stops)	Medium (constant rotation)	Low	Average
Cost of ownership (TCO, 5 years)	Medium-high (investment → savings on downtime)	Low-medium	Low	Average	Low
Modern trends	Dominant on high-speed lines (>80 m/s), AI tuning, digital twin, predictive maintenance	Remaining for cold cutting and crop / cobble	Used as a cheap alternative at medium speeds	Niche (large profile)	Crank / pendulum are inferior on new stations

Brief conclusions on the choice of the system (2025–2026)

• High-speed lines (wire >80–120 m/s, rod >50 m/s, thin strip): practically exclusively modern flying shears (crank-rotary, pendulum, servo-driven) using FPGA, adaptive control, and a digital twin. There are almost no viable alternatives.

• Medium and low speeds (<30–50 m/s), head/tail trimming, emergency cutting: rotary/drum shears are often chosen due to their significantly lower cost and simpler design, despite the significantly worse cutting quality.

Large sections (I-beams, channels>200–600 mm): hot saws or pendulum/pendulum-crank flying shears are used.

Cold cutting of finished products (after refrigeration): preferably stationary guillotine shears or start-stop flying shears - for maximum precision and best end quality.

Hybrid solutions : some lines combine flying shears (for dividing in the process) and stationary shears (for final cutting).

Flying shears remain the gold standard for continuous, high-productivity rolling production thanks to their ability to cut "on the fly" without reducing line speed. The transition to modern designs (especially those with servo drives and Industry 4.0 elements) ensures: a 20-40% increase in productivity ; a significant reduction in scrap; and reduced energy consumption. Therefore, these systems remain the preferred choice for new mill construction and modernization at leading equipment manufacturers (Danieli, SMS group, Primetals, etc.).

3.2 Analysis of approaches to controlling the electric drive of drum flying shears using self-learning neural network algorithms. Hot rolling is a key process in modern metallurgical production, ensuring the continuous production of high-quality steel products that meet increasing technical and economic requirements. The importance of this process is determined not only by the ability to achieve specified geometric parameters and the required mechanical properties of rolled products, but also by the increased efficiency of metal utilization in industries such as construction, automotive, and heavy engineering. With increasing rolling speeds and tighter tolerances, the requirements for reliability and precision control of individual rolling mill components are increasing.

A wide-strip hot rolling mill is a complex technical system whose operation requires the use of sophisticated automatic control systems to ensure a consistent strip thickness at the mill exit . Figure 3 shows the process flow diagram of a drum shear at Qarmet JSC.

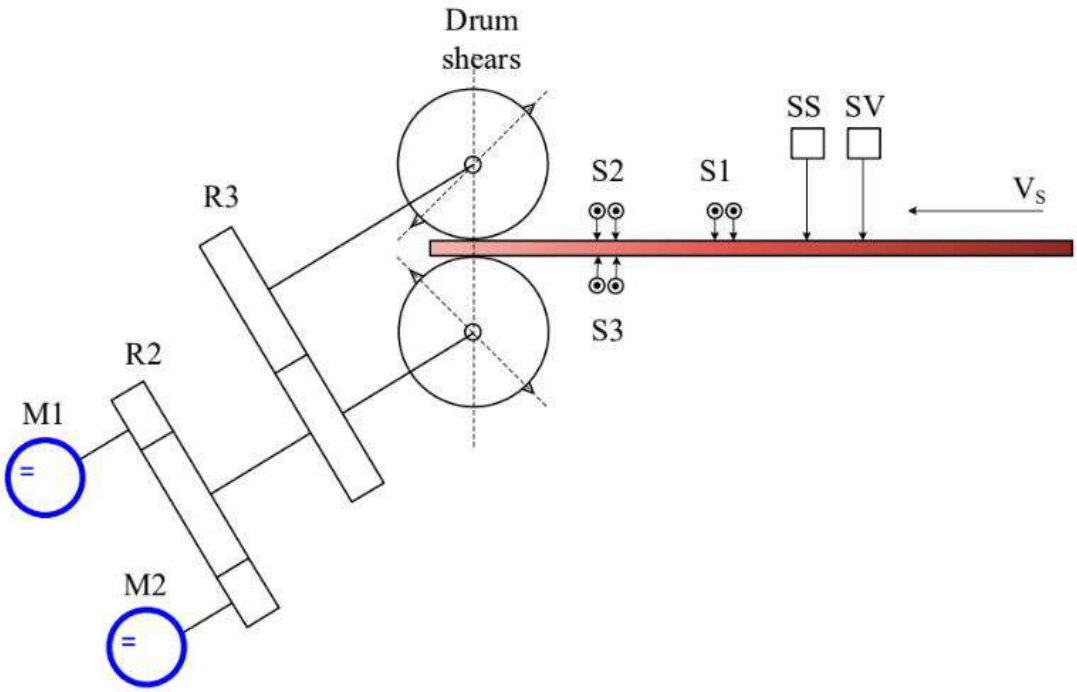

Figure 3 - Flow chart of the drum shears of the 1700 hot rolling mill: S1, S2 - existing strip presence sensors; S3 - strip presence sensor (DELTA IRIS); SS - strip presence sensor (DELTA Rota - Sonde); SV - strip speed sensor (DELTA Sails DL 4068); VS - strip speed sensor.

Drum-type flying shears play a crucial role in the rolling mill's structure, separating and cutting metal blanks during the hot rolling process. Their performance significantly determines the integrity and geometric accuracy of the finished product, ensuring uniformity and repeatability of the cut. Efficient control of the drum-type shear's electric drive helps reduces dimensional deviations and metal loss, ultimately leading to increased overall process efficiency and lower operating costs [37].

At the same time, drum-type flying shears are complex electromechanical components whose mechanical system inevitably experiences dynamic vibrations, negatively impacting cutting accuracy and rolled product quality. Improving the efficiency of this rolling mill component requires the use of modern control methods capable of accounting for nonlinearity, parameter variability, and external disturbances. One promising approach to solving this problem is the use of self-learning neural network algorithms, the effectiveness of which has already been confirmed by a number of studies in the field of electric drive control for metallurgical equipment [37].

In the article by Batyrbek A. and Voronin S. [37,38], the practical implementation of the Industrial Internet of Things (IIoT) concept for monitoring the technical condition of electromechanical equipment was considered using the example of a 5000 sheet rolling mill. The main problem addressed in the study was the significant (up to three times) difference in loads between the motors of the upper and lower rolls, which causes overheating of the more heavily loaded motor, which reduces the service life of the insulation and leads to premature failures. The authors proposed an approach based on the development of object-oriented digital twins – condition monitors created using open-source software.

In a study by Ke , L. et al. [39], a comprehensive analysis of the 40Mn steel strip cutting process using a flying shear was presented. The authors conducted a kinematic study of the flying shear mechanism and created a plane-strain FEM model using the Johnson-Cook constitutive model.

The article by A.S. Maklakov et al. [40] examines modern achievements in the field of network connection schemes for regenerative AC electric drives (RED) for rolling mills, which play a key role in metallurgical production due to their reliability, efficiency and high power.

The article by Ng [41] presents a practical application of direct torque control (DTC) technology to modernize a flying shear system at a metallurgical plant. The study was motivated by frequent failures of the existing system, which resulted in unplanned production downtime.

In the article by Solomon M.-G. and Gaiceanu , M. [42] the problem of energy consumption optimization of a flying shear system for high-efficiency transverse metal strip cutting lines was investigated. The main attention was paid to the complex dynamic operating mode of an asynchronous motor with vector control.

A study by Schenke, M. et al. [43] developed a new method for permanent magnet synchronous motor (PMSM) torque control using reinforcement learning (RL), which addresses the key problem of safely online learning the controller on a real drive without the need for prior knowledge of the plant model.

Thus, the completed review of modern scientific literature confirms the feasibility of using ANNs to control complex electromechanical systems.

Discussion. Hot flying shears continue to play a decisive role in the efficiency of rolling mills, influencing yield, energy consumption, and operating costs. The choice of shear type is determined by a compromise between productivity, cut quality, and long-term costs. Low scrap is achieved with servo-driven systems with AI/ML optimization (Q-CROP Danieli, Crop Shear Assistant Primetals) [44,45]. Energy costs are reduced by 30–45% when switching to servo drives with recuperation [46,47]. The service life of knives is increased by 2–3 times thanks to HSS powder, carbide coatings and automatic gap adjustment [48]. The trend for 2025–2026 is a shift towards servo and hybrid systems with digitalization, despite higher initial investments [49,51].

Numerical examples of calculating the economic effect for 5 years. Let us consider the modernization of the ShSGP with a capacity of 1 million tons/year (comparison of traditional drum shears with servo-driven /hybrid with AI). Assumptions: steel price - 500 USD/t; energy - 0.1 USD/ kW h; set of knives - 50,000 USD; downtime - 10,000 USD/h (2 hours per shift); resharpenings per year: 50 → 20. Cost of modernization - 2 million USD [52]. Savings from waste reduction (2.0% → 0.8%): 6,000,000 USD/year. Energy savings (3.0 → 1.5 kW h /t): 150,000 USD/year. Savings on knives: 1,500,000 USD/year. Savings from reduced downtime: USD 600,000/year. Total annual savings : USD 8,250,000. Over 5 years: USD 41,250,000. ROI over 5 years : 1962.5%. Payback period: ~3 months. Calculations confirm a quick payback of the modernization, especially at large mills [52,53]. In reality, deviations of ±20–30% depend on the type of steel and regional prices. Prospects: reduction of waste <0.5% and energy costs <1 kW h /t is possible with integration into endless rolling and full AI control [53]. Under conditions of increased scale and temperature fluctuations, performance may deteriorate by 20–40% [54]. The proposed neural network-based control architecture does not change the order of astaticity in the speed and current control loops. At the same time, it is known that fractional-order integral-differential controllers can not only increase the order of astaticity, but also simultaneously improve a number of other dynamic performance indicators of the control system.

Conclusions. A comprehensive review of flying shears as a key element of hot rolling is provided, highlighting the transition from traditional designs to intelligent systems. Key findings:

1. Technological role and features: Flying shears provide continuous cutting at high speeds (up to 150 m/s) and temperatures (850–1150°C), minimizing waste and energy consumption. Hot cutting outperforms cold cutting in productivity, but has inferior edge quality (burr 1–5 mm vs. <1–2 mm). Key types (drum, crank) are optimized for different applications, with a focus on synchronization to reduce stress.

2. Current Trends: The evolution to Industry 4.0 includes servo drives, AI (neural networks for controllers), digital twins, and predictive maintenance. Innovations (e.g., Danieli HSS, Primetals

AI optimizers) reduce energy consumption by 15–35%, waste by 5–10%, and downtime by 40–70%. Neural network PI controllers reduce speed fluctuations by a factor of 4 and transients to 0.1 s.

3. Practical significance: The upgrade pays for itself in 3 months (ROI >1900% over 5 years at 1 million tons/year), increasing accuracy (±0.2–0.5 mm) and equipment service life. The proposed approach (self-learning neural controllers with gradient descent) fills a gap in the literature, focusing on DC electric drives.

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PERSONALIZATION OF MANAGERIAL IMPORTANCE AS A FACTOR IN THE DEGRADATION OF PROCESS MANAGEMENT AT THE ENTERPRISE

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Abstract: *This article analyzes the phenomenon of personalization of managerial importance as a systemic cause of the degradation of process management at the enterprise. Despite the formal implementation of process approaches, regulations, and digital tools, in real practice, individual control and the status logic of managers prevail. Processes lose their subjectivity, becoming dependent on personal decisions and informal agreements. Particular attention is paid to the role of individual KPIs, which, in the absence of process consistency, increase fragmentation, local optimization, and conflicts between departments. The dominance of personalized management leads to the illusion of controllability, reduced organizational resilience, increased risks, and strong dependence on specific managers. As an alternative,* ***a process-architectural management model is substantiated****, in which the process becomes the bearer of real responsibility and authority, and the role of the manager is transformed into that of the system architect. The key conditions for the transition to such a model and the main management risks are described.*

Key words*: process management, personalization of management, institutional barriers, KPI, organizational sustainability, process-architectural model.*

With the growing complexity of production and organizational systems, enterprise management is increasingly faced with the need to ensure the sustainability, consistency, and reproducibility of management decisions. Modern enterprises operate in an environment of high uncertainty, accelerated technological change, and increasingly complex efficiency requirements, which objectively increases the importance of process-based and systems-based approaches to management. In this logic, the process is viewed as the basic unit of management, ensuring the continuity of operations and the integration of individual functions into a unified management whole [1,2].

Despite the widespread adoption of process management concepts, quality management systems, and digital control tools, actual management practices in many organizations demonstrate a persistent discrepancy between formally established principles and the actual nature of management decisions. Management continues to be implemented primarily within the logic of personalized control, in which the key role is assigned to the individual importance of managers, and processes are secondary and dependent elements of the management system [3,4].

This contradiction manifests itself in a shift in management focus from process sustainability to individual performance indicators, status positions, and the spheres of influence of management actors. As a result, processes lose their independence as an object of management, and their functioning becomes dependent on personal decisions and informal management practices. This problem is particularly acute in large and hierarchically organized enterprises, where a high degree of formalization is combined with limited process agency.

In traditional enterprise management models, a key role was assigned to the figure of the manager as the bearer of authority, responsibility, and management decisions. Historically, management developed in a relatively stable external environment and limited complexity of production systems, which allowed for the concentration of control and decision-making at the level of individual management positions. In this logic, managerial effectiveness was directly linked to the personal competence and authority of the manager, and processes were viewed as derivatives of management influence [1,2].

With the development of organizational systems and the increasing complexity of production chains, this management model persists primarily at the level of managerial thinking, despite the formal implementation of process-based and systems-based approaches. The personalization of managerial importance in modern organizations manifests itself in a shift in managerial focus from ensuring process stability to maintaining individual zones of control and influence. Managerial importance in this context acts not only as a functional necessity but also as an institutionally enshrined resource, providing access to authority, information, and managerial capital [3,4].

One of the factors contributing to the increased personalization of management is the hierarchical structure of organizational authority, within which responsibility for results is formally delegated to the level of department heads, while processes remain fragmented across functional boundaries. Under such conditions, a process lacks its own subjectivity and is not viewed as an autonomous object of management. Its functioning depends on the decisions and priorities of specific management actors, which increases the personal dependence of the management system [5,6].

An additional mechanism for personalizing managerial significance is individual performance assessment systems, particularly KPIs, focused on measuring the performance of individual managers and departments. In the absence of alignment of metrics across end-to-end processes, such systems encourage localized optimization and increase competition between management units. Managerial significance is then measured not by its contribution to system stability, but by the degree of achievement of individual metrics, cementing personalization as the dominant management logic.

The consequence of this approach is the creation of a management environment in which the importance of the leader becomes more important than the repeatability of management decisions. Processes lose priority, as their effectiveness is difficult to directly link to individual management assessments. As a result, management becomes fragmented, and coordination between departments is achieved primarily through informal agreements and ad hoc decisions.

The personalization of managerial significance is not an individual managerial deviation, but a systemic phenomenon conditioned by the institutional configuration of enterprise management. Understanding this phenomenon is a prerequisite for analyzing the limitations of process management and developing models for transforming management systems aimed at reducing personal dependence and increasing process sustainability [7].

In management theory, a process is viewed as a stable sequence of interconnected actions aimed at creating value and achieving results that extend beyond individual functions and departments. The process approach assumes that the process, rather than the position or department, should serve as the basic unit of management. However, in the practical activities of enterprises, this logic is implemented fragmentarily and is often declarative in nature [7-9].

One of the key limitations of process management is the lack of real managerial status for processes. In many organizations, processes are formally described, visualized, and included in regulations, but lack institutional agency. They are not vested with authority, are not protected from arbitrary management interventions, and lack mechanisms for influencing decisions made within functional hierarchies. As a result, a process exists as a management artifact, but not as a fully-fledged management object [10].

A significant barrier is the functional logic of the management organization, where responsibility and resources are rigidly assigned to departments and their managers. Processes that cross multiple functions are "split" between different decision-making centers. No single participant bears full responsibility for the outcome of the process as a whole, leading to a blurring of

responsibility and decreased controllability. In such a configuration, the process inevitably gives way to functional priorities and local interests [1,2].

An additional limitation stems from the formal appointment of process owners without providing them with real management tools. The process owner is often responsible for metrics and results, but lacks the authority to change regulations, reallocate resources, or adjust the decisions of functional managers. This creates a structural gap between responsibility and authority, whereby the process is formally managed but in reality remains dependent on personal decisions and informal agreements.

The nature of management evaluation is also a significant institutional barrier. Process effectiveness is difficult to reduce to simple and clear indicators, especially in the short term. Unlike individual or functional KPIs, the results of process management emerge gradually and require systemic analysis. With a focus on quick and demonstrable management results, processes become a less attractive target for attention and investment.

As a result, process-based management logic is embedded in a system that is inherently oriented toward personalized control and functional dominance. Processes are forced to adapt to existing management practices rather than shape them. This leads to any failures or deviations in the process being compensated for by manual control, further reinforcing the system's human dependence and reducing its resilience.

The limitations of process management are not methodological but institutional. A process fails to become a fully-fledged object of management not because of a lack of tools or methodologies, but because of a management architecture that prioritizes personal and functional significance. Overcoming these barriers requires reconsidering the very logic of enterprise management and moving from a formal description of processes to their actual institutional consolidation [7,11].

One of the most persistent contradictions in enterprise management systems is the gap between formally assigned responsibility and actual managerial authority. Within modern organizational structures, responsibility for performance is increasingly being declared at the level of department heads and process owners, while key decision-making and resource allocation remain concentrated in other centers of management authority. This gap creates a unique management configuration in which responsibility exists primarily as a formal attribute, unsupported by any real influence on the conditions for achieving results [12].

In the context of process management, this contradiction becomes systemic. Process owners are formally responsible for indicators and results, but lack the authority to intervene in the decisions of functional managers, adjust department priorities, or redistribute resources among process participants. As a result, process management is reduced to a coordination and reporting function, while actual management is exercised through personal management decisions made outside the process logic.

The structural gap between responsibility and authority directly influences managerial behavior. In a context where results are measured but the means to achieve them are beyond control, management actors are forced to shift their focus from process development to protecting their own managerial positions. A rational desire arises to compensate for the lack of formal authority through informal influence, status resources, and personal agreements. Thus, the personalization of management is reinforced not as a personal strategy, but as an adaptation to the institutional constraints of the system.

The long-term consequence of this gap is a decrease in the repeatability of management decisions. Processes cease to function as stable mechanisms and increasingly depend on individual management interventions. System control is maintained through manual oversight, which creates the illusion of short-term efficiency but increases the company's vulnerability to personnel changes and non-standard situations.

Furthermore, the structural gap between responsibility and authority undermines trust in process-based and regulatory governance mechanisms. Formally established procedures are perceived as auxiliary or secondary, while actual decisions are made outside their framework. This

creates a management culture in which regulations are viewed not as binding rules, but as guidelines to be interpreted depending on the management context.

The misalignment between responsibility and managerial authority is one of the key institutional factors hindering the development of process-based management as a sustainable management model. Overcoming this contradiction requires not a redistribution of individual functions, but a revision of the management architecture, within which responsibility for the process must be inextricably linked to actual authority and resources. Without addressing this structural gap, any attempts to formally implement process-based management are doomed to reproduce a personalized management logic [3,4].

In practical enterprise operations, personalized management often results in management decisions being made in a fragmented and poorly coordinated manner. Each manager operates within their own area of responsibility and focuses primarily on the objectives and performance of their department. The overall logic of the enterprise's operations and end-to-end processes are thus neglected.

Fragmentation of management decisions manifests itself in the fact that the same processes are managed by several managers simultaneously, but no one is fully responsible for the outcome. Decisions are made locally and, as a rule, based on short-term interests. As a result, actions that seem justified at the level of a single department can create additional problems for other parts of the process or for the enterprise as a whole [7,13].

A significant factor in fragmentation is the focus on individual performance indicators. Managers focus on achieving their own KPIs, as these are used to evaluate management performance. This encourages localized optimization and reduces incentives for collaborative work on processes that extend beyond the boundaries of a single department. Processes that require the coordinated efforts of multiple participants often remain without adequate management attention.

The lack of stable decision-making mechanisms creates additional complexity. In a context of weak process management, interactions between departments are based primarily on informal agreements and personal contacts between managers. This makes management decisions dependent on ongoing relationships and reduces their predictability and stability.

Over the long term, the fragmentation of management decisions leads to increased management workload and decreased transparency. Managers are forced to constantly deal with the consequences of uncoordinated actions instead of systematically managing processes. The company begins to operate in a constant "firefighting" mode, which reduces resilience and limits opportunities for development.

The fragmentation of management decisions is a direct consequence of the personalized management model. As long as management is built around individual leaders rather than processes, the enterprise faces management gaps, loss of integrity, and decreased decision-making effectiveness [3].

One of the key consequences of personalized management is local optimization, whereby each department and each manager strives to improve their own performance indicators without considering the impact of these actions on the company as a whole. This situation arises when the management performance evaluation system is built around individual or functional KPIs that are not interconnected through end-to-end processes.

In practice, this manifests itself as follows: a manager makes decisions that enable him to meet or exceed his department's performance targets, but these decisions may create additional burdens, delays, or costs in related areas [5,6]. Since negative consequences are not directly reflected in his evaluation system, they remain outside the scope of management attention. As a result, the company faces a situation in which most performance targets are formally met, but the overall efficiency of processes does not improve.

Conflicting performance indicators becomes especially noticeable in processes that require coordinated action across multiple departments. Each process participant focuses on their own metrics and strives to minimize risks, even if this leads to a deterioration in the process's final outcome.

Instead of jointly achieving a common result, competition for indicators, resources, and management recognition develops [7].

An additional problem is created by a focus on short-term results. Individual KPIs are typically assessed within a reporting period and poorly reflect the long-term impact of management decisions. This encourages decisions that provide quick results but do not contribute to process sustainability. Process improvement, which requires time and coordination, is less attractive from a management evaluation perspective.

In the context of local optimization, management increasingly becomes a balancing act between indicators rather than a systemic process development. Managers are forced to defend their metrics and explain deviations, rather than collaboratively analyze the causes of problems and resolve them at the process level. This increases the fragmentation of the management system and reduces trust between departments.

Localized optimization and conflicting performance indicators are a logical consequence of a personalized management model. As long as indicators are focused on individual management units rather than the results of end-to-end processes, the enterprise will continue to reproduce a situation of formal efficiency without any real improvement in manageability and sustainability.

In an environment of personalized management and fragmented processes, digital tools are increasingly used as a means of enhancing control rather than as a mechanism for real management. The implementation of information systems, dashboards, and real-time reporting creates a sense of high enterprise control, but this perception doesn't always correspond to the actual state of processes.

The illusion of controllability arises when digital indicators capture individual results and events but do not reflect the holistic logic of the process. Managers have access to large volumes of data, but this data is structured by functional or individual indicators and does not reveal how the decisions of one department affect the work of others. As a result, management focuses on controlling the numbers rather than understanding the causes of deviations.

In such conditions, digital tools often enhance the personalization of management. Each manager uses data to validate their own effectiveness and justify their decisions. Process analysis is replaced by reporting, and management's focus shifts to interpreting indicators to their own advantage. The process, meanwhile, remains a secondary concern, as its status doesn't fit into simple, visual metrics.

An additional effect of digital control is the increase in manual management interventions. Identified deviations are compensated for by operational decisions aimed at adjusting indicators rather than eliminating the causes of failures. This increases the dependence of processes on the personal involvement of managers and perpetuates the practice of manual management as the norm.

Over the long term, the illusion of control leads to the accumulation of hidden problems. Formally, the enterprise appears manageable and stable, but the actual processes remain fragile and vulnerable. Any changes in management or the external environment quickly reveal the absence of systemic management mechanisms that could function independently of personal control [11].

Digital control tools implemented without changing the management logic don't eliminate the problems of personalized management, but merely mask them. Real enterprise manageability is achieved not by increasing the volume of data and reporting, but by building a process architecture in which digital solutions serve as a support tool, not a replacement for systemic management, (Table 1).

Table 1 - Manifestations and consequences of personalized management in enterprise practice

Manifestation	What does this look like in practice?	Management implications

Fragmentation of management decisions	Decisions are made at the level of individual managers and departments without taking into account end-to-end processes	Loss of control integrity, uncoordinated actions
Lack of a single center of responsibility	Several departments are responsible for the process, but no one is responsible for the overall result.	Blurring of responsibility, growing conflicts
Local optimization	Units improve their performance at the expense of deterioration of adjacent areas	Formal efficiency without systemic results
Conflict of performance indicators	KPIs of departments contradict each other and the goals of the process	Competition instead of cooperation
Focus on short-term results	Decisions are made to achieve performance indicators	Decreased process stability
Manual control	Constant targeted interventions of managers in processes	Personalized management
Informalization of management	Key issues are resolved through personal agreements	Low transparency and predictability
The illusion of control	Having reports, dashboards , and metrics without understanding the root cause of problems	Substitution of control management
Increased management workload	The leaders are busy coordinating and putting out fires.	Decreasing strategic focus
Decreased enterprise sustainability	The system reacts poorly to changes and personnel changes	Increased management risks

The transition to a process-architecture management model is impossible without reconsidering the role of the manager in the enterprise's management system. In the traditional personalized model, the manager is the primary bearer of management control and the key decision-maker. Management effectiveness is directly linked to their personal involvement, commitment, and ability to promptly intervene in processes. However, as organizational systems become more complex, this role becomes a source of management overload and reduces the enterprise's resilience [2, 7].

In the process-architecture model, management is built around processes rather than individual management figures. The manager's role in this logic shifts from constant operational intervention to designing and maintaining the management architecture. The manager's primary task becomes creating conditions under which processes can function stably and predictably without the need for constant manual oversight.

The changing role of management involves a shift from individual control to systems thinking. Managers are responsible not for the execution of individual operations or the achievement of local indicators, but for the coordination of processes, the distribution of responsibility, and the elimination of structural barriers that impede process interaction. Moreover, managerial significance is determined not by the degree of personal indispensability, but by the quality of the established management system [8,9].

An important aspect of the transformation is the abandonment of the practice of constant "firefighting" management. In the process-architecture model, deviations and failures are viewed not as a reason to tighten personal control, but as a signal of process imperfections. The manager's task is to analyze the causes and make changes to the management architecture, rather than to compensate for problems through personal intervention.

The changing role of management requires a rethinking of approaches to managerial responsibility. Managerial accountability shifts from individual results to ensuring the sustainability and repeatability of management decisions. This requires a willingness to delegate authority to processes and their owners, as well as the acceptance that an effective management system can operate independently of the constant presence of a specific manager.

Transforming the leadership role is key to the transition to a process-architecture management model. As long as managerial importance is determined by personal control and operational intervention, processes cannot become an independent foundation for management. Forming a new management role reduces personal dependence , increases enterprise sustainability, and creates conditions for long-term development.

A key element of the process-architecture management model is a rethinking of the role of process in the enterprise management system. In this model, process is viewed not as an auxiliary tool or an object of regulation, but as a fully-fledged bearer of responsibility and management authority. This means that the process, not the position or department, becomes the primary unit of management and performance evaluation.

In practice, this requires clearly assigned responsibility for the process as a whole, including all its stages and participants. The process owner should be accountable not for individual indicators, but for the end result of the process and its sustainability over time. Furthermore, this responsibility must be supported by real authority to influence regulations, resources, and management decisions affecting the process. Without such alignment, process responsibility remains formal and has no impact on management practices [7-9].

Delegating authority to processes helps reduce management fragmentation and bridge the gap between functional units. The process begins to perform an integrating function, linking the actions of various participants into a single, manageable chain. In this configuration, decisions are made with consideration of their impact on the entire process, rather than on a specific section, which improves the consistency of management actions and reduces conflicts between units.

A key condition for the functioning of a process as a responsibility bearer is its institutional protection. The process must be protected from arbitrary changes and ad hoc management interventions that disrupt its logic. This requires the presence of transparent rules for process changes, formalized escalation and approval mechanisms, and clearly defined boundaries for management intervention. Otherwise, the process quickly loses its independence and again becomes dependent on personalized control.

The transition to process-based accountability requires a change in management culture. Managers and process participants must perceive the process not as an external constraint, but as a shared mechanism for achieving results. This requires a shift in management focus from monitoring individual actions to analyzing the causes of deviations and collaboratively seeking solutions at the process level. In this model, responsibility is distributed among roles, but the outcome remains shared.

Empowering processes with responsibility and authority is a key condition for developing a sustainable management system. A process with genuine managerial agency reduces the enterprise's dependence on individual management decisions and creates the basis for repeatable and predictable management. Without this transition, any attempts to implement process management remain formal and do not lead to structural changes in management practices [10].

The transition to a process-architecture management model requires a reconsideration of the performance metrics system and the role of digital tools in management practices. In a personalized management model, metrics are typically focused on assessing the performance of individual managers and departments. This measurement logic reinforces local optimization and perpetuates the

fragmentation of management decisions. In a process-based model, metrics should reflect the status and results of end-to-end processes, not individual management activity.

Restructuring the performance indicator system involves shifting the emphasis from individual and functional KPIs to process metrics. Key indicators become those characterizing process stability, reproducibility, the quality of the result, and the coordination of participants' actions. Such indicators allow us to evaluate not only the final result but also the sustainability of the management system as a whole. Individual indicators do not disappear completely, but begin to play a supporting role in relation to process goals [5,6].

A key element of the new measurement system is the alignment of metrics among process participants. Process metrics should be shared by all key stakeholders and establish a unified understanding of the outcome. This reduces conflicts of interest and encourages collaborative efforts to improve the process rather than competition for metrics. Management assessments shift from individual achievements to contributions to the overall result.

Digital tools in the process-architecture management model no longer serve a purely control function. Their primary purpose is to support decision-making based on process analysis, identifying the causes of deviations, and assessing the consequences of management decisions. Digital systems should be focused on visualizing end-to-end processes rather than demonstrating individual indicators out of context [13,14].

Furthermore, digital tools should support feedback mechanisms and continuous process improvement. This requires the ability to analyze data dynamically, identify bottlenecks, and evaluate the effectiveness of changes. In this configuration, digitalization enhances process management rather than replacing it with formal reporting.

Restructuring the system of metrics and digital tools is a prerequisite for a sustainable transition to a process-architecture management model. As long as metrics and digital solutions are focused on personalized control, they will reproduce existing management distortions. Creating a process-oriented measurement and decision support system helps reduce management fragmentation, increase process transparency, and create the foundation for long-term enterprise sustainability, (Table 2).

Table 2 - Key elements of the process-architectural model of enterprise management

Model element	Content	Management significance
The role of the leader	The manager is not the main source of decisions, but the architect of the management system	Reducing personal dependence of management, increasing sustainability
Focus of control	Management is built around end-to-end processes rather than positions and departments	Improving the consistency of management decisions
Process status	The process is considered as the basic unit of management	Elimination of fragmentation and functional gaps
Responsibility for the result	It is assigned to the process as a whole, not to individual participants	Formation of shared responsibility for the final result
Powers of the process owner	The right to influence regulations, resources and management decisions within the process	Alignment of responsibility and managerial authority
Decision-making mechanism	Decisions are made taking into account the impact on the entire process	Reducing local optimization

Scorecard	Prioritize process indicators over individual KPIs	Coordination of interests of participants in the process
The nature of management control	Control is built into the process and is aimed at identifying the causes of deviations	Reducing manual control
Expected result	Reproducibility of solutions and stability of processes	Improving the manageability and predictability of activities

In today's environment, enterprise resilience is increasingly determined not by the speed of management response or the number of management decisions, but by the ability of core processes to operate stably under changing external and internal conditions. Process resilience means that the enterprise continues to perform its key functions even in the face of increased workload, personnel changes, or the emergence of non-standard situations. At the same time, the quality of results and predictability of processes are maintained without the need for constant manual intervention.

In a personalized management model, sustainability is typically achieved through high levels of managerial involvement. The manager constantly monitors the process, promptly intervenes in deviations, and compensates for system weaknesses with personal decisions. At first glance, this model appears effective, as it allows for a quick response to problems. However, in reality, sustainability in this case is ensured not by the system, but by specific individuals, making management dependent on their presence, experience, and current workload.

The process-architecture management model forms a different approach to sustainability. The primary focus is not on strengthening control, but on the quality of the processes built. A sustainable process has a clear logic, a clear distribution of roles, transparent decision-making rules, and self-correction mechanisms. If a failure occurs in such a process, it does not require immediate manual intervention by the manager, but rather triggers the prescribed analysis and correction procedures.

Process stability is also linked to the reproducibility of management decisions. This means that identical management situations lead to comparable decisions and results, regardless of who currently occupies the management position. This approach reduces the company's dependence on individual management figures and increases management reliability over the long term.

An important aspect of process resilience is the ability of processes to adapt to change. A resilient process is not a rigidly defined process but rather allows for change while maintaining its overall logic and purpose. This allows the company to respond to changes in the external environment without disrupting its internal management structure.

Process sustainability can be considered a key performance indicator of enterprise management. It reflects the maturity of the management system and demonstrates the extent to which management relies on processes rather than individual intervention. Enterprises focused on process sustainability demonstrate greater manageability, lower vulnerability to change, and better conditions for sustainable development [7-9,11].

The transition from a personalized management model to a process-architecture model is inevitably accompanied by management risks. These risks are associated not so much with the processes themselves, but with changes in established management roles, habits, and expectations. Ignoring these risks often leads to the formal implementation of a process-based approach without any real changes in management practices [3,12].

One of the most significant risks is resistance from managers. In a personalized model, management is built around personal control and individual significance, so the redistribution of authority in favor of processes can be perceived as a threat to managerial status. Managers begin to formally support process management, while maintaining their traditional methods of decision-making and influencing processes through informal channels.

Another significant risk is the formalization of processes without changing the underlying management logic. In such cases, processes are described, owners are assigned, and metrics are introduced, but actual decisions continue to be made manually. The process becomes an additional layer of reporting that has no impact on management decisions. This leads to increased bureaucratic burden and decreased employee trust in the process-based approach.

The gap between responsibility and authority during the transition phase also poses a serious threat. If process owners are given responsibility for results but not empowered with real tools to influence them, they find themselves in a vulnerable position. The process model then reproduces the same management problems, but in a more complex form, which increases management fragmentation.

An additional risk is associated with attempting a sudden and simultaneous transition to a new management model. A process-architecture model requires time to establish new management practices and shift management thinking. Rapid implementation without gradual adaptation can lead to management disorganization and reduced operational efficiency in the short term.

The management risks of transitioning to a process-architecture model are systemic and related to human factors, management culture, and the enterprise's institutional environment. These risks can only be mitigated through a conscious and phased approach to management transformation, in which process changes are accompanied by changes in roles, responsibilities, and the management evaluation system.

Sustainable implementation of a process-architecture management model is impossible without creating specific organizational conditions. Experience shows that formally describing processes and implementing new regulations is insufficient. If the management system and management culture remain unchanged, the process approach quickly loses its significance and becomes a formality.

The first and most crucial requirement is top-level management support. The process-architecture model affects the distribution of authority and responsibility, so without a clear position from senior management, it cannot be consistently implemented. Support should be expressed not through declarations, but through tangible management decisions that prioritize the process over the interests of individual departments and managers.

The second important condition is the effective delegation of authority to processes. Appointing process owners only makes sense if they have the authority to influence operating rules, approve changes, and initiate corrective actions. Without such authority, the process remains dependent on individual decisions and cannot perform an integrative management function.

The third condition is aligning the performance assessment system with the process-based management logic. As long as performance indicators focus solely on individual or functional results, the process-based architectural model will encounter resistance and distortions. Process indicators must become part of the management assessment and be used in key decision-making.

An equally important requirement is a phased implementation. A process-architecture model requires changes in management habits and interactions between departments. Gradual implementation allows for identifying weaknesses, adjusting approaches, and mitigating the risk of management disruption. This approach fosters trust in the process logic and its adoption in practice.

Finally, the sustainability of the process model is directly linked to management culture. Processes begin to function effectively when participants perceive them not as a formal requirement, but as a shared mechanism for achieving results. This presupposes a willingness to jointly analyze problems, a rejection of personal blame, and a focus on process improvement rather than demonstrating individual significance [7,13,10].

Sustainable implementation of a process-architecture management model requires simultaneous changes to the management architecture, evaluation system, and management culture. Only when these conditions are met can processes become the true foundation of enterprise management, ensuring its sustainability, consistency, and long-term development.

(table 3).

Table 3- Process-architectural management model: sustainability, risks and implementation conditions

Analytical aspect	Content	Management sense
Process stability	The ability of processes to maintain stability, predictability and quality of results when conditions, composition of participants and management influences change	Sustainability is achieved through process quality, not through constant manual control.
The Source of Resilience in a Personalized Model	Personal involvement of managers, prompt intervention, manual control	High dependence on specific management figures, low reproducibility
Source of stability in the process model	Clear process architecture, role distribution, built-in adjustment mechanisms	Reducing personal dependence and increasing control reliability
Key management risks of the transition	Resistance from managers, formalization of processes without changes in practice, gap between responsibility and authority	The risk of imitation of process management and the growth of managerial bureaucracy
Risk of formal implementation	The processes are described, the owners are appointed, but decisions are made according to the old logic	Discrediting the process approach and loss of staff trust
Risk of mismatch between responsibility and authority	Process owners are responsible for the outcome, but cannot influence resources and decisions.	Reproduction of previous management distortions
Management support condition	Priority of processes over functional and personal interests at the senior management level	The process becomes a real object of control
Condition for restructuring the system of indicators	Process metrics become part of management assessment	Reducing local optimization and KPI conflicts
Condition for phased implementation	Gradual change in management practices and roles	Reducing the risks of management disruption
Condition of management culture	Focus on analyzing causes, joint problem solving, and avoiding personal searches for the guilty	The processes begin to operate reliably and reproducibly.

The study revealed that one of the key problems in modern enterprise management is the dominance of personalized management significance over process-based management logic. Despite the formal implementation of a process-based approach, metrics, and digital tools, the actual management practices in many organizations continue to be built around individual control, local interests, and the personal responsibility of managers. As a result, processes lose their status as the basic unit of management and become dependent on personal decisions and informal management agreements.

The study found that the personalization of management is systemic and is driven by institutional characteristics of management organization: a hierarchical power structure, functional fragmentation, individualized KPIs, and a gap between responsibility and actual management authority. These factors create a management environment in which local optimization and the demonstration of managerial activity are more significant than the sustainability and reproducibility of processes.

An analysis of the practical manifestations of personalized management revealed its key consequences: the fragmentation of management decisions, conflicting performance indicators, and the creation of an illusion of control through digital control tools. These phenomena reduce management transparency, increase the company's dependence on individual management figures, and increase the system's vulnerability to change and uncertainty.

As an alternative, the article substantiates a process-architecture management model, within which the process is viewed as the bearer of responsibility and authority, and the manager's role is transformed from that of a personal controller to that of an architect of the management system. It is shown that management stability in this model is achieved through the reproducibility of management decisions, the coordination of participants' actions, and the institutionalization of processes, rather than through increased manual control.

Particular attention is paid to the conditions for the sustainable implementation of the process-architecture model. It has been established that its implementation is only possible with simultaneous changes to the management architecture, performance measurement system, and management culture. A formal transfer of process tools without changing the management logic leads to the reproduction of previous distortions and reduces confidence in the process-based approach.

The findings allow us to conclude that the long-term manageability and sustainability of an enterprise in today's environment are determined not by the strength of personal control, but by the quality of the established process architecture. The transition to a process-architecture management model is not a technical but a managerial transformation, requiring a reconsideration of the role of the manager, a redistribution of responsibilities, and a change in management thinking. Implementing this approach creates the foundation for reducing the dependence of management on individuals, increasing the sustainability of processes, and ensuring the long-term development of the enterprise.

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МИГРАЦИЯ ЖАНА АНЫН УЛУТТУК ӨНҮГҮҮГӨ ТИЙГИЗГЕН ТАРЫХЫЙ ТААСИРИ

КАРИМОВА КАНЫШАЙ АБДИЛАЖАНОВНА
Кыргызстан Республикасы, Ош шаары
Ош мамлекеттик университетинин курулуш колледжи

Аннотация. *Бул макалада миграциянын Кыргызстандагы улуттук өнүгүүгө тийгизген тарыхый, социалдык жана экономикалык таасири комплекстүү талдоого алынган. Байыркы көчмөн маданияттагы сезондук көчүүлөрдөн тартып, падышачылык Россиянын колониялык саясаты, совет мезгилиндеги индустриализация жана эгемендүүлүктөн кийинки тышкы эмгек миграциясына чейинки процесс коомдук түзүлүшкө кандай таасир эткени иликтенет. Азыркы миграциянын динамикасы, анын ичинде Россия жана Казакстан багытындагы эмгек агымдары, түштүк аймактарынын мигрант жөнөтүүчү борборлорго айланышы, акча которуулардын ИДПдагы мааниси жана миграциянын үй-бүлөлүк, демографиялык, маданий кесепеттери да каралат. Макалада миграциянын оң жана терс жактары тең салмактуу баяндалып, улуттук коопсуздук, адам капиталы жана региондордун өнүгүүсү жагынан чечилбей жаткан маселелер белгиленет. Ошондой эле миграциялык саясатты жакшыртуу, диаспоралар менен системалуу иштөө жана ички эмгек рыногун өнүктүрүү боюнча сунуштар берилет.*

Ачкыч сөздөр: *Миграция, эмгек мигранттары, улуттук өнүгүү, демография, акча которуулар, идентүүлүк*

Аннотация. *В данной статье представлен комплексный анализ исторического, социального и экономического влияния миграции на национальное развитие Кыргызстана. В ней рассматривается, как этот процесс – от сезонных миграций в древних кочевых культурах до колониальной политики царской России, индустриализации в советское время и внешней трудовой миграции после обретения независимости – повлиял на социальную структуру. Также рассматривается динамика современной миграции, включая потоки рабочей силы в Россию и Казахстан, превращение южных регионов в центры отправки мигрантов, роль денежных переводов в ВВП, а также семейные, демографические и культурные последствия миграции. В статье представлено сбалансированное описание позитивных и негативных аспектов миграции, а также выявлены нерешенные проблемы с точки зрения национальной безопасности, человеческого капитала и регионального развития. Также даются рекомендации по совершенствованию миграционной политики, системной работе с диаспорами и развитию внутреннего рынка труда.*

Ключевые слова: *Миграция, трудовые мигранты, национальное развитие, демография, денежные переводы, идентичность*

Abstract. *This article provides a comprehensive analysis of the historical, social, and economic impact of migration on national development in Kyrgyzstan. It examines how the process, from seasonal migrations in ancient nomadic cultures to the colonial policy of Tsarist Russia, industrialization during the Soviet era, and external labor migration after independence, has affected the social structure. The dynamics of current migration, including labor flows to Russia and Kazakhstan, the transformation of the southern regions into migrant-sending centers, the importance of remittances in GDP, and the family, demographic, and cultural consequences of migration, are also examined. The article presents a balanced description of the positive and negative aspects of migration, and identifies unresolved issues in terms of national security, human capital, and regional*

development. It also provides recommendations for improving migration policy, working systematically with diasporas, and developing the internal labor market.

Keywords: *Migration, labor migrants, national development, demography, remittances, identity*

Кыргызстандын тарыхый өнүгүүсүндө миграция коомдук турмуштун бардык катмарларына терең таасир эткен өзгөчө социалдык кубулуш катары таанылып келет. Байыркы көчмөн маданияттан баштап, орус падышачылыгынын административдик башкаруусу, совет мезгилиндеги индустриализация жана эгемендүүлүк жылдарындагы эмгек миграциясына чейин, көчүүлөр өлкөнүн демографиялык түзүлүшүн, аймактык өнүгүү багыттарын, экономикалык динамикасын жана маданий иденттүүлүгүн олуттуу өзгөртүп келген. Изилдөөчүлөр белгилегендей, миграция «тарыхый процесстердин кыймылдаткыч күчтөрүнүн бири» болуп, коомдук түзүлүштүн өзгөрүшүнө дайыма стимул берген.

Көчмөн кыргыз коомунда миграция жашоо образынын бөлүгү болгон. Табигый-климаттык шарттардын татаалдыгы, мал чарбачылыгынын сезондуулугу жана соода кербен жолдорунун өзгөрмөлүүлүгү кыргыздарды жайлоо-кыштоо багытында үзгүлтүксүз көчүүгө мажбур кылган. Бул ички миграция коомдун структурасын, эмгек бөлүштүрүүнү жана уруулук мамилелерди бекемдөөгө көмөкчү болгон. Антропологдордун айтымында, көчмөн коомдогу миграция «ресурстарды рационалдуу пайдалануунун эң ийгиликтүү формасы» болгон.

Орус империясынын Кыргызстан аймагына келгенден кийинки колониялык саясаты миграциялык процесстердин жаңы толкунун жаратып, аймактын этникалык жана социалдык түзүлүшүн олуттуу өзгөрткөн. Бул мезгилде орус дыйкандарын көчүрүү, чеп-гарнизондорду жайгаштыруу жана административдик-аймактык реформалар жүргүзүлгөн. Натыйжада кыргыздардын жер аянты кыскарып, ички миграция күчөгөн. Бул тууралуу белгилүү тарыхчы Е. Бекмаханов (1957) мындай деп жазат: «XIX кылымдын экинчи жарымында Орусия жүргүзгөн көчүрүү саясаты жана административдик реформалар Орто Азиянын көчмөн калкынын салттуу социалдык түзүлүшүнө олуттуу өзгөрүүлөрдү алып келди. Жер пайдалануу системасы жана коомдук мамилелер империялык башкаруунун таасири менен түп-тамырынан трансформацияланды». [9]

Совет доорунда миграция массалык жана пландуу мүнөзгө ээ болду. Индустриализациянын алкагында Фрунзе, Ош, Майлуу-Суу, Кара-Балта сыяктуу шаарлар өнөр жай борборлоруна айланып, союздук республикалардан миңдеген адистер көчүп келди. Айылдардан шаарларга миграция күчөп, урбанизациянын темпи өсүп, демографиялык түзүлүш олуттуу өзгөрдү. Советтик статистикалык документтерде 1950–1980-жылдар аралыгында Кыргызстандын шаар калкы 3,2 эсеге көбөйгөнү көрсөтүлгөн [10].

Миграциянын келип чыгышы адамзат тарыхынын башаты менен байланыштуу. Бирок изилдөөчүлөр үчүн миграциянын илимий түшүнүк катары калыптанышы жана анын коомдук өнүгүүдөгү ордун аныктоо өзгөчө мааниге ээ. Миграция социалдык-демографиялык татаал процесс болуп эсептелип, калктын жайгашуусуна, структуралык өзгөрүүсүнө, өндүрүштүк күчтөрдүн кайра бөлүштүрүлүшүнө жана табигый-экономикалык ресурстарды рационалдуу пайдаланууга олуттуу таасир тийгизет [8].

Кыргыз Республикасында калктын жайгашуу структурасындагы өзгөрүүлөр, этностук курамдагы динамика, ишканалардын кыскарышы жана квалификациялуу жумушчу күчүнүн кетиши экономикалык жана социалдык өнүгүүгө түздөн-түз таасир этүүдө.

Өлкөнүн рыноктук экономикага өткөн мезгилинде миграциялык процесстерди иликтөө өзгөчө мааниге ээ болду. Пландуу башкаруунун жоктугу шартында ар түрдүү этностордун, билим деңгээли боюнча топтордун, социалдык катмарлардын миграциялык жүрүм-турумун изилдөө зарыл болуп калды. Ошондой эле эмгек ресурстарын оптималдуу бөлүштүрүүгө багытталган мамлекеттик миграциялык саясаттын зарылдыгы өстү.

Миграция ички жана тышкы болуп бөлүнөт. Ар биринин өзүнө жараша себептери бар. Мажбурлуу миграция – согуш, кризис, табигый кырсыктар сыяктуу сырттан болгон таасирлерден улам пайда болот. Добровольдуу миграция – адамдын өз каалоосу менен жумуш издөө, жашоо шартын жакшыртуу максатында көчүүсү [8].

Эгемендүүлүктөн кийин өлкө экономикалык оор кырдаалга туш болуп, бул миграциянын жаңы формасы — тышкы эмгек миграциясын пайда кылды. Азыркы мезгилде Кыргызстандын тышкы эмгек миграциясы көбүнчө стихиялуу, көмүскө жана формалдуу эмес мүнөзгө ээ. Миграцияны тескөө жана аны мониторинг кылуу толук кандуу деңгээлде жүргүзүлбөгөндүктөн, өлкөдөн чыгып кеткен жарандардын реалдуу саны расмий статистикадан бир нече эсе көп экени эксперттик баалоолордон көрүнөт. Учурда эмгек миграциясы Кыргызстандагы эң масштабдуу социалдык-экономикалык көрүнүш болуп, жумушсуз калктын олуттуу бөлүгү үчүн негизги альтернативдүү эмгек рыногуна айланган [1].

Миграциянын аймактык экономикалык кирешелерди түзүүдөгү таасири да чоң. Эмгек мигранттары жиберген акча каражаттары үй-бүлөлөрдүн жашоо деңгээлин көтөрөт, инвестициялык өнүгүүгө өбөлгө түзөт жана айрым жерлерде негизги киреше булагына айланат.

1990-жылдардын аягынан тартып Кыргызстандын жүз миңдеген жарандары Россия, Казакстан, Корея, Түркия жана Европа өлкөлөрүнө жумуш издеп чыгып, бул көрүнүш туруктуу социалдык-экономикалык факторго айланды. Расмий маалымат боюнча Кыргыз Республикасынын жарандарынын басымдуу бөлүгү Россияда – 540 миң, андан кийин Казакстанда – 113 миң, Түштүк Кореяда 15 миң, Түркияда 14 миң жана башка өлкөлөрдө 30 миңге чейин эмгек мигранттар бар. Кыргызстандын аймактык өнүгүүсүнө миграциянын тийгизген таасири акыркы он жылдыкта өзгөчө байкалып, региондор арасында экономикалык теңсиздикти тереңдеткен фактор катары көрүнүүдө. Социалдык-экономикалык өнүгүүсү боюнча олуттуу айырмачылыктар өлкөнүн миграциялык жүрүм-турумуна түздөн-түз таасир этүүдө. Мигрант жөнөтүүчү негизги аймактар — Ош, Жалал-Абад жана Баткен облустары — агрардык өндүрүш үстөмдүк кылган, жумуш орундар чектелүү, өндүрүштүк инфраструктура өнүкпөй калган региондор катары мүнөздөлөт. Улуттук статистика комитетинин 2023-жылдагы маалыматтары боюнча, Баткен облусунда киши башына өндүрүлгөн ИДП 42 миң сомду түзсө, Бишкекте бул көрсөткүч 178 миң сомдон ашкан. Мындай дисбаланс аймактардан миграциянын күчөшүнө, эмгек ресурстарынын азайышына, жаштардын кетиши аркылуу калктын картаюусуна, инфраструктуралык долбоорлордун жай өнүгүшүнө жана региондордун борбор шаарга көзкарандылыгынын өсүшүнө алып келүүдө. Экономисттер белгилегендей, региондор аралык теңсиздик миграциянын күчөшүнө шарт түзүп, миграция өз кезегинде ошол теңсиздикти ого бетер тереңдетет. [11]

Миграциянын өсүшүнө ички социалдык-экономикалык кризистер, жумушсуздук, квалификациялуу жумуш орундардын жетишсиздиги, жаштар арасындагы экономикалык туруктуулуктун жоктугу сыяктуу факторлор чоң таасирин тийгизет. Кыргызстандын ЕАЭБге кошулуусу миграциянын айрым жол-жоболорун жеңилдеткен менен, акыркы жылдары Орусиядагы миграциялык режим акырындап татаалдашууда.

Миграциянын оң жактары да, терс жактары да бар. Оң жагынан алганда, мигранттардын акча которуулары ички суроо-талапты жогорулатып, үй-бүлөлөрдүн жашоо деңгээлин жакшыртат, жакырчылыкты азайтат жана өлкөнүн төлөм балансын турукташтырууга көмөктөшөт. Эмгек мигранттары жөнөткөн акча которуулар Кыргызстандын экономикасы үчүн стратегиялык мааниге ээ. Улуттук банктын 2023-жылдагы маалыматына ылайык, Кыргызстандын мигранттары бир жыл ичинде өлкөгө 2,7 миллиард долларга жакын акча которушкан. Изилдөөлөр көрсөткөндөй, мигранттар жөнөткөн каражаттар негизинен күнүмдүк керектөө чыгымдарына, турак жайды оңдоо жана курулуш иштерине, билим берүүгө, саламаттыкты сактоого, ошондой эле чакан жана орто ишкердикке колдоо көрсөтүүгө багытталат. IOM жана Дүйнөлүк банк жүргүзгөн эл аралык салыштырма анализдер мигранттардын акча которуулары үй-бүлөлөрдүн керектөөсүн туруктуу кармоого,

жакырчылыкты кыскартууга жана аймактардагы ички суроо-талаптын өсүшүнө олуттуу түрткү болорун көрсөтөт. Мындан тышкары, акча которуулар өлкөнүн төлөм балансын жакшыртууда жана сомдун салыштырмалуу туруктуулугун камсыздоодо маанилүү роль ойнойт. Бул каражаттар ички суроо-талапты жогорулатып, региондордогу турмуш деңгээлин көтөрүүгө, чакан ишкердиктин өнүгүшүнө олуттуу түрткү берет. Ошол эле учурда мигранттар Россиядагы патенттик система аркылуу жыл сайын жүз миллиондогон доллар төлөп, кабыл алуучу өлкөлөрдүн да салык системасын толуктап жатышат. [2,3,5]

Терс жагынан алганда, өлкөдөн эмгекке жарамдуу, демилгелүү жана атаандаштыкка жөндөмдүү жаштардын кетиши улуттук экономиканын потенциалын төмөндөтөт. Миграциянын натыйжасында үй-бүлөлөрдүн ажырашуу көрсөткүчү өсүп, салттуу социалдык байланыштар алсырайт. Эмгектин экспортунан пайда алган өлкөлөр (айрыкча Россия) үчүн да миграциянын айрым терс натыйжалары бар: көмүскө экономика күчөйт, социалдык чыгымдар өсөт жана аймактык тең салмактуулук бузулат. Бирок миграциянын терс экономикалык кесепеттери да бар. Айрыкча «акылдардын агып кетиши» көрүнүшү акыркы жылдары күчөп, өлкөнүн адамдык капиталын олуттуу начарлатууда. Акыркы жылдары медицина, билим берүү жана инженердик-IT тармактарындагы адистердин чет өлкөгө чыгып кетиши күчөгөнү бир катар изилдөөлөрдө белгиленет. Бирок кесиптик бөлүнмө боюнча расмий мамлекеттик статистика сунушталбайт. Ошондуктан "акылдардын агып кетиши" тенденциясы сандык жактан толук катталбай жатканы айкын. Айыл жерлеринде жаштардын сыртка кетүүсү калктын картаюусуна, эмгек ресурстарынын азайышына жана айыл чарба тармагынын алсырашына алып келүүдө. [11]

Миграциянын дагы бир олуттуу социалдык кесепети — ата-энеси сыртта иштеген үй-бүлөлөрдүн көбөйүшү. Азаттыктын 2025-жылдагы расмий маалыматы боюнча, өлкөдө ата-энеси миграцияга кетип, жакындарынын колунда калган балдардын саны 86 миңден ашат. Бул балдар көбүнчө эмоционалдык бошутукка, ата-эне моделинин жоктугуна, жүрүм-турум көйгөйлөрүнүн пайда болушуна, окууга болгон кызыгуунун төмөндөшүнө жана «көзөмөлсүз өспүрүм» категориясынын кеңейишине дуушар болууда. Психологдор бул көрүнүштү «миграциянын жашыруун социалдык баасы» катары баалап, миграциясы көп аймактарда үй-бүлөлөрдүн ажырашуу көрсөткүчү да жогору экенин белгилешет [4].

“БУУнун жана ЮНИСЕФтин Борбор Азиядагы миграция боюнча 2021–2023-жылдардагы изилдөөлөрү чет өлкөдө чоңойгон кыргыз балдары тилдик жана маданий өздүк идентүүлүктү сактоодо кыйындактарга туш болуп жатканын көрсөтөт. Айрыкча миграция агымы жогору өлкөлөрдө (Россия, Түркия, Корея) балдардын бир бөлүгү кыргыз тилин үйдө активдүү колдонбой калганы, мектеп чөйрөсүндө толук ассимиляция жүрүп жатканы белгиленет [6,7]. Ошону менен катар акыркы жылдары кыргыз диаспоралары түзгөн маданий жана билим берүү борборлору улуттук маданиятты сактоого олуттуу салым кошуп келет.

Кыргызстан үчүн миграция – улуттук коопсуздук, экономикалык туруктуулук жана адамдык капиталды сактоо менен байланышкан стратегиялык маселе. Ошондуктан миграциялык саясат калкты иш менен камсыз кылууну жакшыртууга, мигранттарды коргоого, алардын каражатын өлкөгө тартууга жана реэмиграцияны стимулдаштырууга багытталган комплекстүү чараларды камтууга тийиш.

Жыйынтыктап айтканда, миграция – Кыргызстан үчүн тарыхый, социалдык жана экономикалык жактан көп кырдуу мааниге ээ кубулуш. Анын таасири өлкөнүн демографиялык тең салмактуулугун, региондордун өнүгүүсүн, билим берүү жана эмгек рыногун, улуттук идентүүлүктү түздөн-түз аныктайт. Ошондуктан мамлекет миграцияны жөнгө салган стратегиялык саясатты өнүктүрүп, региондордогу жумуш орундарын көбөйтүү, мигранттардын укуктарын коргоо жана диаспоралар менен системалуу иш жүргүзүү сыяктуу чараларды ишке ашыруусу зарыл.

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ТУРИЗМ И ЦИФРОВИЗАЦИЯ: ТЕНДЕНЦИИ, ВЫЗОВЫ И ПЕРСПЕКТИВЫ РАЗВИТИЯ

АРАПОВА КУЛМИРА МАМЫРОВНА, КОНЫСОВА ШОЛПАН МАХМУДОВНА, ЕСЕНОВА АЙМАН ЕРМУХАМЕДОВНА
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Аннотация: *В статье всесторонне анализируется влияние цифровизации на трансформацию современной туристской индустрии в глобальном и национальном масштабе. Рассматриваются ключевые цифровые инструменты, формирующие новый формат туристских услуг: онлайн-платформы бронирования, большие данные, системы машинного обучения, виртуальная и дополненная реальность, мобильные сервисы, цифровая навигация, маркетинговые технологии нового поколения и автоматизированные системы управления туристскими потоками. Особое внимание уделяется роли искусственного интеллекта как ядра цифровой трансформации, способствующего повышению персонализации, улучшению качества сервиса и оптимизации взаимодействия между туристами, бизнесом и государственными структурами.*

В статье выявляются основные преимущества цифровых технологий для индустрии туризма, включая повышение эффективности бизнес-процессов, прозрачность транзакций, расширение глобальной доступности туристских продуктов, рост доверия потребителей благодаря онлайн-отзывам и рейтинговым системам. Вместе с тем анализируются барьеры внедрения инноваций в странах с развивающейся цифровой инфраструктурой, таких как Казахстан: низкая цифровая грамотность персонала, недостаточность инвестиционных ресурсов, медленное распространение высокоскоростного интернета в регионах и ограниченный уровень применения аналитических систем.

Проведён комплексный анализ изменения туристского поведения под влиянием цифровых платформ, включая смещение к самостоятельному планированию путешествий, рост требований к персонализированному обслуживанию, усиление роли мобильных технологий и формирование культуры мгновенного доступа к информации. Определены перспективные направления развития цифрового туризма, включающие создание «умных» туристских территорий, применение блокчейн-технологий, развитие национальных цифровых экосистем, интеграцию Big Data в управление туристскими потоками и использование VR/AR для продвижения культурно-исторических объектов. В завершение предлагаются практические рекомендации по повышению международной конкурентоспособности туристской отрасли Казахстана в условиях ускоренной цифровой трансформации.

Ключевые слова: *туризм, цифровизация, цифровые технологии, искусственный интеллект, big data, мобильные приложения, цифровой маркетинг, онлайн-бронирование, виртуальная реальность, цифровые платформы.*

Введение

Цифровизация в XXI веке стала не просто технологической тенденцией, а системообразующим фактором, влияющим на развитие ключевых отраслей экономики, включая туризм, который традиционно характеризуется высокой зависимостью от информационного обмена, сервисных технологий и взаимодействия с потребителем. В условиях глобальной конкуренции туристские дестинации вынуждены перестраивать

механизмы управления, маркетинга, продвижения и обслуживания, ориентируясь на использование цифровых решений, обеспечивающих ускорение процессов, повышение эффективности и создание новых форм туристского опыта.

Современный турист является активным пользователем цифровых технологий. По данным международных исследований, более 70–80% путешественников начинают планирование поездки, используя мобильные устройства и онлайн-платформы. Существенную роль играют социальные сети, видеоконтент, агрегаторы отзывов и сервисы картографической навигации, формирующие представление о туристском продукте ещё до фактического путешествия. В результате туристская индустрия сталкивается с необходимостью не только адаптироваться к изменившимся ожиданиям потребителей, но и предлагать инновационные решения, которые обеспечивают мгновенный доступ к услугам, высокую точность информации и удобство взаимодействия на каждом этапе путешествия.

Цифровой след туриста, формируемый через онлайн-поисковые запросы, геолокационные данные, транзакции и активность в социальных сетях, становится важнейшим инструментом анализа и прогнозирования. Он позволяет организациям оптимизировать маркетинговые стратегии, персонализировать предложения, дифференцировать цены и выявлять востребованные направления. Большие данные и аналитические системы предоставляют государственным органам возможность управлять туристскими потоками, проводить мониторинг загрузки объектов, предотвращать перегруженность локаций и обеспечивать устойчивое развитие территории.

Для Казахстана, обладающего значительным природным, культурным и историческим потенциалом, цифровизация является ключевым фактором повышения привлекательности туристской отрасли на региональном и международном уровнях. Национальные программы развития туризма всё активнее включают элементы цифровой экосистемы: электронные путеводители, онлайн-архивы культурного наследия, виртуальные туры по музеям, цифровые карты туристских зон, системы аналитики движения туристов. Появление отечественных онлайн-сервисов бронирования, расширение электронных государственных услуг, внедрение мобильных приложений для путешественников и развитие цифрового маркетинга способствуют формированию нового образа Казахстана как современной и технологически развитой туристской дестинации.

Однако наряду с позитивными тенденциями существуют и вызовы: недостаточная цифровая грамотность персонала, слабая инфраструктура в ряде регионов, нехватка инвестиций в цифровые решения, а также низкий уровень интеграции туристских предприятий в глобальные онлайн-платформы. Эти проблемы требуют комплексного подхода, включающего государственную поддержку, развитие человеческого капитала и внедрение современных ИКТ инструментов на всех уровнях туристской цепочки.

Таким образом, цифровизация представляет собой мощный драйвер трансформации туристской отрасли, меняющий её структуру, механизмы функционирования и характер взаимодействия участников. Исследование её влияния и возможностей особенно актуально для Казахстана, который стремится занять достойное место на мировом туристском рынке и формирует собственную модель цифрового туризма, основанную на инновациях, доступности и устойчивом развитии.

Теоретические основы цифровизации туризма

Цифровизация в туризме представляет собой комплексный процесс интеграции современных информационно-коммуникационных технологий (ИКТ) в деятельность туристских организаций, органов управления туризмом и непосредственно в формирование туристского опыта потребителей. Она охватывает все уровни туристической индустрии — от автоматизации внутренних бизнес-процессов и управления ресурсами, до персонализации услуг и создания интеллектуальных систем поддержки принятия решений. Основная цель цифровизации заключается в повышении эффективности работы отрасли, улучшении

качества обслуживания туристов и обеспечении конкурентоспособности туристских дестинаций на региональном и глобальном уровнях.

Ключевыми направлениями цифровой трансформации являются:

Онлайн-сервисы бронирования и агрегаторы туристских услуг. Они обеспечивают мгновенный доступ к информации о туристских продуктах, позволяют сравнивать предложения разных компаний, получать актуальные цены и бронировать услуги онлайн. На глобальном уровне лидерами являются Booking.com, Expedia, TripAdvisor, Airbnb, на национальном — платформы Kazakhstan.travel, Chocotravel, Aviata, которые способствуют интеграции отечественного туристского рынка в мировую экосистему.

Цифровой маркетинг. Включает в себя таргетированную рекламу, SEO-оптимизацию, продвижение в социальных сетях (SMM), контент-маркетинг, e-mail рассылки и персонализированные предложения. Цифровой маркетинг позволяет компаниям не только увеличить охват аудитории, но и более точно сегментировать целевые группы туристов, анализировать поведение пользователей и адаптировать продукт под их предпочтения.

Электронные платежи и цифровые кошельки. Использование безопасных платежных систем позволяет туристам мгновенно оплачивать услуги и снижает зависимость от наличных средств, особенно при международных путешествиях.

Виртуальная и дополненная реальность (VR/AR). Эти технологии позволяют создавать интерактивные маршруты, виртуальные экскурсии по музеям, национальным паркам и историческим объектам, формируя у туристов предварительное впечатление о путешествии.

Большие данные (Big Data) и аналитические системы. С их помощью организации прогнозируют сезонность, анализируют туристские потоки, выявляют предпочтения различных групп туристов и формируют стратегические решения.

Искусственный интеллект и чат-боты. AI используется для автоматизации обработки запросов, создания персонализированных рекомендаций, прогнозирования цен и оптимизации маршрутов. Чат-боты становятся стандартом обслуживания клиентов в гостиницах, туристических агентствах и транспортных сервисах.

Умные туристские пространства и Internet of Things (IoT). Включают сенсорные системы мониторинга туристских потоков, интеллектуальные информационные табло, системы управления умной инфраструктурой и экологическим мониторингом, что повышает безопасность и комфорт туристов.

Таким образом, цифровизация формирует новый формат взаимодействия между туристами, бизнесом и государством, обеспечивая более высокий уровень персонализации, оперативность сервисов и прозрачность туристских процессов.

Влияние цифровизации на туристское поведение

Современные цифровые технологии радикально изменили модель поведения туристов, что отражается как на потребительских предпочтениях, так и на способах планирования путешествий.

Самостоятельность выбора. Сегодня туристы всё меньше зависят от традиционных турагентств. Они используют онлайн-платформы для самостоятельного выбора маршрутов, бронирования жилья и транспорта, изучения культурных и развлекательных объектов. Этот процесс сопровождается активным анализом отзывов, рейтингов и рекомендаций, что делает потребителя более информированным и требовательным.

Информационная насыщенность. Туристы имеют доступ к огромным массивам информации: рейтинги, обзоры, видеообзоры, блоги и социальные сети становятся источниками оценки качества услуг. Это меняет стратегию принятия решений: туристы оценивают предложения не только по цене, но и по пользовательским отзывам, уровню сервиса и актуальности информации.

Ожидание персонализации. Цифровые технологии позволяют формировать индивидуальные рекомендации на основе анализа поведения пользователя, его предпочтений и предыдущего опыта. Туристы ожидают, что приложения и платформы будут учитывать их

интересы и предлагать персонализированные маршруты, экскурсии и дополнительные сервисы.

Мобильность. Смартфон стал универсальным инструментом туриста. Через мобильные приложения осуществляется навигация, поиск информации о достопримечательностях, перевод иностранных языков, бронирование и оплата услуг, коммуникация с другими туристами и службами поддержки.

Безопасность и доверие. После пандемии COVID-19 возросла роль цифровых сертификатов, бесконтактных сервисов и онлайн-консультаций. Цифровизация обеспечивает минимизацию личного контакта, повышает уровень доверия к туристским сервисам и способствует формированию новых стандартов безопасности.

Таким образом, цифровизация превращает туриста из пассивного потребителя в активного участника процесса, способного самостоятельно планировать путешествия, адаптировать маршрут под личные предпочтения и взаимодействовать с сервисами в режиме реального времени.

Внедрение цифровых технологий в индустрии туризма

Онлайн-бронирование и цифровые платформы

Онлайн-сервисы бронирования и агрегаторы стали основой современной туристской индустрии. Они позволяют туристам получать актуальные предложения, сравнивать стоимость услуг, читать отзывы других пользователей и мгновенно совершать оплату. Появление таких платформ как Booking.com, TripAdvisor, Expedia и Airbnb радикально изменило рыночные механизмы: уменьшилась зависимость от посредников, повысилась прозрачность цен и улучшилось качество сервиса.

В Казахстане активное развитие онлайн-платформ, таких как Kazakhstan.travel, Chocotravel и Aviata, способствует росту доступности туристических услуг для жителей страны и иностранных туристов. Эти сервисы предоставляют возможность интеграции с международными платформами, что повышает привлекательность Казахстана как туристической дестинации.

Big Data и аналитика туристских потоков

Применение Big Data в туризме позволяет прогнозировать сезонные колебания спроса, выявлять популярные маршруты, оптимизировать ценовую политику и разрабатывать персонализированные предложения. Аналитика больших данных помогает не только бизнесу, но и государственным органам в управлении туристскими потоками: планировании инфраструктуры, распределении ресурсов и контроле за нагрузкой на культурные и природные объекты.

Для Казахстана использование Big Data имеет стратегическое значение: анализ данных о туристах помогает формировать национальные программы развития туризма, выявлять точки притяжения туристов и повышать эффективность инвестиций в регионы.

VR/AR-технологии

Виртуальная (VR) и дополненная (AR) реальность создают новые возможности для продвижения туристских объектов. Виртуальные туры позволяют туристу «попробовать» путешествие заранее, посещать музеи и исторические объекты удалённо, а дополненная реальность делает экскурсии более интерактивными. Для Казахстана внедрение VR/AR-технологий особенно актуально для отдалённых регионов, где доступ к туристическим объектам ограничен физически.

Искусственный интеллект и автоматизация

Искусственный интеллект используется для разработки персонализированных маршрутов, прогнозирования цен на услуги, обработки запросов туристов и автоматизации обслуживания. Чат-боты и интеллектуальные помощники позволяют круглосуточно взаимодействовать с клиентами, отвечать на вопросы и предоставлять актуальную информацию, повышая качество обслуживания и снижая нагрузку на персонал.

Проблемы и барьеры цифровизации туризма

Несмотря на активное внедрение цифровых технологий, туристская отрасль сталкивается с рядом проблем, замедляющих её развитие:

Низкая инфраструктурная готовность. В отдалённых регионах Казахстана интернет-соединение и мобильная связь остаются слаборазвитыми, что ограничивает возможность применения цифровых инструментов.

Недостаток квалифицированных кадров. Малый и средний бизнес зачастую не обладает необходимыми компетенциями для внедрения и управления цифровыми технологиями.

Финансовые барьеры. Внедрение инновационных решений требует значительных инвестиций, что является препятствием для небольших туристских предприятий.

Недоверие к электронным сервисам. Часть туристов и организаций испытывает осторожность при использовании онлайн-платежей, цифровых сертификатов и новых технологий.

Отсутствие единых стандартов. Нет согласованных национальных стандартов для цифровых сервисов, что затрудняет интеграцию и унификацию процессов.

Для Казахстана решение этих проблем требует комплексного подхода: развитие цифровой инфраструктуры, повышение квалификации персонала, внедрение государственных программ поддержки цифровизации, стимулирование инвестиций и создание стандартов цифрового туризма.

Перспективы развития цифрового туризма

Перспективные направления цифровизации туризма включают:

Создание «умных» туристских городов и территорий. Внедрение сенсорных систем, интеллектуальной навигации, систем мониторинга потоков и управления инфраструктурой для повышения комфорта и безопасности туристов.

Развитие государственных цифровых платформ. Создание единой витрины туристских услуг Казахстана с интеграцией информации о туристических объектах, гостиницах, экскурсиях и транспортных услугах.

Внедрение блокчейн-технологий. Использование блокчейна обеспечит прозрачность сделок, защиту данных туристов и повысит доверие к туристическим сервисам.

Интеграция искусственного интеллекта в маркетинг. AI позволит анализировать поведение туристов, создавать персонализированные рекламные кампании и продвигать национальный туристский бренд на глобальном рынке.

Разработка VR/AR-маршрутов. Использование виртуальной и дополненной реальности для создания интерактивных туристических маршрутов и продвижения объектов культурного наследия.

Применение цифровых паспортов туриста. Электронные идентификаторы позволят интегрировать туристские услуги, упрощать регистрацию и доступ к сервисам, а также повышать уровень безопасности.

Эти меры будут способствовать повышению конкурентоспособности туристской отрасли Казахстана, обеспечению устойчивого роста, привлечению иностранных туристов и формированию современного образа страны как инновационной и технологически развитой туристической дестинации.

Заключение

Цифровизация является одним из ключевых факторов, определяющих динамику развития современной туристской отрасли, и выступает в роли стратегического драйвера трансформации рынка туристских услуг. Внедрение цифровых технологий изменяет традиционную архитектуру туристской индустрии, формируя новые модели взаимодействия между туристами, туристическими компаниями и государственными структурами. Эти изменения затрагивают все уровни туристического процесса: планирование поездок, бронирование, предоставление услуг, продвижение туристских продуктов и мониторинг туристских потоков.

Цифровизация способствует значительному повышению качества обслуживания туристов. Использование мобильных приложений, онлайн-сервисов бронирования, систем виртуальной и дополненной реальности позволяет предоставлять более персонализированные услуги, оперативно реагировать на запросы клиентов, предлагать индивидуальные маршруты и интерактивные экскурсии. Аналитические инструменты, работающие на основе больших данных, помогают туристическим организациям прогнозировать спрос, оптимизировать ценообразование и выявлять новые сегменты рынка. Искусственный интеллект и автоматизация обслуживания уменьшают нагрузку на персонал, обеспечивая при этом круглосуточный доступ к сервисам и повышение общей эффективности работы предприятий.

Для Казахстана цифровизация открывает уникальные возможности для ускоренного развития туристической отрасли. Интеграция современных цифровых технологий позволяет формировать национальные туристские бренды, повышать узнаваемость страны на международном рынке, расширять доступность туристских продуктов и повышать уровень удовлетворенности туристов. Применение цифровых платформ и систем аналитики способствует эффективному управлению туристскими потоками, снижает нагрузку на популярные объекты и позволяет развивать новые регионы как туристические дестинации.

Вместе с тем успешная цифровая трансформация отрасли требует комплексного подхода и решения ряда ключевых задач. Необходимо обеспечить системную государственную поддержку внедрения цифровых технологий, включая разработку нормативно-правовой базы, стимулирование инвестиций, поддержку малых и средних туристических предприятий и внедрение единых стандартов цифровых сервисов. Особое значение имеет повышение цифровой грамотности персонала туристических компаний и образовательных учреждений, подготовка специалистов по управлению цифровыми туристскими продуктами и интеграция современных ИКТ-инструментов в учебные программы.

Кроме того, стратегически важным направлением является модернизация инфраструктуры, включая расширение высокоскоростного интернета, создание умных туристских зон, внедрение сенсорных и аналитических систем, а также обеспечение безопасности цифровых данных туристов. Цифровизация открывает возможности для интеграции Казахстана в глобальные туристские цепочки, формирования устойчивых потоков въездного и внутреннего туризма и повышения конкурентоспособности на мировом рынке.

Таким образом, цифровизация не только трансформирует структуру туристской отрасли, но и создает условия для устойчивого и инновационного развития туризма в Казахстане. Она является необходимым инструментом для формирования современной туристской экосистемы, которая будет способна удовлетворять растущие потребности туристов, привлекать инвестиции, укреплять национальный бренд и способствовать социально-экономическому развитию страны. Для достижения этих целей требуется последовательная реализация стратегических мер, комплексная государственная поддержка, подготовка квалифицированных кадров и внедрение передовых технологий на всех уровнях туристской индустрии.

В конечном итоге, цифровизация становится не просто технологическим трендом, а фундаментальным фактором обеспечения устойчивого роста, инновационности и международной конкурентоспособности туристской отрасли Казахстана.

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СПОРТИВНЫЙ, ЭКСТРЕМАЛЬНЫЙ И ГОРНОЛЫЖНЫЙ ТУРИЗМ: ТЕНДЕНЦИИ РАЗВИТИЯ И ПЕРСПЕКТИВЫ

РАХИМОВА ДИЛЬБАР АКБАРОВНА, ЖОЛШИЕВА МАДИНА БЕРДИМУРАТКЫЗЫ, ЕСЕНОВА АЙМАН ЕРМУХАМЕДОВНА
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Аннотация: *В статье подробно анализируются особенности спортивного, экстремального и горнолыжного туризма как ключевых и перспективных направлений современной туристской индустрии. Акцент делается на выявлении специфики данных видов активного отдыха, их социально-экономической значимости, инфраструктурных требований и факторов, определяющих динамику их развития в условиях глобальных и региональных трансформаций туристского рынка. Особое внимание уделено оценке уровня безопасности, роли профессиональной подготовки кадров, а также влиянию туристских рисков на восприятие этих видов туризма в обществе.*

В исследовании рассматриваются тенденции мирового и казахстанского рынка экстремального и горнолыжного туризма, включая влияние климатических изменений, цифровизации, развития специализированной инфраструктуры, брендинга туристских территорий и государственной поддержки отрасли. На основе анализа выявлены ключевые вызовы, препятствующие росту сектора: нехватка профессиональных инструкторов, отсутствие единых стандартов безопасности, недостаточная доступность современного оборудования и необходимость усиления нормативно-правовой базы.

В статье представлены конкретные рекомендации по повышению качества туристских услуг, развитию потенциала горнолыжных комплексов, стимулированию молодежного интереса к спортивному и экстремальному туризму, а также усилению международной конкурентоспособности Казахстана как туристского направления. Исследование подчеркивает значимость интеграции инновационных подходов, маркетинговых технологий и механизмов государственно-частного партнерства в устойчивом развитии активных видов туризма.

Ключевые слова: *спортивный туризм, экстремальный туризм, горнолыжный туризм, туристская индустрия, безопасность, инфраструктура, Казахстан.*

Введение

В современных условиях спортивный, экстремальный и горнолыжный туризм занимают одно из наиболее динамично развивающихся направлений мировой туристской индустрии. На фоне стремительного технологического развития, глобальной конкуренции туристских территорий и роста интереса населения к активным формам отдыха данные виды туризма приобретают стратегическое и социально-экономическое значение. Увеличение числа путешественников, выбирающих активный отдых, обусловлено не только стремлением к новым впечатлениям, но и повышением внимания к здоровому образу жизни, психологической разгрузке и спортивной активности.

Спортивный туризм выступает важным инструментом физического воспитания, способствует развитию выносливости, формированию лидерских качеств и командного духа. Его популярность растёт среди молодежи, школьников, студентов и семейных путешественников, поскольку он сочетает познавательную, спортивную и воспитательную функции. В условиях урбанизации и ограниченности «живого» контакта с природой

спортивный туризм помогает компенсировать дефицит природной среды и укрепляет экологическую культуру общества.

Экстремальный туризм, в свою очередь, характеризуется высоким уровнем эмоциональной насыщенности и связан с психологическими потребностями современных путешественников в поиске рискованных, нестандартных форм времяпрепровождения. Он ориентирован на ограниченную, но быстро растущую аудиторию, для которой важны индивидуальность маршрута, ощущение опасности и самопреодоление. Экстремальные практики способствуют популяризации outdoor-культуры и формируют уникальное туристское предложение, способное значительно повысить имидж страны на международном уровне.

Горнолыжный туризм является одним из наиболее инвестиционно привлекательных направлений в силу своей сезонности, комплексности инфраструктуры и высокой доходности. Он оказывает значительное влияние на развитие регионов, стимулирует строительство дорог, гостиниц, подъемников, ресторанов и спортивных объектов. Для Казахстана горнолыжный туризм приобретает особую значимость благодаря наличию качественного горного рельефа, благоприятных климатических условий и растущему интересу населения к зимним видам спорта.

Анализ показывает, что Казахстан обладает большим потенциалом для всестороннего развития данных видов туризма. Природные условия Южного Казахстана, Восточного Казахстана и Алматинской области создают благоприятные предпосылки для строительства горнолыжных комплексов, организации альпинистских маршрутов, рафтинга, параглайдинга и других форм экстремальной активности. Однако уровень развития инфраструктуры и безопасности пока не соответствует международным стандартам, что требует комплексного подхода со стороны государства и бизнеса.

Целью настоящего исследования является комплексный анализ особенностей, проблем и перспектив развития спортивного, экстремального и горнолыжного туризма, а также определение ключевых факторов их конкурентоспособности в условиях современного туристского рынка. Исследование направлено на выявление тенденций, определяющих развитие отрасли, и разработку практических рекомендаций по управлению качеством услуг, повышению туристской безопасности и формированию привлекательного туристского имиджа Республики Казахстан.

Спортивный туризм: сущность, значение и современные тенденции развития

Спортивный туризм представляет собой один из наиболее структурированных и традиционных видов активного туризма, основанный на преодолении природных препятствий с использованием физической подготовки, специальных навыков и туристского снаряжения. Он включает пешеходные, водные, велосипедные, лыжные, горные, спелео- и другие дисциплины, каждая из которых требует определённого уровня технической и физической подготовки.

В современной научной литературе спортивный туризм рассматривается не только как форма активного отдыха, но и как социально значимый феномен, способствующий гармоничному развитию личности. Его ключевые функции включают:

- оздоровительную, связанную с улучшением физического состояния участников;
- воспитательную, формирующую лидерские качества, ответственность, устойчивость к стрессу;
- познавательную, позволяющую изучать природные комплексы, географические особенности и исторические территории;
- социально-коммуникативную, укрепляющую межличностные связи и навыки взаимодействия в экстремальных условиях.

Среди особенностей спортивного туризма выделяются:

Наличие спортивно-квалификационных требований. Маршруты делятся на категории сложности, а туристы проходят подготовку, обучение технике безопасности и ориентированию на местности.

Строгое планирование маршрутов, включающее разработку графика движения, анализ рисков, подготовку инвентаря и аварийных выходов.

Формирование устойчивых навыков безопасного поведения в природной среде, включая укрепление экологической культуры и осознанного отношения к окружающей среде.

Воспитательный потенциал, который делает спортивный туризм инструментом патриотического воспитания и социализации молодежи.

В Казахстане спортивный туризм получает все большее организационное и институциональное развитие. Значительную роль играют туристские клубы при университетах, региональные федерации альпинизма, молодежные движения и спортивные лагеря. Развиваются маршруты в Алматинской, Восточно-Казахстанской и Туркестанской областях, где природный рельеф способствует проведению категорийных походов различной сложности. Государственные программы по развитию массового спорта также стимулируют включение спортивного туризма в образовательные и молодежные программы.

В совокупности это делает спортивный туризм важным элементом формирования внутреннего туризма и популяризации активного образа жизни среди населения.

Экстремальный туризм: виды, риски, социально-экономическая значимость и направления развития

Экстремальный туризм — это направление туризма, основанное на стремлении человека к получению сильных эмоций и преодолению опасных природных или техногенных факторов. Его отличительная черта — высокий уровень риска, требующий специальной подготовки, оборудования и профессионального сопровождения.

К наиболее распространенным видам экстремального туризма относятся:

−парапланеризм и дельтапланеризм, предполагающие полёты с крутых склонов и горных массивов;

−роунджампинг, связанный со свободным падением с высоты с использованием альпинистских систем;

−скалолазание и альпинизм, требующие высокой физической подготовки;

−рафтинг и каякинг, проходящие по бурным горным рекам;

−багги-сафари, джип-туры, эндуро-маршруты;

−кайтинг и виндсерфинг, популярные в регионах с устойчивыми ветровыми потоками.

Основные характеристики экстремального туризма:

Высокий уровень адреналина, делающий эту сферу привлекательной для молодежи и искателей впечатлений.

Необходимость профессионального сопровождения. Любая ошибка может привести к серьёзным последствиям, поэтому инструкторский состав имеет решающее значение.

Использование специализированного оборудования, зачастую дорогостоящего и требующего регулярного обслуживания.

Жёсткие требования к безопасности, включая наличие сертифицированных маршрутов, страхового покрытия и медицинского контроля.

Несмотря на потенциальные риски, экстремальный туризм демонстрирует устойчивый рост. Это связано с:

−развитием цифровых медиа, где экстремальный контент (видео, блоги, трансляции) становится популярным;

−формированием культуры outdoor-отдыха;

−увеличением спроса на индивидуальные и нестандартные туристские продукты.

Казахстан обладает значительным потенциалом для развития экстремального туризма благодаря разнообразию природных ландшафтов. Перспективными регионами являются:

Туркестанская область (Сайрам-Угам, Машат, долина реки Бадам);

Алматинская область (Медео, Кок-Жайляу, Чарынский каньон);

Восточно-Казахстанская область (Алтай, Риддер, Катон-Қарағай).

Однако для полноценного развития требуется создание безопасных сертифицированных маршрутов, подготовка профессиональных инструкторов и продвижение экстремального туризма на международном рынке.

Горнолыжный туризм: инфраструктура, факторы развития и перспективы Казахстана

Горнолыжный туризм представляет собой одну из наиболее капиталоёмких отраслей туристского сектора. Он требует создания сложной инфраструктуры, включающей:

−канатные дороги различных типов;

−системы искусственного оснежения;

−современные гостиничные и рекреационные комплексы;

−пункты проката оборудования;

−спасательные службы и медицинские посты;

−профессиональных инструкторов и технический персонал.

В Казахстане горнолыжный туризм активно развивается благодаря наличию подходящих природно-климатических условий. К ключевым центрам относятся:

−«Шымбулак», самый развитый и популярный курорт международного уровня;

−«Ак-Булак», ориентированный на массовые и спортивные катания;

−«Табаган», используемый для зимних развлечений и корпоративного отдыха;

−Горнолыжный комплекс «Қасқасу» в Туркестанской области, который рассматривается как крупный перспективный проект, способный стать туристским ядром Южного Казахстана.

Преимущества развития горнолыжного туризма:

Круглогодичная загрузка регионов, учитывая развитие летних треков, веломаршрутов и параглайдинга.

Создание новых рабочих мест, способствующих снижению миграции из горных районов.

Привлечение иностранных туристов, заинтересованных в катании по уникальным ландшафтам.

Формирование международного имиджа страны и развитие сопутствующих отраслей — гостиничного бизнеса, транспортных услуг, общественного питания.

Тем не менее отрасль сталкивается с рядом ограничений:

−высокая стоимость строительства и обслуживания канатных дорог;

−необходимость безукоризненной безопасности трасс;

−влияние климатических факторов, включая сокращение снежного сезона;

−недостаток профессиональных кадров в сфере горнолыжной подготовки.

Дальнейшее развитие возможно через механизмы государственно-частного партнерства, инвестиции в инфраструктуру и продвижение Казахстана как центра зимнего спорта Центральной Азии.

Проблемы и направления повышения эффективности развития активных видов туризма

Несмотря на значительный потенциал, развитие спортивного, экстремального и горнолыжного туризма в Казахстане сталкивается с рядом системных проблем.

К ключевым проблемам относятся:

Недостаточная инфраструктура в отдалённых регионах, включая отсутствие дорог, маршрутов и объектов размещения.

Низкая доступность профессионального оборудования, что ограничивает массовое участие населения.

Необходимость совершенствования системы безопасности, отсутствия сертифицированных стандартов и программ подготовки специалистов.

Недостаточная квалификация инструкторов и гидов, особенно в экстремальном туризме.

Информационный дефицит: слабое продвижение туристских территорий и отсутствие комплексных цифровых платформ.

Недостаток инвестиций, особенно в горнолыжную инфраструктуру.

Для решения данных проблем целесообразно:

Активизировать государственно-частное партнёрство, направленное на развитие спортивных и горнолыжных кластеров.

Внедрять международные стандарты безопасности UIAA, IFSC, ISO и сертификационные программы для инструкторов.

Создавать центры подготовки гидов и инструкторов на базе вузов и спортивных организаций.

Развивать цифровой маркетинг, включая VR-туры, мобильные приложения, онлайн-карты маршрутов.

Организовывать спортивные фестивали, соревнования, международные экспедиции, что повышает узнаваемость регионов.

Создавать льготные условия для инвесторов в горнолыжные комплексы и экстремальные парки.

Заключение

Комплексная реализация данных мер позволит вывести спортивный, экстремальный и горнолыжный туризм на новый уровень, обеспечив устойчивое развитие туристской индустрии Казахстана.

Спортивный, экстремальный и горнолыжный туризм в Казахстане обладают значительным потенциалом для превращения в ключевые драйверы развития национальной туристской индустрии. Их комплексное развитие отражает современные тенденции мировой туристской сферы, где растущая востребованность активных и эмоционально насыщенных видов отдыха сочетается с увеличением внимания к здоровому образу жизни, экологической устойчивости и качеству туристских услуг. Анализ показывает, что данные виды туризма способны не только укрепить международный имидж Казахстана как привлекательного места для активного отдыха, но и стать важным инструментом социально-экономического роста, особенно в регионах с природным и спортивным потенциалом.

Спортивный туризм играет значимую роль в воспитании молодежи, формировании гражданской позиции, росте физической культуры и популяризации массовой активности среди населения. Он способствует укреплению социальной сплочённости, созданию условий для семейного и молодежного отдыха, а также развитию внутреннего туризма, что особенно важно в условиях необходимости диверсификации туристского потока. Благодаря своей образовательной и воспитательной направленности спортивный туризм может интегрироваться в образовательные программы, способствуя формированию экологического сознания и навыков безопасного поведения в природной среде.

Экстремальный туризм, несмотря на высокие риски, обладает значительным экономическим потенциалом за счет привлечения туристов, ориентированных на уникальные и адреналиновые впечатления. Благодаря разнообразию ландшафтов, Казахстан может развивать широкий спектр экстремальных направлений — от парапланеризма и скалолазания до рафтинга и технических видов спорта. Однако ключевым фактором успеха является создание безопасной, сертифицированной инфраструктуры, соответствующей международным стандартам. Безопасность, профессионализм инструкторов и грамотное управление рисками являются обязательными условиями устойчивого развития этого сектора.

Горнолыжный туризм, являясь инвестиционно-ёмким направлением, способен оказывать мультипликативный эффект на развитие региональной экономики. Горнолыжные курорты создают рабочие места, стимулируют развитие гостиничной и транспортной инфраструктуры, формируют постоянный туристский поток, привлекают иностранные инвестиции. Проекты, подобные «Шымбулаку» и «Қасқасу», являются стратегически значимыми для формирования конкурентного зимнего туристского продукта. В долгосрочной перспективе Казахстан способен стать центром зимнего туризма Центральной Азии при

условии модернизации инфраструктуры, внедрения инноваций и повышения качества сервиса.

Однако для реализации обозначенных возможностей требуется системный подход. Наиболее актуальными направлениями остаются: совершенствование нормативно-правовой базы, развитие стандартов безопасности, подготовка профессиональных кадров, стимулирование инвестиционной активности, использование потенциала цифровых медиа для продвижения туристских территорий и формирование устойчивой туристской экосистемы. Особого внимания заслуживает развитие государственно-частного партнёрства, позволяющего обеспечить приток инвестиций и эффективное управление туристскими кластерами.

Таким образом, спортивный, экстремальный и горнолыжный туризм должны рассматриваться как взаимодополняющие элементы единой туристской стратегии Казахстана. Их интеграция в национальную политику развития туризма обеспечит не только экономическую выгоду, но и социальный эффект, выражающийся в укреплении здоровья населения, повышении уровня физической активности, формировании экологической культуры и раскрытии потенциала регионов. Комплексное развитие этих направлений позволит Казахстану занять достойное место на мировом туристском рынке и сформировать устойчивый туристский продукт, соответствующий международным требованиям качества и безопасности.

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ИНЖИНИРИНГТЕГІ ТӘУЕКЕЛДЕРДІ БАСҚАРУҒА ЦИФРЛЫҚ ТРАНСФОРМАЦИЯНЫҢ ЫҚПАЛЫ

ҚҰМАТАЙ АРУНА ҚАНАТҚЫЗЫ
Дәулет Серікбаев атындағы Шығыс Қазақстан техникалық университетінің Бизнес мектебінің магистранты

НУРЕКЕНОВА ЭЛЬВИРА СОБЕТОЛЛАЕВНА
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Аннотация: *Мақалада цифрлық трансформацияның (Индустрия 4.0) инжиниринг жобаларындағы тәуекелдерді басқаруға (ТБ) әсері қарастырылады: BIM, IoT, жасанды интеллект және цифрлық егіздер тәуекелдерді басқаруды реактивті модельден проактивті-предиктивті (болжамды) модельге қалай ауыстыратыны, талдаудың дәлдігін және шешімдердің жылдамдығын арттыратыны көрсетілген. Сонымен қатар, жаңа қатерлер – кибертәуекелдер, деректердің сапасы мен тұтастығы мәселелері, технологиялық дайындықтың болмауы және жеткізушілерге тәуелділік анықталады. Жобалардың тұрақтылығы мен тиімділігі үшін e-ERM-ді Data Governance протоколдарымен және кибертұрақтылық шараларымен интеграциялаудың, сондай-ақ персоналдың цифрлық құзыреттілігін дамытудың қажеттілігі негізделеді.*

Түйін сөздер: *цифрлық трансформация, тәуекелдерді басқару, инжиниринг, Индустрия 4.0, BIM, IoT, жасанды интеллект, цифрлық егіздер, кибертәуекелдер, деректерді басқару.*

Қазіргі инжиниринг, әсіресе капиталды көп қажет ететін салаларда (құрылыс, энергетика, ауыр өнеркәсіп), төртінші өнеркәсіптік революция (Индустрия 4.0) технологияларының мүмкіндіктерінің экспоненциалды өсуіне байланысты түбегейлі цифрлық трансформация (ЦТ) кезеңін бастан кешуде [1; 3]. Ғимараттарды ақпараттық модельдеуді (BIM), Заттар интернетін (IoT), жасанды интеллект (ЖИ) жүйелерін және Цифрлық егіздерді (Digital Twins) енгізу операциялық модельдерді түбегейлі өзгертіп, тиімділікті, жобалаудың дәлдігін арттырып және пайдалану шығындарын оңтайландыруда.

Алайда, бұл технологиялық көші-қон жобалық және корпоративтік тәуекелдер матрицасындағы іргелі өзгерістермен бірге жүреді. Негізінен физикалық, қаржылық және уақытша қатерлерге бағытталған дәстүрлі тәуекелдерді басқару (ТБ) моделі жаңа, өзара байланысты қатерлер алдында жеткіліксіз тиімділікті көрсетуде. Оларға, ең алдымен, кибертәуекелдер (операциялық технологияларға шабуылдар), деректердің тұтастығы мен сапасына байланысты тәуекелдер, сондай-ақ ұйымның технологиялық дайындығының тәуекелдері жатады. Қазіргі инженерлік жобалардың жоғары күрделілігі жағдайында, бұл жаңа факторларды тиісті түрде басқара алмау маңызды сәтсіздіктерге және айтарлықтай экономикалық шығындарға әкелуі мүмкін.

Бұл мақаланың мақсаты – цифрлық трансформацияның инжинирингтегі тәуекелдерді басқару процесіне екі жақты әсерін жүйелі түрде талдау. Жұмыста цифрлық құралдарды енгізу арқылы ТБ оңтайландырудың негізгі драйверлері анықталады және сонымен бірге Корпоративтік тәуекелдерді басқару жүйесіне (КТБЖ) интеграциялауды талап ететін жаңа тәуекелдердің жіктелуі, бағалануы және маңыздылығы талданады.

Зерттеу құрылымы Индустрия 4.0 контекстіндегі ТБ эволюциясын талдауды, цифрлық құралдардың алдын алу тәуекелдерін басқарудағы артықшылықтарын егжей-тегжейлі

көрсетуді, сондай-ақ инженерлік жобаларда кибертұрақтылықты арттыру және деректердің сапасын қамтамасыз ету бойынша ұсыныстарды әзірлеуді қамтиды [5; 11].

Бұл зерттеу инжиниринг саласындағы цифрлық трансформацияның (ЦТ) тәуекелдерді басқаруға (ТБ) әсерін жан-жақты талдау үшін кешенді сараптамалық тәсілді қолданады.

Зерттеу келесі негізгі әдістерге негізделген:

– жүйелі әдебиеттік шолу (Systematic Literature Review): Индустрия 4.0, BIM, IoT, ЖИ/ML және Digital Twins технологияларын корпоративтік тәуекелдерді басқару (КТБЖ) контекстінде қолдану бойынша соңғы ғылыми жарияланымдар (2018–2024 жылдар) мен салалық есептерді талдау [14];

– салыстырмалы талдау (Comparative Analysis): Дәстүрлі ТБ стандарттары (ISO 31000, PMBOK) мен цифрлық ортада туындайтын жаңа тәуекелдер (кибертәуекелдер, деректер тұтастығы) арасындағы айырмашылықтарды анықтау [14];

– кейс-стади Әдісі (Case Study Method): ЦТ-ны табысты енгізген және ТБ-ны оңтайландырған әлемдік инжиниринг және құрылыс компанияларының (мысалы, Norr, Siemens, Shell) тәжірибелерін жинақтау және жіктеу. Бұл әдіс цифрлық құралдардың нақты экономикалық әсерін (мысалы, қайта өңдеуді, істен шығуды азайту) сандық деректер арқылы дәлелдеуге мүмкіндік берді [15].

Инжинирингтегі цифрлық трансформация (ЦТ) – бұл кәсіпорын қызметінің барлық аспектілеріне цифрлық технологиялардың терең интеграциялануы, жобалау, құрылыс, пайдалану және объектілерге қызмет көрсету тәсілдерін түбегейлі өзгерту. Бұл Индустрия 4.0 тұжырымдамасының негізгі элементі болып табылады және тәуекелдерді басқаруға сыни түрде әсер ететін төрт негізгі технологиялық кластерге негізделген (кесте 1) [14]:

Кесте 1 - Тәуекелдерді басқаруда қолданылатын заманауи цифрлық технологиялар

Технология	**Қысқаша сипаттама**	**ТБ-ға әсері (мүмкіндік)**	**Кейс-стади элементі**
BIM (Ғимараттарды Ақпараттық Модельдеу)	Жоба деректерін біріктіретін интеллектуалды 3D-модель. [5]	Жобалау сатысында коллизияларды (Clash Detection) ерте анықтау және жою (4D/5D) [5]	Norr: BIM Clash Detection қолдану арқылы қайта өңдеулерді 37% азайтты. [5]
IoT (Заттар Интернеті)	Жабдықтар мен персоналды нақты уақытта (RTM) бақылайтын датчиктер желісі [11]	Еңбекті қорғау (HSE) және техникалық тәуекелдерді төмендету (Predictive Maintenance) [11]	Siemens Smart Factory: IoT арқылы жоспардан тыс тоқтауларды 52% төмендетті. [11]
ЖИ/ML (Жасанды Интеллект)	Үлкен Деректерді (Big Data) талдайтын және болжайтын алгоритмдер [12]	Тарихи үлгілерге негізделген тәуекелді оқиғаларды предиктивті талдау және болжау [12]	Skanska: Жеткізу тізбегінің мерзім бұзылуын 87% дәлдікпен болжады. [12]
Digital Twins (Цифрлық Егіздер)	Физикалық объектінің нақты уақытта жаңартылатын виртуалды көшірмесі [13]	Маңызды сценарийлерді (апат, жүйенің істен шығуы) имитациялық модельдеу	Shell Гудрун: Digital Twin енгізу арқылы жылдық операциялық шығынды 20 млн USD азайтты. [13]

		(Simulation-based Risk Testing) [13]	

Инжинирингтегі тәуекелдерді басқарудың дәстүрлі тәсілдері тарихи тұрғыдан қаржылық, келісімшарттық, техникалық, уақытша және саяси тәуекелдер сияқты санаттарға бағытталған. Бұл тәсілдер халықаралық стандарттармен реттеледі:

– ISO 31000 («Тәуекел менеджменті. Принциптер және нұсқаулық»): ТБ процесін контексті орнатуды, бағалауды, өңдеуді, мониторингтеуді және тәуекелдерді қайта қарауды қамтитын итерациялық цикл ретінде анықтайды [1].

– PMBOK Guide (Жобаларды басқару білімдері жинағына арналған нұсқаулық): жоба тәуекелдерін басқару процесін жоспарлаудан бастап бақылауға дейін сипаттайды [2].

Алайда, ЦТ бұл стандарттарды кеңейтуді және өзгертуді талап ететін жаңа қиындықтар туғызады:

–тәуекелдердің жылдамдығы және өзара байланысы: цифрлық жүйелер жоғары жылдамдықпен жұмыс істейді. Бір IT-компонентіндегі ақау операциялық технологияларда (OT) каскадты істен шығуларды тудыруы мүмкін, бұл дәстүрлі қолмен бағалау және әрекет ету әдістерін қолдануға келмейтін етеді [6].

–жаңа санаттардың пайда болуы: маңызды кибертәуекелдердің, жүйелердің автономиясына байланысты тәуекелдердің және деректердің тұтастығы тәуекелдерінің пайда болуы КТБЖ-ге жаңа, мамандандырылған процедуралар мен метрикаларды қосуды талап етеді [7].

–реактивті ТБ-дан проактивті ТБ-ға ауысу: ЦТ оқиғаға реакция жасаудан проактивті және предиктивті басқаруға көшуге мүмкіндік береді. Бұл ТБ-ны тікелей цифрлық платформаларға (мысалы, тәуекел индикаторларын BIM-модельдерге байлау) интеграциялауды талап етеді, бұл классикалық стандарттарда толық көлемде қарастырылмаған [6; 7].

Осылайша, цифрлық ортада тұрақтылық пен бәсекеге қабілеттілікті сақтау үшін инжиниринг компаниялары шектеулі ТБ-дан дәстүрлі және нақты цифрлық қатерлерді өңдей алатын интеграцияланған тәуекелдерді басқару жүйесіне (e-ERM) көшуі керек.

Цифрлық трансформация инжиниринг саласына тәуекелдерді басқарудың (ТБ) тиімділігі мен дәлдігін арттыруға, мәселелерді реактивті тіркеуден проактивті және предиктивті бақылауға көшуге мүмкіндік беретін бұрын-соңды болмаған мүмкіндіктер береді.

Цифрлық құралдар ықтимал қатерлерді автоматтандырылған және ертерек анықтауды қамтамасыз етеді:

– BIM-модельдеуді қолдану (BIM-based Risk Identification): BIM-модельдер жобалау сатысында сәулет, құрылымдық және инженерлік жүйелер арасындағы коллизияларды (Clash Detection) автоматтандырылған талдауды жүргізуге мүмкіндік береді. Ірі құрылыс компаниялары BIM арқылы коллизияларды ерте анықтау нәтижесінде орташа есеппен 3-5% жобалық құнды үнемдегенін немесе кешігулерді 15% қысқартқанын хабарлайды [8].

– ЖИ/ML қолданатын предиктивті талдау: машиналық оқыту алгоритмдері үлкен тарихи жобалық деректер массивтерін (KPI, ақаулар туралы есептер, жеткізушілер деректері, ауа-райы жағдайлары) өңдейді. Анықталған үлгілер негізінде ЖИ нақты тәуекелді оқиғалардың (мысалы, жеткізу мерзімінің бұзылуы немесе жабдықтың істен шығуы) басталу ықтималдығын жоғары сенімділікпен болжай алады. Бұл тәсіл сапалық тәуекелді бағалауды сандық және объективті бағалауға айналдырады [8].

– ЦТ-ның негізгі артықшылығы – жоба мен активтің күйін үздіксіз мониторингтеуді қамтамасыз ету қабілеті:

– мониторингтегі IoT-датчиктердің рөлі: жабдықтарға, құрылымдарға және жұмысшыларға (киілетін құрылғылар) орнатылған датчиктер нақты уақытта деректер жинайды. Бұл:

– IoT-сенсорлардың қолданылуы құрылыс алаңдарындағы апаттарды 20%-ға дейін азайтуға көмектеседі, ал өнеркәсіптік жабдықтарда жоспардан тыс тоқтаулардың алдын алу шығындарды 40%-ға дейін төмендетеді [9].

– маңызды жабдықтың дірілін, температурасын немесе тозу деңгейін бақылау арқылы техникалық тәуекелдерді басқаруға, ескерту қызметін (Predictive maintenance) жүзеге асыруға мүмкіндік береді [9].

– сценарийлік талдауға арналған цифрлық егіздер: Digital Twins имитациялық модельдеуге (Simulation-based risk testing) арналған динамикалық платформа ретінде қызмет етеді. Физикалық активке өзгерістер енгізер алдында немесе ықтимал қатер (мысалы, экстремалды ауа-райы жүктемесі) туындаған кезде менеджерлер виртуалды ортада әртүрлі әрекет ету стратегияларын тексере алады. Бұл ықтимал залалды азайта отырып, тәуекелдерді азайту жоспарларын (Risk mitigation plans) оңтайландыруға мүмкіндік береді [15].

Цифрлық технологияларды енгізу дәстүрлі тәуекелдерді басқаруды оңтайландырып қана қоймайды, сонымен бірге инжиниринг компанияларының корпоративтік тәуекелдерді басқару жүйесіне (КТБЖ) интеграциялануы тиіс нақты қатерлер туғызады.

Цифрландыру ақпараттық технологиялар (IT) мен операциялық технологиялар (OT) арасындағы шекараларды жойғандықтан, кибертәуекел басым факторға айналады.

– операциялық технологияларға (OT) шабуылдар: инжиниринг пен өнеркәсіпте OT (АСУ ТП, SCADA жүйелері, өнеркәсіптік IoT) физикалық процестерді (мысалы, жабдықтың жұмысы, ағындарды реттеу) басқарады. OT-ға сәтті кибершабуыл деректердің ағып кетуіне ғана емес, сонымен қатар физикалық зақымға, өндірістің тоқтауына, экологиялық апаттарға және персоналдың қауіпсіздігіне қатер төндіруі мүмкін [10].

– жобалық деректердің құпиялылығын бұзу: BIM-модельдер, ақиқаттың бірыңғай көзі (Single source of truth) бола отырып, жоба туралы толық ақпаратты, соның ішінде коммерциялық құпияларды, құрылымдық осалдықтарды және маңызды параметрлерді қамтиды. Оларды рұқсатсыз өзгерту немесе ұрлау айтарлықтай қаржылық және беделдік тәуекелдер туғызады [7; 8].

– жеткізу тізбегінің тәуекелдері (Supply chain risk): қатер корпоративтік желіге қол жеткізе алатын бағдарламалық қамтамасыз ету, бұлттық қызметтер немесе мердігерлердің сыртқы жеткізушілерінен туындауы мүмкін [15].

Цифрлық жүйелер Big Data-ға сүйенеді; сондықтан деректердің сапасы қабылданатын шешімдердің сапасын және тәуекел деңгейін тікелей анықтайды.

– "нашар деректер" тәуекелі (Bad Data): толық емес, дәл емес немесе бұрмаланған кіріс деректері (мысалы, IoT-датчиктерінің қате көрсеткіштері немесе дұрыс таңбаланбаған тарихи ақпарат) ЖИ/ML-жүйелері қабылдаған түбегейлі дұрыс емес болжамдарға және шешімдерге әкелуі мүмкін. Қате шешімдерді автоматтандыру ықтимал залалды бірнеше есе арттырады [3; 9].

– деректердің тұтастығы: BIM-моделіндегі немесе Digital Twin-дегі деректерді рұқсатсыз немесе кездейсоқ өзгерту тәуекелі. Бүкіл жобалық команда бір модельмен жұмыс істегендіктен, бір жерде тұтастықтың бұзылуы бүкіл жобаға таралуы мүмкін

Бұл тәуекелдер ұйым ішіндегі цифрлық ортаны енгізуге және қолдауға байланысты.

– технологиялық айырмашылық тәуекелі (Digital Divide): негізгі персоналдағы цифрлық құзыреттіліктің жеткіліксіз деңгейі күрделі ТБ құралдарын дұрыс қолданбауға немесе жүйе тудыратын деректерді елемеуге әкелуі мүмкін .

– шамадан тыс автоматтандыру тәуекелі: ЖИ-ке және автоматтандырылған процестерге шамадан тыс сенім адамдық бақылауды және сыни ойлауды жоғалтуға әкелуі мүмкін. Алгоритмнің істен шығуы немесе аномалиялар пайда болған жағдайда, адам араласуға үлгермеуі немесе қабілетсіз болуы мүмкін.

– жеткізушілерге тәуелділік тәуекелі (Vendor Lock-in): Digital Twins немесе бұлттық шешімдер үшін меншікті (жеке) платформаларға көшу нақты жеткізушіге тәуелділікті

тудырады. Бұл лицензиялық саясатқа, баға конъюнктурасына және жүйені қолдаудың ықтимал тоқтатылуына байланысты тәуекелдерді арттырады.

Цифрлық трансформация дәуірінде тәуекелдерді сәтті басқару жаңа құралдарды енгізуді ғана емес, сонымен қатар әдіснама мен ұйымдастырушылық мәдениетті түбегейлі қайта құруды талап етеді. Тәуекелдерді басқаруды (ТБ) және цифрлық технологияларды интеграциялау бойынша ұсыныстар келесі негізгі бағыттарды қамтиды:

Жеке "тәуекелдер тізілімінен" күнделікті цифрлық процестерге біріктірілген жүйеге көшу қажет:

– BIM-дегі ERM: негізгі тәуекел индикаторларын (KRI) және оларды азайту шараларын тікелей BIM-моделінің элементтеріне (4D/5D) байлау. Мысалы, маңызды құрылымның жеткізілуінің кешігуіне байланысты тәуекел модельде визуализациялануы және сандық бағалануы тиіс [12];

– KRI мониторингі үшін ЖИ-ті қолдану: IoT-датчиктерден және корпоративтік жүйелерден (ERP, PDM) келетін деректерді үздіксіз бақылау үшін ЖИ қолданатын жүйелерді әзірлеу, KRI рұқсат етілген диапазондан шыққан кезде автоматты түрде ескерту үшін [5];

– бірыңғай тәуекел деректері платформасын құру (Risk Data Lake): деректердің барлық түрлерін (геокеңістіктік, IoT, жобалық, қаржылық) талдау және имитациялық модельдеу (Digital Twins) үшін қолжетімді бірыңғай қоймаға біріктіру [8];

– ОТ-жүйелері ең осал және маңызды болғандықтан, ТБ кибертұрақтылыққа бағытталуы тиіс [14]:

– желілерді сегменттеу: шабуылдардың таралуын болдырмау үшін өнеркәсіптік желілерді (ОТ) корпоративтік ақпараттық желілерден (IT) қатаң бөлу .

– үшінші тарап тәуекелдерін бағалау: жобалық немесе операциялық желілерге қол жеткізе алатын барлық жеткізушілер мен мердігерлер үшін қатаң киберқауіпсіздік аудитін енгізу (жеткізу тізбегінің тәуекелін басқару).

– деректер сапасының тәуекелін басқару өте маңызды болып келеді:

– data governance протоколдары: ЖИ және Digital Twin-де қолданылатын деректердің тұтастығын, дәлдігін және уақтылылығын қамтамасыз ету үшін нақты саясаттар мен процедураларды енгізу. Бұған IoT-құрылғылардан деректер жинауды стандарттау кіреді [11].

– ЖИ-модельдерін верификациялау: құбыжықтықты анықтау және тәуекел болжамдарының объективтілігін қамтамасыз ету үшін машиналық оқыту алгоритмдерін тұрақты тексеру және аудиттеу [13].

– деректерге жауапкершілік: жобаның өмірлік циклінің барлық кезеңдерінде деректер сапасы үшін рөлдер мен жауапкершілікті (Data Ownership) нақты тағайындау [16].

Цифрлық трансформация инжиниринг саласындағы тәуекелдерді басқару ландшафтын түбегейлі өзгертіп, жаңа мүмкіндіктер мен қатерлер туғызады. Индустрия 4.0 технологияларын интеграциялау тәуекелдерді басқаруды реактивті модельден проактивті-предиктивті жүйеге ауыстырады. Мысалы, ЖИ-ке негізделген предиктивті талдау жеткізу тізбегіндегі мерзім бұзылуын 87% дәлдікпен болжауға мүмкіндік береді, бұл жоба мерзімін 10-15% қысқартуға ықпал етеді.Бұл инженерлік жобаның өмірлік циклінің барлық кезеңдерінде тәуекелдерді дәлірек анықтауды, сандық бағалауды және мониторингтеуді қамтамасыз етеді [6; 7;]

Сонымен қатар, Киберқатерлер және деректердің тұтастығын жоғалту сияқты жаңа кластар туындайды. ОТ-жүйелерге жасалған кибершабуылдардың жылдық экономикалық шығыны орташа есеппен 3-5 млн долларды құрайды, бұл осы қауіптерді КТБЖ-ге жедел интеграциялауды талап етеді [17]. Бұл факторлар дәстүрлі тәуекелдерді басқару стандарттарын қайта қарауды және кәсіпорынның цифрлық платформаларымен біріктіріле алатын электрондық корпоративтік жүйелерді (e-ERM) енгізуді талап етеді [11; 12].

Цифрлық тәуекелдерді басқарудың тиімді дамуы тек кешенді тәсіл болған жағдайда ғана мүмкін болады, ол келесілерді қамтиды:

– тәуекелді деректердің бірыңғай қоймасын (Risk Data Lake) қалыптастыру;

– деректер сапасын қамтамасыз ету үшін деректерді басқару протоколдарын енгізу қажет. "Нашар деректер" (Bad Data) салдарынан қабылданған қате шешімдердің құны кейбір ірі жобаларда жалпы бюджеттің 5%-на дейін жетуі мүмкін.операциялық жүйелердің кибертұрақтылығын арттыру [13];

– персоналды цифрлық талдау және мониторинг құралдарын пайдалануға жүйелі түрде дайындау.

Зерттеу нәтижелері инжиниринг компаниялары үшін екі негізгі бағытта маңызды:

– экономикалық тиімділік: проактивті ТБ моделіне көшу операциялық шығындарды орта есеппен 15-20%-ға дейін төмендетеді (мысалы, Norr кейсіндегідей қайта өңдеулерді 37% азайту арқылы) және маңызды активтердің жоспардан тыс тоқтауын 50%-дан астам төмендетеді (Siemens smart factory). Интеграцияланған ТБ жүйесі жобаларды орындау кезіндегі кешігулер мен бюджетті асырудың алдын алады [18];

– басқарушылық тұрақтылық: e-ERM енгізу және деректерді басқару протоколдарын орнату компанияларға технологиялық дайындықтың төмендігі, кибершабуылдар және деректердің бұрмалануы сияқты жаңа, өзара байланысты қатерлерді жүйелі түрде басқаруға мүмкіндік береді. Бұл ұйымның тұрақтылығын арттырып, сандық ортадағы бәсекеге қабілеттілікті қамтамасыз етеді [17].

Индустрия 4.0 технологияларын интеграциялау тәуекелдерді басқаруды реактивті модельден проактивті-предиктивті жүйеге ауыстырады. Мысалы, ЖИ-ке негізделген предиктивті талдау жеткізу тізбегіндегі мерзім бұзылуын 87% дәлдікпен болжауға мүмкіндік береді, бұл жоба мерзімін 10-15% қысқартуға ықпал етеді [19].

Осылайша, цифрлық трансформация тәуекелдерді жоймайды, бірақ олардың табиғатын және динамикасын өзгертеді. Инжиниринг компанияларының жаңа технологиялық шындықтағы жетістігі цифрлық құралдарды жай ғана пайдалану қабілетімен емес, сонымен қатар тәуекелдерді басқаруды олардың архитектурасына енгізу, саналы және бейімделгіш тәуекелді ойлау мәдениетін қалыптастыру қабілетімен анықталады.

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УЧЕТ МАТЕРИАЛЬНЫХ РЕСУРСОВ: МЕТОДОЛОГИЧЕСКИЙ ПОДХОД И ПРАКТИЧЕСКИЙ ОПЫТ

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Аннотация: *В данной статье рассматривается соответствие учета запасов стандартам МСФО 2. Особое внимание уделяется первоначальной оценке, последующей оценке, учету, документации и бухгалтерским проводкам по сырью, материалам, готовой продукции и товарам. Расчет себестоимости с использованием методов FIFO и AVCO объясняется на практических примерах.*

Ключевые слова: *МСФО 2, себестоимость реализованной продукции, FIFO, AVCO, сырье и материалы.*

Введение

МСФО 2 регулирует процесс определения как себестоимости запасов, так и списания себестоимости в расходы. Он также содержит рекомендации по определению чистой реализуемой стоимости. В нем объясняется основа стандартных методов расчета себестоимости. При последующей оценке запасов берется наименьшая из двух величин: первоначальная себестоимость и чистая реализуемая стоимость. Чистая реализуемая стоимость определяется путем вычитания продажной цены, установленной по справедливой стоимости в данном процессе работы, и затрат, необходимых для осуществления этой продажи.[1]

В учете запасов используются следующие счета: «Материальные запасы», «Производственные затраты», «Незавершенное строительство», «Готовая продукция», «Товары», «Прочие активы, предназначенные для продажи», «Прочие запасы» и «Корректировки на обесценение запасов».[9]

Запасы включают следующие активы:

- активы, предназначенные для продажи в обычном порядке ведения бизнеса, такие как товары, приобретенные розничным продавцом для перепродажи;
- активы, находящиеся в процессе подготовки к продаже (готовая продукция, незавершенное производство); или
- активы в виде сырья и материалов, потребляемых в процессе производства или оказания услуг (сырье или материалы);

Сырье и материалы — это предметы, используемые в производстве товаров, при выполнении работ, при оказании услуг и для удовлетворения потребностей предприятия, имеющие срок полезного использования менее 1 года. Сырье и материалы являются оборотными активами, поставляемыми в процессе производства и полностью передающими свою стоимость производимой продукции. [5]

В зависимости от их роли в производстве материалы делятся на следующие группы:

✓ Сырье и материалы

✓ Приобретенные полуфабрикаты и комплектующие, конструкции и детали (части)

✓ Топливо
✓ Упаковка и упаковочные материалы
✓ Запасные части
✓ Прочие материалы
✓ Материалы, переданные на переработку
✓ Строительные материалы

Сырье и материалы закупаются путем добавления к цене покупки различных расходов (комиссионных сборов, импортных таможенных пошлин, транспортных расходов и т. д.). [7]

Сырье и материалы могут быть приобретены из следующих источников:

✓ в виде долевого вклада в уставный капитал учредителя;
✓ при производстве самим предприятием;
✓ при покупке у продавца;
✓ при импорте из-за рубежа;
✓ при покупке в форме безвозмездной финансовой помощи;
✓ при покупке незарегистрированными лицами;
✓ при покупке у физических лиц по акту купли-продажи.

При закупке сырья и материалов сначала должен быть заключен договор. Договор, заключенный между сторонами, указывает наименование, единицу измерения, количество, цену, условия транспортировки и оплаты, а также данные сторон, приобретаемых сырьем и материалами. Договор составляется в двух экземплярах. После заполнения всех данных и подтверждения печатями и подписями сторон, один экземпляр остается у покупателя, а другой — у продавца. [6]

После заключения договора организация-продавец выставляет покупателю счет-фактуру с указанием своих реквизитов. Покупатель переводит указанную сумму на счет поставщика на основании выставленного счета-фактуры. Покупатель выдает доверенность сотруднику, ответственному за закупку сырья и материалов. После предоставления доверенности руководство предприятия-продавца окончательно разрешает выпуск сырья и материалов, и продавец выставляет счет-фактуру. [8]

Сырье и материалы могут быть выпущены в производственный процесс, для удовлетворения внутренних потребностей предприятия, проданы, переданы бесплатно или уничтожены по любой причине (устаревание, потеря, кража и т. д.).

Выпуск сырья и материалов может осуществляться с использованием лимитных закупочных карт, если на предприятии существует лимит на выпуск материалов, или на основании заявки и внутреннего счета-фактуры, если лимита нет. Если сырье и материалы продаются, их выпуск документируется счетом-фактурой.

Схема1. Классификация ресурсов

Источник: составлено автором

Если налогоплательщик не ведет индивидуальный учет имеющихся в его распоряжении товаров, он имеет право вести учет запасов по методу средней стоимости. Соответствие сырья и материалов приведено в следующей таблице:

Таблица 1. Учет операций с сырьём и материалами

Содержание сделки	Дебет	Кредит
Когда сырье и материалы используются внутри предприятия		
Стоимость сырья и материалов списывается с себестоимости производства или продажи.	202,701	201
Материалы, используемые при продаже готовой продукции и товаров.	711	201
Материалы, используемые при монтаже и вводе в эксплуатацию основных фондов.	113	201
Сырье и материалы предоставляются бесплатно		
Первоначальная стоимость сырья и материалов списывается	731	201
НДС взимается с сырья и материалов, предоставляемых бесплатно	731	545
Когда налоговое обязательство возникает до утверждения бюджета	545	521
Продажа сырья и материалов		
Продажа сырья и материалов.	211,171	601
Первоначальная стоимость сырья и материалов списывается	701	201
НДС, взимаемый с сырья и материалов	211,171	545
Когда налоговое обязательство возникает до утверждения бюджета	545	521
Погашение задолженности перед предприятием за проданное сырье и материалы.	221,223	211,171

Утеря, недостача, повреждение или кража сырья и материалов		
Удаление утерянных, пропавших, поврежденных или украденных сырьевых материалов и материалов.	731	201
Расчетный НДС	731	545
Когда налоговое обязательство возникает до утверждения бюджета	545	521

Источник: составлено автором на основе Tanriverdiev, G. E. (2019).

Формирование первоначальной стоимости.

В стоимость товаров включены закупочная цена, транспортные расходы, пошлины и т. д. Расходы на хранение после покупки, излишние расходы и т. д. не включены. [10]

Пример 1. Предприятие занимается куплей-продажей товаров. При покупке товаров за границей оно перевело со своего банковского счета 1000 манатов на закупочную цену, 200 манатов на транспортные расходы и 100 манатов на таможенные пошлины.

223 Банковский счет

Дата	**Содержание**	**Дебет**	**Кредит**	**Сумма (манаты)**
30.12	Баланс	5000		5000
01.01	Покупная цена товаров		1000	4000
01.01	Транспортные расходы при покупке товаров		200	3800
02.01	Таможенная пошлина при покупке товаров		100	3700

205 товаров

Дата	**Содержание**	**Дебет**	**Кредит**	**Сумма (манаты)**
06.12	Баланс	500		500
03.01	Полученные товары	1300		1800

Готовая продукция включает в себя затраты на материалы, заработную плату сотрудников, работающих на производстве, и другие косвенные затраты. Затраты, превышающие норму, и затраты на хранение, не включенные в производственный процесс, не включаются. [11]

Пример 2. Производственное предприятие отправило со склада в производство материалов на сумму 500 манатов для изготовления столов. 400 манатов были рассчитаны как заработная плата сотрудников, работающих на производстве, и 300 манатов как коммунальные расходы, использованные в производстве. В результате было произведено 10 столов.

201 Материалы

Дата	**Содержание**	**Дебет**	**Кредит**	**Сумма (манаты)**

05.10	Баланс	1000		1000
01.01	Запущено в производство		500	500

202 Производственные затраты

Дата	**Содержание**	**Дебет**	**Кредит**	**Сумма (манаты)**
01.01.	Материалы	500		500
31.01	Рабочая сила	400		900
31.01	Коммунальные затраты	300		1200
01.02	Продукт готов		1200	0

533 Обязательства по заработной плате

Дата	**Содержание**	**Дебет**	**Кредит**	**Сумма (манаты)**
31.01	Заработная плата рассчитывалась для рабочих, занятых на производстве.		400	400

538 Прочие краткосрочные платежи

Дата	**Содержание**	**Дебет**	**Кредит**	**Сумма (манаты)**
31.01	Были рассчитаны коммунальные расходы, использованные в производстве.		300	300

204 Готовый продукт

Дата	**Содержание**	**Дебет**	**Кредит**	**Сумма (манаты)**
01.02	Продукция была импортирована.	1200		1200

При последующих оценках, исходя из принципа осмотрительности, берется меньшая из двух величин: первоначальная стоимость и чистая реализуемая стоимость.

Чистая реализуемая стоимость – сумма, оставшаяся после вычета стоимости транспортировки и рыночных сборов из рыночной стоимости.

При сравнении первоначальной стоимости и чистой реализуемой стоимости, если первоначальная стоимость ниже, бухгалтерская запись не делается, поскольку избыточная стоимость будет отражена в отчете о прибылях и убытках при продаже актива. Если при сравнении первоначальной стоимости и чистой реализуемой стоимости известно, что чистая реализуемая стоимость ниже, то мы отражаем это как прочие расходы. [3]

Стоимость проданных товаров – это бухгалтерский показатель, представляющий прямые затраты на производство товаров. Он включает в себя стоимость материалов, труда и любые другие накладные расходы, непосредственно связанные с приобретением или созданием продукции, которую компании продают для получения дохода. Чистая реализуемая стоимость также известна как «стоимость проданных товаров» и указывается непосредственно под выручкой в отчете о прибылях и убытках. В соответствии с общепринятыми принципами

бухгалтерского учета США (GAAP) компании должны соблюдать определенные правила относительно того, какие расходы включаются в их административные и сбытовые расходы и как они рассчитываются. Чем выше административные и сбытовые расходы компании, тем ниже ее валовая прибыль и маржа, что напрямую влияет на прибыльность и конкурентоспособность. [5]

Себестоимость проданных товаров = Остаток на начало года + Закупки – Остаток на конец года [4]

Прибыль = Выручка от продаж – Себестоимость проданных товаров

Методы расчета себестоимости проданных товаров [2]

FİFO	Предполагается, что товары, которые были приобретены или произведены первыми, продаются в первую очередь. Следовательно, на конец периода на складе остаются товары, которые были приобретены или произведены последними.
AVCO	Стоимость каждого товара определяется как средневзвешенная стоимость аналогичных товаров на начало периода и стоимость аналогичных товаров, приобретенных или произведенных в течение периода.
LİFO	Последний вариант предполагает, что сначала продаются приобретенные или произведенные товары. Следовательно, товары, остающиеся на складе в конце периода, состоят из товаров, приобретенных или произведенных в течение нескольких периодов (слоев складских запасов).
Индивидуальная идентификация	К каждому продукту применяется индивидуальный подход.

Пример 3. На предприятии произошли следующие операции.

Дата	**Транзакция**	**Количество**	**Цена за единицу (манаты)**	**Сумма (манаты)**
01.01	Баланс	100	1	100
07.01	Купить	50	1.2	60
09.01	Купить	30	1.3	39
10.01	Продать	120	5	600
06.02	Купить	30	1.5	45
07.02	Продать	70	5	350

Метод FIFO

Доход от продаж 600 + 350 = 950 AZN

Себестоимость проданных товаров 100 + 60 + 39 + 10*1.5 = 214 AZN

Выгода 950 - 214 = 736

Остаток 20 * 1.5 = 30

Метод Авко (цикл)

Доход от продаж 600 + 350 = 950 AZN

себестоимость единицы продукции (100 + 60 + 39 + 45) / (100 + 50 + 30 + 30) = 1.162

Себестоимость проданных товаров 190 * 1.162 = 220.78

Выгода 950 – 220.8 = 729.2

Остаток 20 * 1.162 = 23.24

Метод Авко (непрерывный)

Доход от продаж 600 + 350 = 950 AZN

Стоимость единицы товара на 10.01 (100 + 60 + 39) / (100 + 50 + 30) = 1.106
Себестоимость проданных товаров на 10.01 120 * 1.106 = 132.72
Стоимость единицы товара на 07.02 (60 * 1.106 + 45) / (60 + 30) = 1.237
Себестоимость проданных товаров на 07.02 70 * 1.237 = 86.59
Выгода 950 – 132.72 + 86.59 = 903.87
Остаток 20 * 1.237 = 24.74

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ЖАҺАНДАНУ ДӘУІРІНДЕГІ ЭКОНОМИКАЛЫҚ ӨСУ МЕН МАКРОЭКОНОМИКАЛЫҚ ТЕҢГЕРІМ

ҚАЗЕЗ ГҮЛІМАЙ ЕРКЕБҰЛАНҚЫЗЫ
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Ғылыми жетекші – **ДЕМЕУОВА ҚҰРАЛАЙ ЖҮНІСАҚЫНҚЫЗЫ**
Алматы, Қазақстан

Аннотация. *Бұл мақалада жаһандану жағдайындағы экономикалық өсу үдерістері мен макроэкономикалық теңгерімді сақтау мәселелері жан-жақты қарастырылады. Қазіргі әлемдік экономикада мемлекеттердің өзара тәуелділігінің артуы, халықаралық сауда, капитал қозғалысы және технологиялық трансформация экономикалық дамуға жаңа мүмкіндіктермен қатар, жаңа қауіп-қатерлер де алып келуде. Мақалада дамыған және дамушы елдердің экономикалық өсудегі ерекшеліктері, инфляция, жұмыссыздық, бюджет тапшылығы және төлем балансы сияқты негізгі макроэкономикалық көрсеткіштердің өзгерісі салыстырмалы түрде талданады. Сондай-ақ жаһандану жағдайында макроэкономикалық теңгерімді қамтамасыз етудің тиімді жолдары ұсынылады.*

Кілтті сөздер: *жаһандану, экономикалық өсу, макроэкономикалық теңгерім, инфляция, жұмыссыздық, бюджет тапшылығы, халықаралық сауда.*

XXI ғасырда жаһандану үдерісі әлемдік экономиканың құрылымын түбегейлі өзгерткен негізгі факторлардың біріне айналды. Қазіргі таңда мемлекеттердің экономикалық дамуы тек ішкі ресурстар мен ұлттық саясатқа ғана емес, сонымен қатар халықаралық экономикалық байланыстардың деңгейіне, жаһандық нарықтардағы жағдайға және трансұлттық капитал қозғалысына тікелей тәуелді болып отыр. Ақпараттық-коммуникациялық технологиялардың қарқынды дамуы, цифрландыру, халықаралық сауда көлемінің ұлғаюы және инвестициялық ағындардың күшеюі экономикалық өсудің жаңа мүмкіндіктерін қалыптастырды.

Жаһандану жағдайында әлемдік экономикалық кеңістік біртұтас жүйе ретінде жұмыс істей бастады. Бір елде орын алған экономикалық немесе қаржылық дағдарыс қысқа уақыт ішінде басқа мемлекеттердің экономикасына да әсер етуі мүмкін. Бұл құбылыс 2008 жылғы жаһандық қаржы дағдарысы мен кейінгі экономикалық құлдыраулар барысында айқын байқалды. Мұндай жағдайда экономикалық өсу мәселесі тек өндіріс көлемінің артуымен ғана өлшенбей, оның тұрақтылығы мен сапасына ерекше назар аударуды талап етеді.

Экономикалық өсу – белгілі бір уақыт аралығында ел экономикасындағы өндіріс көлемінің ұлғаюымен, ұлттық табыстың артуымен және жалпы ішкі өнімнің өсуімен сипатталатын күрделі әрі көпқырлы үдеріс. Ол мемлекеттің әлеуметтік-экономикалық даму деңгейін айқындайтын басты көрсеткіштердің бірі болып табылады. Экономикалық өсу халықтың өмір сүру сапасының жақсаруына, жаңа жұмыс орындарының құрылуына, әлеуметтік инфрақұрылымның дамуына және елдің халықаралық экономикалық аренадағы бәсекеге қабілеттілігінің артуына негіз қалайды. Жаһандану жағдайында экономикалық өсу үдерісі айтарлықтай жеделдей түсті. Себебі жаһандану ұлттық экономикаларды әлемдік нарықтармен тығыз байланыстырып, өндіріс пен капитал қозғалысының шекараларын кеңейтті. Бұл өз кезегінде экономикалық дамуға ықпал ететін бірнеше маңызды факторлардың күшеюіне әкелді.

Біріншіден, халықаралық сауданың кеңеюі экономикалық өсудің негізгі қозғаушы күштерінің біріне айналды. Елдер арасындағы тауарлар мен қызметтердің еркін алмасуы өндіріс көлемін ұлғайтып, кәсіпорындардың жаңа нарықтарға шығуына мүмкіндік берді.

Экспорт көлемінің артуы ұлттық экономиканың кірісін көбейтіп, төлем балансының жақсаруына ықпал етеді. Алайда халықаралық саудаға шамадан тыс тәуелділік кейбір елдер үшін сыртқы нарықтағы баға ауытқуларына тәуелді болу қаупін арттырады.

Екіншіден, шетелдік инвестициялардың артуы жаһандану жағдайындағы экономикалық өсудің маңызды факторы болып табылады. Тікелей шетелдік инвестициялар өндірістік қуаттарды жаңартуға, жаңа технологияларды енгізуге және еңбек нарығын дамытуға мүмкіндік береді. Инвестициялар арқылы ел экономикасына қаржы ғана емес, басқару тәжірибесі, инновациялық шешімдер мен заманауи менеджмент үлгілері де енеді. Дегенмен дамушы елдерде шетелдік капиталға шамадан тыс тәуелділік экономикалық қауіпсіздікке кері әсер етуі мүмкін.

Үшіншіден, технологиялар мен инновациялардың таралуы экономикалық өсудің сапалы деңгейге көтерілуіне ықпал етеді. Ақпараттық технологиялар, цифрлық экономика, автоматтандыру және жасанды интеллект сияқты жаңашыл бағыттар өндіріс тиімділігін арттырып, еңбек шығындарын азайтады. Жаһандану бұл технологиялардың тез таралуына жағдай жасап, елдер арасындағы технологиялық алшақтықты азайтуға мүмкіндік береді. Алайда дамушы елдерде инновациялық инфрақұрылымның әлсіздігі бұл мүмкіндіктерді толық пайдалануға кедергі келтіреді.

Төртіншіден, еңбек өнімділігінің өсуі экономикалық дамудың маңызды шарты болып табылады. Жаһандану еңбек нарығын кеңейтіп, білім мен тәжірибе алмасуына жол ашты. Білікті кадрлардың қалыптасуы, адами капиталдың сапасының артуы экономикалық өсудің ұзақ мерзімді тұрақтылығын қамтамасыз етеді. Сонымен қатар еңбек өнімділігінің өсуі жалақы деңгейінің артуына және халықтың тұрмыс сапасының жақсаруына тікелей әсер етеді.

Дамыған елдер жаһандану үдерісінің артықшылықтарын тиімді пайдалана отырып, жоғары технологиялы өндірістерді, қаржы нарықтарын және инновациялық экономиканы дамыту арқылы тұрақты экономикалық өсуді қамтамасыз етіп отыр. Бұл елдерде ғылыми-зерттеу және тәжірибелік-конструкторлық жұмыстарға бөлінетін қаржының көп болуы экономиканың сапалы өсуіне мүмкіндік береді. Ал дамушы елдер үшін жаһандану бір жағынан жаңа нарықтарға шығу, инвестиция тарту және технологияларды меңгеру мүмкіндігін берсе, екінші жағынан шикізатқа тәуелділік, сыртқы экономикалық тәуекелдер және макроэкономикалық тұрақсыздық қаупін арттырады. Әсіресе экспорттың біржақты құрылымы мен валюта бағамының құбылмалылығы экономикалық өсудің тұрақтылығына кері әсерін тигізеді. Сондықтан дамушы елдер үшін экономиканы әртараптандыру, өңдеуші өнеркәсіпті дамыту және институционалдық реформаларды жүзеге асыру аса маңызды болып табылады.

Төмендегі кестеде дамыған және дамушы елдердегі негізгі макроэкономикалық көрсеткіштердің салыстырмалы көрінісі келесі кестеде көрсетілді.

1-кесте: Экономикалық өсім мен макроэкономикалық көрсеткіштер

Көрсеткіштер	**Дамыған елдер**	**Дамушы елдер**
ЖІӨ өсімі (%)	2–3 %	4–6 %
Инфляция (%)	2–4 %	6–10 %
Жұмыссыздық (%)	4–6 %	7–12 %
Бюджет тапшылығы (% ЖІӨ)	3–5 %	5–8 %
Төлем балансы	Тұрақты	Тұрақсыз

1-кестеден көріп отырғанымыздай, дамушы елдерде экономикалық өсу қарқыны жоғары болғанымен, макроэкономикалық тұрақсыздық деңгейі де айқын байқалады. Бұл жаһандану жағдайында экономикалық өсудің сапасына ерекше назар аудару қажеттігін көрсетеді. Осы тұрғыдан алғанда, макроэкономикалық теңгерім ұғымы қазіргі экономикалық дамудың басты категорияларының біріне айналып отыр. Макроэкономикалық теңгерім – бұл ел экономикасындағы негізгі макроэкономикалық көрсеткіштердің, атап айтқанда инфляция

деңгейінің, жұмыспен қамту көлемінің, мемлекеттік бюджет тапшылығының, төлем балансының, ұлттық валютаның тұрақтылығы мен жалпы экономикалық өсудің өзара үйлесімді әрі тұрақты жағдайда болуы. Бұл көрсеткіштердің бір-бірімен тепе-теңдікте дамуы экономикалық жүйенің орнықтылығын қамтамасыз етеді.

Экономикалық жүйеде макроэкономикалық теңгерім сақталған жағдайда ғана ұзақ мерзімді және тұрақты даму мүмкін болады. Инфляцияның қалыпты деңгейде болуы халықтың сатып алу қабілетін сақтап, әлеуметтік тұрақтылықты қамтамасыз етеді. Жұмыспен қамтудың жоғары деңгейі еңбек нарығындағы тұрақтылықты арттырып, халық табысының өсуіне ықпал етеді. Ал мемлекеттік бюджет пен төлем балансының теңгерімділігі елдің қаржылық қауіпсіздігін нығайтып, сыртқы экономикалық күйзелістерге төтеп беру қабілетін күшейтеді. Алайда жаһандану дәуірінде макроэкономикалық теңгерімді сақтау барған сайын күрделене түсуде. Себебі ұлттық экономикалар халықаралық нарықтармен тығыз байланысып, сыртқы экономикалық факторлардың ықпалы айтарлықтай күшейді. Әлемдік қаржы нарықтарындағы өзгерістер, шикізат бағасының құбылмалылығы, халықаралық капитал қозғалысының қарқыны, геосаяси тәуекелдер мен сауда шектеулері макроэкономикалық көрсеткіштердің тұрақтылығына тікелей әсер етеді.

Жаһандану жағдайында инфляция деңгейіне сыртқы факторлар, әсіресе импорт бағасының өсуі мен валюталық бағамның ауытқуы қатты ықпал етеді. Импортқа тәуелді елдерде ұлттық валютаның әлсіреуі бағаның өсуіне алып келіп, инфляциялық қысымды күшейтеді. Бұл өз кезегінде халықтың нақты табысының төмендеуіне және әлеуметтік теңсіздіктің артуына себеп болуы мүмкін. Жұмыспен қамту мәселесі де жаһандану жағдайында күрделене түсті. Бір жағынан, халықаралық еңбек бөлінісі мен инвестициялардың артуы жаңа жұмыс орындарының ашылуына мүмкіндік берсе, екінші жағынан, автоматтандыру мен технологиялық жаңару кейбір салаларда жұмыс орындарының қысқаруына алып келеді. Бұл еңбек нарығында құрылымдық жұмыссыздықтың өсу қаупін арттырады. Мемлекеттік бюджет теңгерімі жаһандану жағдайында ерекше маңызға ие. Экономикалық өсуді ынталандыру мақсатында жүргізілетін фискалдық саясат бюджет тапшылығының артуына әкелуі мүмкін. Ал шамадан тыс бюджет тапшылығы мемлекеттік қарыздың өсуіне және қаржылық тұрақсыздыққа соқтырады. Сондықтан мемлекеттер экономикалық өсуді қолдау мен бюджеттік тәртіпті сақтау арасында тепе-теңдік табуы тиіс. Төлем балансының жағдайы да макроэкономикалық теңгерімнің маңызды көрсеткіші болып табылады. Экспорт пен импорт арасындағы теңгерімнің бұзылуы валюталық резервтердің азаюына және ұлттық валютаның құнсыздануына әкелуі мүмкін. Әсіресе шикізат экспортына тәуелді елдер әлемдік нарықтағы баға өзгерістеріне өте сезімтал келеді. Осылайша, жаһандану дәуірінде макроэкономикалық теңгерімді сақтау мемлекеттер үшін күрделі әрі көпқырлы міндетке айналды. Бұл міндетті шешу үшін тиімді ақша-несие және фискалдық саясат жүргізу, экономиканы әртараптандыру, қаржы нарықтарын реттеу және институционалдық реформаларды жүзеге асыру қажет. Тек осындай кешенді шаралар ғана жаһандану жағдайында экономикалық тұрақтылықты қамтамасыз етіп, ұзақ мерзімді даму мүмкіндігін қалыптастырады.

Жаһандану экономикалық өсудің маңызды қозғаушы күштерінің бірі ретінде халықаралық сауданың рөлін арттырды. Елдер арасындағы тауар, қызмет және капитал алмасуы өндіріс көлемінің өсуіне, жаңа жұмыс орындарының ашылуына және технологиялардың таралуына мүмкіндік берді. Дегенмен, халықаралық саудаға шамадан тыс тәуелділік кейбір елдер үшін экономикалық тұрақсыздық қаупін күшейтті. Әсіресе шикізат экспортына бағытталған елдер әлемдік нарықтағы баға ауытқуларына өте сезімтал болып отыр.

Жаһандану дамыған елдер үшін тұрақты экономикалық өсуді сақтауға мүмкіндік береді, себебі олардың институционалдық жүйелері мықты және қаржы нарықтары дамыған. Ал дамушы елдерде сыртқы қарыздың артуы, валюта бағамының құбылмалылығы және инфляция экономикалық теңгерімді әлсіретеді.

2-кесте: Жаһанданудың экономикалық өсуге әсерінің салыстырмалы талдауы

Факторлар	**Дамыған елдер**	**Дамушы елдер**
Технология	Жоғары деңгей	Импортқа тәуелді
Инвестиция	Ішкі және сыртқы	Негізінен сыртқы
Экспорт құрылымы	Диверсификацияланған	Шикізаттық
Экономикалық тәуекел	Төмен	Жоғары

2-кестеде салыстырмалы талдау жаһандану жағдайында экономикалық саясаттың маңызын арттырады. Әсіресе құрылымдық реформалар мен экономиканы әртараптандыру макроэкономикалық теңгерімді сақтаудың негізгі құралы болып табылады.

Сонымен қатар, жаһандану әлеуметтік-экономикалық теңсіздіктің тереңдеуіне де ықпал етті. Дамыған елдер жаһандану артықшылықтарын тиімді пайдаланып, жоғары технологиялы өндіріс пен қаржы секторын дамыту арқылы тұрақты экономикалық өсуді қамтамасыз етсе, дамушы елдер көбінесе арзан еңбек күші мен шикізат көзі ретінде қалып отыр. Бұл жағдай макроэкономикалық теңгерімнің бұзылуына, табыстардың әділетсіз бөлінуіне және әлеуметтік шиеленістердің күшеюіне алып келеді.

Қаржы нарықтарының жаһануы да макроэкономикалық теңгерімге айтарлықтай әсер етті. Қысқа мерзімді алыпсатарлық капиталдың қозғалысы ұлттық валюталардың тұрақтылығына қауіп төндіріп, инфляциялық қысымды күшейтуі мүмкін. Осыған байланысты мемлекеттер үшін тиімді ақша-несие және фискалдық саясат жүргізу, қаржы нарықтарын реттеу және экономиканы әртараптандыру мәселелері алдыңғы қатарға шықты. Жаһандану жағдайында экономикалық өсуді қамтамасыз ету мен макроэкономикалық теңгерімді сақтау арасында күрделі әрі көпқырлы байланыс қалыптасқан. Экономикалық өсудің басты мақсаты халықтың өмір сүру сапасын арттыру болса, макроэкономикалық теңгерім осы мақсатқа жетудің негізгі алғышарты болып табылады. Сондықтан қазіргі кезеңде экономикалық саясат тек өсім көрсеткіштеріне емес, оның тұрақтылығы мен әлеуметтік тиімділігіне бағытталуы тиіс.

Қорытындылай келе, жаһандану дәуірінде экономикалық өсу мен макроэкономикалық теңгерім бір-бірімен тығыз байланысты. Экономикалық өсудің жоғары қарқыны әрдайым тұрақты дамуды білдірмейді, егер макроэкономикалық теңгерім сақталмаса. Сондықтан мемлекеттер үшін басты міндет – жаһандану мүмкіндіктерін тиімді пайдалана отырып, инфляцияны бақылау, бюджет тапшылығын азайту, экономиканы әртараптандыру және әлеуметтік тұрақтылықты қамтамасыз ету. Тиімді макроэкономикалық саясат пен институционалдық реформалар ғана жаһандану жағдайында тұрақты әрі сапалы экономикалық өсуді қамтамасыз ете алады. Бұл өз кезегінде ұлттық экономиканың бәсекеге қабілеттілігін арттырып, халықтың өмір сүру деңгейін жақсартуға мүмкіндік береді.

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ПРОБЛЕМЫ АУДИТОРСКОЙ ДЕЯТЕЛЬНОСТИ

СЕРГЕЕВА ТАТЬЯНА ВИКТОРОВНА
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Аннотация: *Цель статьи является изучение и анализ проблем аудиторской деятельности, а так же пути их решения. В ходе проведения исследования были рассмотрены теоретические и практические аспекты развития аудита в современных условиях. Определено, что основными проблемами является переход на цифровизацию и нехватка компетентных специалистов, вследствие чего необходимо совершенствование системы подготовки специалистов и создание привлекательных условий труда.*

Ключевые слова: *Цифровизация, Проблемы аудиторской деятельности, Профессиональные специалисты, Проверка, Репутация.*

Введение:

Актуальность темы исследования обусловлена усиливающимся влиянием цифровизации на все сферы экономической деятельности, включая аудит. Переход на электронные формы отчетности, анализ больших объёмов данных, автоматизация проверки документов, все это существенно изменило подходы к проведению аудиторской проверки. Благодаря внедрению, цифровая аудиторская проверка выявила ряд проблем - от недостаточной компетенции специалистов и сложности адаптации старшего поколения до технических сбоёв и угроз кибербезопасности. Все это обусловлено необходимостью детального изучения проблем аудиторской деятельности в условиях цифровизации и поиска путей их решения.

Целью исследования является изучение и анализ проблем аудиторской деятельности, а так же в определении направления по принятию решений и совершенствованию аудиторской проверки. Особое внимание уделяется цифровизации, уровню профессиональной подготовке аудиторов, исключение человеческого фактора и минимизация ошибок при анализе данных.

Для достижения целей в исследовании, требуется решить ряд задач:

- Рассмотреть научные публикации посвящённые проблемам аудиторской деятельности;
- Изучить и выявить факторы влияющие на аудиторские проверки;
- Выявить основные проблемы возникающие при аудиторской проверки;
- Проанализировать влияния цифровизации на качество аудиторской проверки;
- Разработать рекомендации по решению проблем аудиторской деятельности.

Объектом исследования - аудиторская деятельность в Республике Казахстан.

Предметом исследования являются проблемы и направления на усовершенствование аудиторской проверки на территории Республики Казахстан.

В ходе написания работы были использованы такие методы исследования как, анализ научной литературы и публикаций, изучение международных стандартов аудита, обобщение и систематизация данных, сравнение разных стандартов и подходов в проведении аудита.

Теоретическая и практическая значимость исследования заключаются в том что, результаты работы способствуют глубокому пониманию и решению проблем аудиторской деятельности.

Глава 1. Теоретические основы аудиторской деятельности.

1.1. Понятие, сущность и значение аудита.

Аудит - проверка в целях выражения независимого мнения о финансовой отчетности и прочей информации, связанной с финансовой отчетностью, в соответствии с законодательством Республики Казахстан.[1]

Главная цель аудита состоит в определении достоверности и правдивости финансовой отчетности субъекта, в проверке, а так же контроле за соблюдением клиентом законов и норм хозяйственного права и налогового законодательства.[2]

Основные задачи регулирования в области аудиторской деятельности:

1) установление правовых основ аудиторской деятельности;
2) определение основных направлений осуществления аудиторской деятельности;
3) защита прав и законных интересов физических и юридических лиц, государства в области аудиторской деятельности;
4) создание условий для повышения профессиональных компетенций аудиторов.[3]

1.2. Цифровизация экономики и ее влияние на аудит.

Современный мир очень быстро развивается и благодаря этому произошли значительные изменения в аудиторской деятельности. Основным изменением стал переход на цифровизацию в РК. Цифровизация внесла большой вклад в развитие аудиторских проверок, а так же выявила ряд ошибок, которые помогли улучшить работу аудитора.

Одной из проблем, возникших в период цифровизации стал, сам переход на электронные документы. Некоторые предприятия понесли убыток, так как стоимость цифровизации и хранения информации обходилась в большие суммы. Но не смотря на это компании продолжают автоматизировать учет на предприятиях, что ведёт к автоматизации бухгалтерских процессов и возможностей задействовать меньшее количество людей.

Использование цифровых технологий также увеличило риск проблем с кражей данных, что значительно влияет на деловую репутацию аудиторской фирмы. Деловая репутация аудиторской фирмы так же является очень важной проблемой аудиторской деятельности, ведь она на прямую влияет на количество и качество проверки.

Глава 2. Проблемы аудиторской деятельности в современных условиях.

Аудиторская деятельность является неотъемлемой частью финансового контроля и обеспечивает достоверность бухгалтерской (финансовой) отчетности организаций. Однако в последние годы в аудиторской деятельности наблюдается ряд проблем, связанных как с изменением в законодательстве, так и с активным развитием технологий.

На сегодняшний день возникает серьёзный вопрос в снижении профессиональной компетенции аудиторов и консультантов. Для того, что бы стать аудитором нужно закончить высшее экономическое образование, иметь стаж работы и получить лицензию аудитора, в связи с этим большое количество молодых специалистов выбирает легкодоступные методы обучения, которые не так развиты в экономической сфере. То есть выбирают сертифицирование и обучение в колледжах, не желая развиваться дальше и получать высшее экономическое образование, из-за этого так же возникает дефицит кадров.

Ограниченное количество профессиональных специалистов на прямую влияет на работу аудиторов, ведь большинство из них преклонного возраста, а этот значительно ухудшает работу с технологиями.

Так же основными проблемами аудиторской проверки можно считать:

- Аудиторские риски. Для разработки плана аудита и начала аудиторских проверок необходимо оценить вероятность, всевозможные варианты событий, включая нежелательные, для того, что бы уложиться в сроки и не допустить ошибок в форс-мажорных обстоятельствах.
- Изучение клиента. Необходимо изучить с разных сторон деятельность организации, изучить систему внутреннего контроля и учётную политику. Так же получить полезную информацию из анализа работы внутреннего контроля.
- Планирование аудита. После изучения деятельности организации и всех аспектов системы ее бухгалтерской отчетности, важно правильно определить срок проверки на каждую процедуру, что бы не упустить ни одной детали.

- Контроль качества аудита. Правила и обязанности проверяющих и проверяемых, этика взаимодействия, конфиденциальность информации, сохранение документов.
- Неокупаемость затрат на создание системы проведения аудиторской проверки.
- Отсутствие системного подхода к решению проблем у проверяемой организации.
- Возможные нарушения со стороны аудиторов о конфиденциальности информации аудируемой организации.
- Отсутствие системного подхода к решению проблем проверяемой организации.
- Нехватка выбранных мер направленных на устранение негативных явлений, предупреждению возможных убытков, сбоев систем хозяйственного механизма. [4]

Глава 3. Пути решения проблем аудиторской деятельности.

Проведённый анализ показал, что современная аудиторская деятельность в Республике Казахстан сталкивается с рядом проблем, связанных с внедрением технологий, недостаточным уровнем квалификации работников и преклонным возрастом специалистов. В связи с этим, что бы устранить проблемы нужно обеспечить аудиторские фирмы новыми кадрами, а для этого нужно применить комплекс мер организационного, правового и экономического характера.

1) Совершенствование системы подготовки специалистов. Для этого нужно создать условия в которых молодым кадрам будет интересно и легко развиваться, к примеру дать больше грантов.

2) Создание привлекательных условий труда. Обеспечить более удобный режим работы, повысить заработную плату для начинающих специалистов, сократить режим работы и награждать работников.

3) Повышение квалификаций действующих специалистов. Регулярно проводить тренинги, семинары, которые будут способствовать не только повышению квалификации, но и сплочению коллектива.

4) Внедрение цифровых технологий. Автоматизировать рутинные процессы для снижения нагрузки на специалистов, которое послужит для обеспечения более приятной работой.

5) Создание программ наставничества. Необходимо развивать систему при которой опытные аудиторы передают знания молодым специалистам. Это позволит сохранить профессиональный опыт старшего поколения и адаптировать молодёжь к практической работе.

Благодаря этим пунктам можно решить большинство проблем аудиторской деятельности, которые помогут проводить аудиторские проверки более легко и доступно.

Заключение.

В ходе проведения исследования были рассмотрены теоретические и практические аспекты развития аудита в современных условиях. Среди ключевых проблем выделяются недостаточное количество кадров, большие затраты на цифровизацию и некомпетентность молодых специалистов. Так же установлено что, большинство специалистов преклонного возврата, что создает кадровый разрыв и осложняет внедрение технологий. В работе были предложены пути решения данных проблем включая, совершенствование системы подготовки специалистов, создание привлекательных условий труда, создание программ наставничества. Реализация данных мер позволит повысить качество аудиторских услуг, создать условия для устойчивого развития аудиторской отрасли в Казахстане, привлечь молодых специалистов в профессию и сократить кадровый дефицит.

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