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Sustainable Agricultural Transformation: Insights from the Emilia-Romagna Region

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ABSTRACT

Today, Kazakhstan's agricultural industry remains one of the most risk-prone, heavily influenced by adverse weather conditions, volatile market prices, and insufficient infrastructure. The study aims to assess opportunities for enhancing Kazakhstan's agricultural sector's competitiveness through the adoption of smart technologies, drawing lessons from the Emilia-Romagna region in Italy. The research employs a combination of comparative analysis and case study methodologies to evaluate the applicability of international best practices in the context of Kazakhstan's agricultural development. The study relies on a variety of data sources, including government reports, international case studies, and performance metrics from both Kazakhstan and the Emilia Romagna Region. The findings demonstrate that integrating technologies such as IoT, robotics, and blockchain can improve productivity, sustainability, and market attractiveness in the agricultural sector. The study also highlights the need to enhance farmer and manager competencies and promote family businesses and cooperatives. By adopting these strategies, Kazakhstan could address the existing challenges in its agricultural sector, reduce vulnerabilities, and create a more robust agro-industrial ecosystem. Future research should focus on developing specific pilot programs that apply these integrated approaches at a regional level, as well as assessing the long-term impacts of digital and sustainable practices in enhancing the competitiveness of Kazakhstan's agricultural sector.

KEYWORDS: Smart Agriculture, Family Businesses, Agribusiness, Sustainable Development, Digitalization, Region, Regional Development, Emilia-Romagna

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1. INTRODUCTION

Kazakhstan's vast open spaces provide significant potential for agricultural development, presenting an ideal environment for integrating emerging technologies such as artificial intelligence, IoT, robotics, and edge computing. The agricultural sector in Kazakhstan holds considerable promise for the rapid adoption of these technologies, which could transform the industry on a large scale. However, agriculture in the country remains one of the most risk-prone sectors, influenced heavily by adverse weather conditions, diseases, and price volatility (OECD/FAO, 2021). Reactive, ex-post responses to crises essentially characterize current risk management practices in Kazakhstan, and there is an urgent need for a more comprehensive and integrated approach that addresses vulnerabilities proactively (Ibyzhanova et al., 2022).

The ongoing industrialization and digitization of agriculture, characterized by the adoption of intelligent technologies (Pavione et al., 2020), can potentially stimulate growth across related sectors and foster the overall development of the regional economy. The emphasis is on harnessing the benefits of digital transformation through an integrated ecosystem of technologies and data systems across the entire agricultural supply chain, encompassing operations from the field to farms, agribusiness, and government organizations (Smagulova, 2020). This transformation contributes to Kazakhstan's broader economic transition from reliance on oil and natural gas. Although agricultural production currently accounts for just over 4.5% of the national GDP, the sector has begun to attract a generation of young entrepreneurs who are eager to create start-ups focusing on productive genetics, biological advancements, and process digitization (U.S. Department of Agriculture, Foreign Agricultural Service, 2022).

The government of Kazakhstan has recognized the importance of modernizing agriculture. It has introduced a vital development strategy to drive the ecological transition, advance digitization, modernize agricultural practices, enhance the transit potential between China and Europe, diversify productive capacities beyond hydrocarbons, and implement privatizations. However, the adoption of innovative agricultural techniques, such as organic crop production, remains limited; only about 1.5% of Kazakhstan's 22 million hectares of total crop area is cultivated using organic methods (U.S. Department of Agriculture, Foreign Agricultural Service, 2022).

This paper explores how Kazakhstan can enhance its agricultural sector by drawing lessons from successful territorial development models, specifically the Emilia Romagna Region agro-industrial ecosystem in Italy. It also examines the feasibility of implementing integrated performance evaluation tools, proposes an educational methodology for entrepreneurship in agriculture, and highlights the potential for mentorship and cooperation between the Emilia Romagna Region and critical regions in Kazakhstan, including Almaty, Turkistan, and Mangystau. The overarching goal is to foster the capacity for entrepreneurship and self-achievement among farmers and agricultural managers through a "learning by doing" approach, thereby driving the adoption of new technologies and improving the agricultural sector's competitiveness. It was highlighted particularly the role of field experiences with the individuation of excellence cases available for the education of farmers and agricultural managers to entrepreneurship and self-achievement in order to apply new technologies and marketing applied knowledge.

The study assesses opportunities for enhancing Kazakhstan's agricultural sector's competitiveness. This will be achieved by evaluating the potential for adopting smart technologies, drawing on successful experiences from the Emilia-Romagna region in Italy, and tailoring these approaches to Kazakhstan's specific conditions and needs. The focus is on identifying practical strategies that can be implemented to drive innovation,

improve productivity, and foster sustainable growth in the agricultural sector.

2. LITERATURE REVIEW

Digitalization and the use of technologies for the future development of agriculture

In the research's target regions, Almaty, Mangystau, and Turkistan, one direction for regional development could be the agricultural recovery of lands affected, as stated by the Government Report, by a decline in fertility in the last twenty years. The recovery or fertility, connected to the fertilizing of soils, the application of modern technologies for cultivation, the rational watering, and the use of high-performance seeds, plants, and animal varieties, would have a drag effect on the entire regional economy and society with the involvement of people and activities spread in the territory and different economic sectors in the activities connected to the furniture of products and of production tools and in the chain products (Bianchi, 1999; Dinis Sousa et al., 2021). One risk to be avoided is the abandonment of territories and practices to enhance environmental ability (Mella & Gazzola, 2015). All this also guarantees jobs that also play a role in enhancing and protecting the territory.

To this end, the government has the job of valorizing the excellence of the agroindustry and, in general, agribusiness through pilot experiences. So, the intervention strategy passes through the analysis of the territory, the selection of the area of intervention, and within it, cases in which the combination of ownership structure, economic dimension, and land vocation would characterize opportunities for pilot experiences. Irrigation development is a critical economic development enabler and accelerator in an economy that is considered agro-based agriculture. Smart irrigation is the new frontier of irrigation.

Thanks to Smart irrigation technology, it's possible to use weather data or soil moisture data to determine the landscape's irrigation needs. In this way, irrigation efficiency is maximized by reducing water waste while maintaining plant health and quality. For big companies, this is not a problem, but for SMEs, it's not easy. SME irrigation development is viable and able. In many parts of the developing world, small-scale irrigation systems are an effective and necessary strategy for boosting agricultural output, bolstering household food security, and reducing rural poverty. Irrigation is critical to poverty alleviation, economic growth, food security, and environmental protection in developing countries. It is essential to the technologies, institutions, and policies underpinning increased agricultural output. Thus, as an agricultural production input, irrigation water is an essential socio-economic good with a positive role in poverty alleviation.

Socio-cultural and economic potentials, roadmap, models, and scenarios planning

The research focuses on comparing the regions of Almaty, Turkistan, and Mangystau in Kazakhstan with analogous areas in Italy, analyzing their development across three primary dimensions: efficacy, efficiency, and adequacy. These dimensions are interrelated within a fundamental system of regional performance. Efficiency pertains to enhancing agricultural productivity through the fertilization of soils and the widespread adoption of modern agro-industrial practices. Efficacy examines the promotion of entrepreneurship, emphasizing the growth of family businesses and cooperatives as key drivers of regional development. Adequacy evaluates the role of government policies in fostering entrepreneurship and providing incentives for regional growth. Together, these interconnected dimensions highlight the interplay between agricultural innovation, entrepreneurial activity, and policy support, offering a comprehensive framework for assessing and improving regional potential.

The interplay between efficacy, and adequacy provides a framework in the context of smart agriculture and sustainable development (Figure 1).

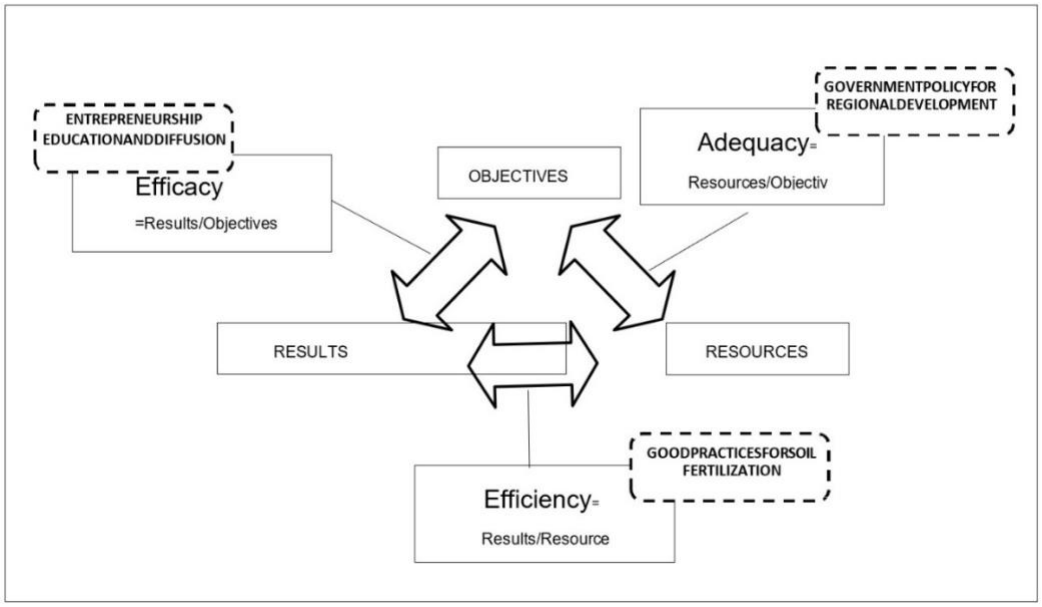

FIGURE 1. Main indexes related to the report subjects

Note: compiled by authors

Figure 1 illustrates the relationship between three critical dimensions: efficacy, efficiency, and adequacy. Efficacy refers to achieving desired results relative to set objectives, focusing on the diffusion of entrepreneurship and education in agriculture. Efficiency measures the effective utilization of resources, emphasizing best practices for soil fertilization and modern agricultural techniques. Adequacy evaluates the alignment of resources with objectives, highlighting the importance of government policies in fostering regional development.

These interconnected dimensions underline the need for a cohesive strategy integrating educational initiatives, resource optimization, and supportive policies to drive sustainable agricultural transformation. This system testifies that each item is connected with others and that the development is to be perceived in different directions with a coordination of interventions, a coordination almost now not completely achieved.

The Efficiency: The fertilization of soils and the diffusion of good modern agricultural practices

Kazakhstan has good-quality agricultural land, but its continental climate and soil-depleting agricultural practices have limited its exploitation. Moreover, only about 1.5% of the total crop area of 22 million hectares is cultivated using organic crop production technologies (U.S. Department of Agriculture, Foreign Agricultural Service, 2022). Agriculture is relatively poor due to the political inheritance of the past, which has not allowed the development of new cultivation technologies. Moreover, due to the presence of brackish land, it isn't easy to prepare correctly.

The crop industry faces several critical challenges that hinder its development and competitiveness. A key issue is the low level of diversification, which limits the resilience and sustainability of agricultural production. The underdevelopment of selection undertakings and the seed production system, coupled with a shortage of seeds from domestic breeding programs, further constrains the sector's growth. Additionally, soil fertility continues to deteriorate, exacerbating productivity challenges. Inefficient irrigation practices, characterized by insufficient adoption of water-

saving technologies, also impede optimal resource utilization.

The industry suffers from a low level of technical and technological modernization, which restricts the adoption of innovative farming practices. Moreover, the high corruption component in implementing control, supervisory functions, and public services undermines trust and efficiency within the sector. Insufficient digitalization further limits the ability to leverage modern data-driven solutions for improved management and productivity.

Organic farming remains underdeveloped, with inadequate technologies for producing and processing organic raw materials. Existing regulatory legal acts and national standards in organic production fail to align with international practices and do not adequately address the needs of domestic producers. Collectively, these issues underscore the need for comprehensive reform and strategic investment to modernize and enhance the crop industry's performance and global competitiveness.

A central subject to this purpose is the problem of black soils for a surface in Kazakhstan of 108 million hectares, as mentioned in the FAO Report. Black soils are more at risk than ever from the climate crisis, biodiversity loss, and land use change. Black Soils have the characteristic of being dense and dark lands, rich in organic matter. They are intrinsically fertile but are also very sensitive to human intervention and subject to degradation. They contain much organic carbon and represent enormous greenhouse gas potential. However, they guarantee a food basket for many countries. Therefore, promoting their conservation and sustainable use is essential to support and ensure food security where it is lacking while still protecting the environment.

In target Regions of the project, Almaty, Mangystau, Turkistan, one direction for the regional development could be the agricultural recovering of lands affected, as stated by Government Report, by a decline of fertility in last twenty years. This is partially connected, as FAO observed this caused phenomenon by the inappropriate use of black soils, meaningfully diffused in Kazakhstan, and from the loss of biodiversity and, generally, by climate change.

The recovery of fertility, connected to the fertilizing of soils, the application of modern technologies for cultivation, the rational watering, and the use of high-performance seeds, plants, and animal varieties, would have a drag effect on the entire regional economy and society with the involvement o people and activities spread in the territory and different economic sectors in the activities connected to the furniture of products and of production tools and in the chain products.

For this purpose, the government has the job of valorizing excellence through pilot experiences of agroindustry and, in general, agribusiness. So, the strategy of interventions passes through the analysis of the territory, the selection of the area of intervention, and within it of cases in which the combination of ownership structure, economic dimension, and land vocation would characterize opportunities of pilot experiences. Irrigation development is a key economic development enabler and accelerator in an economy that is considered agro-based agriculture. Smart irrigation is a new frontier of irrigation. Thanks to Smart irrigation technology, it is possible to use weather data or soil moisture data to determine the landscape's irrigation needs. In this way the, irrigation efficiency is maximized by reducing water waste, while maintaining plant health and quality. It is not a problem for the big companies, but it is not easy for the SMEs. SME irrigation development is viable and sustainable. In many parts of the developing world, small-scale irrigation systems are an effective and important strategy for boosting agricultural output, bolstering household food security, and clipping rural poverty. Irrigation is a critical input in developing countries for poverty alleviation, economic growth, food security, and environmental protection. Irrigation is essential to the package of technologies, institutions, and policies that underpin increased agricultural output. Thus, as an agricultural production input, irrigation water is an essential socio-economic good with

a positive role in poverty alleviation (UNDP, 2024).

The Efficacy: The diffusion of entrepreneurship and the opportunities for family business and Co-operatives

Family Businesses (FB) and Co-operatives play a central role not only in Italy, where it has a relevant position in the district model and in its contribution to employment and socio-economic stability. Also, in Balkan Countries and South America, the central position of FB and Co-operatives is recognized not only in quantitative but also from a qualitative point of view (European Commission, 2007; OECD, 2005; United Nations, 2003).

In particular, FB and Co-operatives are considered interesting models for the development processes of Transition Countries in which it is linked to enterprise culture. In this scenario, the large diffusion of FB and Coop are a characteristic of European and Italian economies and contributed to enriching the economic transactional models (Bartlett & Ghoshal, 2000). For this purpose, the Italian Region, Emilia Romagna, was chosen as a territorial laboratory of advanced agriculture and the application of smart agriculture. This laboratory was available for cultural and historical attitudes, initiatives of education entrepreneurship, self-achievement, and partnerships for projects and concrete initiatives leading to Kazakhstan agriculture's sustainable and technological development.

3. RESULTS

Considering the existing local systems, the differences did not constitute a relevant obstacle to comparing entrepreneurial aspects (Table 1).

TABLE 1. Main differences between Kazakhstan Areas considered in the Report and the Emilia Romagna Region of Italy

Kazakhstan	**Emilia-Romagna**
Scarce diffusion of individual and small business	There is a high diffusion of small businesses, many of them individual
Weak link of entrepreneurship with cultural events	Strong link of economic activities with local culture, supported by numerous cultural enterprises (fairs, festivals, cultural heritage, and events)
Minimal involvement of local government in the development of the territory and entrepreneurship	Active support from local municipalities in the development of territory and entrepreneurship
Most universities are directly dependent on the government	Universities spread throughout the territory
Intermediate level of interconnectivity in the global digital landscape	High interconnectivity with information and technological networks
Scarce diffusion of industry, concentrated in areas with high levels of pollution.	Industrial settlements and areas distributed across the territory with particular attention to ecological considerations

Note: compiled by authors

Today, family businesses (FB) and cooperatives are increasingly recognized within the e-economy as significant drivers of entrepreneurship, transitioning from post-Fordism to advanced applications of ICT and postmodern culture. These initiatives in land recovery for crops aim to leverage the expertise and successful practices from leading agricultural areas in Italy, particularly through partnerships with key companies in the Emilia-Romagna region. Notable contributors include SAIS, an Italian Agricultural Seed Group specializing in high-quality seeds; SubaSeeds Company SPA, a prominent seed production

company; and Amadori, a leading Italian agri-food group specializing in poultry and expanding into the broader protein sector with diverse offerings such as chicken meat, plant-based products, and frozen foods. Additionally, IRRINET, a regional irrigation system for agricultural water management developed by the Canale Emiliano Romagnolo consortium, provides advanced tools for optimizing water use through telematic technologies. Orogel, a cooperative of farmers and agronomic technicians, leads the production of fresh frozen vegetables with full supply chain control. Together, these partnerships serve as a model for integrating innovation, sustainability, and entrepreneurial strategies into agricultural development, offering valuable lessons for regions like Kazakhstan.

At the same time, these items can shortly be compared and targeted to the Emilia Romagna Region, evidencing the change of perspective needed to implement sustainable agricultural and technological development in Kazakhstan. Although it is a huge synthesis, this comparison clearly shows the relevance of the local system as a category that allows, for dimensions and structural characteristics, a confrontation among countries of different dimensional scales and structures.

The theoretical background of small and medium-sized business development is strongly linked to research on enterprise startups. Authors report various evolving approaches, culminating in recent ideas connected to neo-constructivism, neo-institutionalism, and systemic determinism (Table 2).

TABLE 2. The main evolutionary steps of theoretical approaches to business creation

Theoretical approaches	Approach to business creation
Rational Determinism (Spinoza)	It is possible to project the optimal path to enterprise creation.
Empirical theory (Locke)	Enterprises are born from single actions and experimental activities.
Constructivism (Berger, Luckman, Weick)	Enterprises are the result of put and take the approach
Institutionalism (Veblen)	Institutional and formal frameworks of the state and government condition the success of enterprise creation and development.
Neoempirical (Popper, Hempel)	It is impossible to define general principles deriving them from a limited number of cases. Each enterprise represents a fortuitous event unrepeatable.
Neo-constructivism	As for scientists and professionals, good enterprise practices derive from entrepreneurial practice communities.
Neo institutionalism (Albert, Hikermeier)	The private and public sectors can share in enterprise creation through a diverse framework.
Systemic Determinism (Scott, Nelson-Winter)	Relationships network limits and qualify the best practices available in a specific environment.

Note: compiled by authors

The lack of methodological rigor in previous research has resulted in a scarcity of comprehensive studies on family businesses (FB) despite the abundance of analyses on MSMEs and, more recently, on micro-enterprises. This gap has led scholars to adopt a utilitarian approach, often relying on findings from MSME research to examine the structures and processes of family businesses and cooperatives. While some aspects of MSMEs have been conveniently applied to these contexts, other authors, such as Livingston (2007), advocate for exploring new paradigms specific to family businesses and cooperatives. These paradigms could also be relevant for

studying the startup phase and the role of managerial control during this period.

There exist many kinds of business simulations that are used in vocational education and training. In order to ensure a clear definition of the different simulation methods, the Practice Enterprise will be compared to other methods like Business Games, Learning Office, and Junior Companies.

Table 3 provides an overview of the business simulations and of the main differences in terms of fictitious or actual performances.

TABLE 3. Comparison of four simulation methods

Simulation Method	Flow of Goods and Services	External Contacts
Business Games	Fictitious	Fictitious
Learning Office	Fictitious	Fictitious
Practice Enterprise	Fictitious	Real
Junior Company	Real	Real

Note: complied based on Gramlinger (2000)

Practice Enterprise and Business Games

Unlike Practice Enterprises, Business and Simulation Games have a pre-designed game structure. Under the constraint of specific resources and information (e.g., market data), learners strive to achieve maximum success for a fictitious business. The game is framed into time units or periods in which learners try to solve the underlying problem. Furthermore, Business Game did not consider social aspects or external contacts, and no commercial tasks were undertaken. Briefly, the didactics is focused on making decisions under different situations.

Practice Enterprise and Learning Offices

Literature defines the Learning Office as a model of a real business. The learners are divided into smaller learning groups than in Business Games. The company's daily business (e.g. business correspondence, bookkeeping) is performed by the different departments and upcoming business activities are planned. There are no real external contacts, and the flow of goods and money are fictitious, as can be seen in Table 1. In contrast to the Business Game, the focus lies on daily office activities (e.g., correspondence) instead of sole decision-making. The difference between the PE and the Learning Office is that the Learning Office is a closed system. There is neither a market where other Learning Offices co-exist nor real outside contacts since the trainer simulates all communication. Therefore, the students cannot observe and react to any market changes.

The Junior Company is a usual set for the duration of one school year, where students establish a company and offer self-developed products and services on the actual market. Initially, the students develop their business idea independently and go through all phases of an actual business project. These phases include idea generation, team building, planning, and production of the products or services. The students are also responsible for the marketing and selling of their products or services and, at the end of the school year, for the closing of their business.

As Table 1 indicates, unlike the Learning Office and the PE, a Junior Company trades with natural products and money and has (just like PEs) real external contacts. The Junior Company participates in the real market. Real capital is used (although only limited amounts) and establishes business relationships with customers and suppliers. The Junior Company and the PE have a different degree of reality. A PE has no real economic risk. Learning and working takes place in a protected area. Junior Companies bear entrepreneurial risk and, therefore, often operate under a mother company's legal and financial protection. Business simulation is a teaching methodology that refers to constructivism and connectivism theories through a learning-by-doing approach

that embodies all the instances of blended learning.

The key features of this teaching approach are its authenticity, contextualization, and situational design, aimed at replicating real-world scenarios representative of an organizational entity, typically a company, in all its functional and organizational dimensions, making it highly relevant and meaningful. It is active, requiring participants to process information dynamically and organize it efficiently to comprehensively understand the situation. It is also constructive, integrating new knowledge with existing understanding through reflection, enriching and giving purpose to the learning process. Additionally, it is intentional, focused on achieving a specific objective, such as managing business processes, and cooperative, as knowledge emerges from group discussions and shared re-elaborations. Here, the learning cooperation dimension represents a valid tool for integrating cognitive, professional, and social skills. In this didactic process, knowledge results from a re-elaboration of the group that discusses and shares (Gualdi, 2016).

Since 2001, Italian universities have started educational collaborations, particularly in the field of agricultural business: in 2001, the Faculty of Economics of the University of Bologna introduced a Business Management Course, the Practice Enterprise, as followed a few years later by the University of Parma (Bianchi, 2008), in 2023 an agreement was drawn up with the Oriental University of Naples and the universities of Almaty within the Erasmus+ program that will allow, in addition to the exchange of students, the exchange of teachers and researchers (Università Orientale di Napoli, 2023), in 2024 a Memorandum of Understanding was signed in Astana between the University of the Marche and Zhetysu University, in the field of agricultural sciences which provides for the activation of a double degree in Agricultural Sciences, Applied Technologies and Management of Bioresources, based on an educational path that will be held at the two universities, in English and Italian (Ansa, 2024).

Business Simulation is a participatory learning environment in which the dimension of cooperative learning represents a valid tool for integrating cognitive, professional, and social skills, as the members of the group, in order to achieve common goals, are called to work constructively and responsibly in the decision-making process with a positive interdependence, dialogic exchange, and collective reflection. All these activities aimed to improve participants' problem-solving and teamwork skills, qualities that the modern working context strongly requires, and they seem to have fruitful results in project management and performance (Table 4).

TABLE 4. Defining the skills citizens will need in the future world of work

<table>
<tr><th colspan="2">Cognitive</th><th colspan="2">Interpersonal</th></tr>
<tr><td>Critical Thinking
- Structured problem-solving
- Logical reasoning
- Understanding biases
- Seeking relevant information</td><td>Planning and Ways of Working:
- Work-plan development
- Time management and prioritization
- Agile thinking
-Ability to learn</td><td>Mobilizing Systems:
- Role modeling
- Win-win negotiations
- Crafting an inspiring vision
- Organizational awareness</td><td>Developing Relationships:
- Empathy
- Inspiring trust
- Humility
- Sociability</td></tr>
<tr><td>Communication:
- Storytelling and public speaking
- Asking the right questions</td><td>Mental Flexibility:
- Creativity and imagination
- Translating knowledge to different contexts</td><td colspan="2">Teamwork Effectiveness:
- Fostering inclusiveness
- Motivating different personalities
- Resolving conflicts
- Collaboration
- Coaching</td></tr>
</table>

<table>
<tr><td>- Synthesizing messages
- Active listening</td><td>- Adopting a different perspective
- Adaptability</td><td colspan="2">- Empowering</td></tr>
<tr><td colspan="2">Self-Leadership</td><td colspan="2">Digital skills</td></tr>
<tr><td>Self-Awareness and Self-Management:
- Understanding one's own emotions and triggers
- Self-control and regulation
- Understanding one's own strengths
- Self-motivation and wellness</td><td>Entrepreneurship:
- Courage and risk-taking
- Driving change and innovation
- Energy, passion, and optimism
- Breaking orthodoxies</td><td>Digital Fluency and Citizenship:
- Digital literacy
- Digital Learning
- Digital collaboration
- Digital ethics</td><td>Software Use and Development:
- Programming literacy
- Data analysis and statistics
- Computational and algorithmic thinking</td></tr>
<tr><td colspan="2">Goals Achievement:
- Ownership and decisiveness
- Achievement orientation
- Grit and persistence
- Coping with uncertainty</td><td colspan="2">Understanding Digital Systems:
- Data literacy
- Smart systems
- Cybersecurity literacy
- Tech translation and enablement</td></tr>
</table>

Note: compiled based on Dondi et al. (2021)

This teaching is based on Learning by doing. It aims to apply the theoretical knowledge acquired during studies in the business context to achieve fundamental skills such as problem-solving, decision-making, working teams, autonomy, responsibility, and communication. It also allows students to compete internationally with students from all over the world, participating in the international fair of simulated companies. It should be noted that the teaching staff comprises three profiles: the Teacher, the Tutor, and the Mentor.

The pervasive perspective of this didactical approach, developed by UIB in many International Projects like PICASP, is still in progress. Practice Enterprise could be diffused in many directions as synthesized, as shown in Table 5.

TABLE 5. Beneficiaries and targets group of practice enterprise

Category	Needs	Constraints
Final Beneficiaries	- Development and awareness of cultural diversity. - Building a shared vision of river governance. - Restoring knowledge and skills of high cultural quality. - More flexible delivery and fruition of services concerning cultural heritage, mobility, and local development linked to river basin governance.	- Scarce attitudes may be diffused in such organizations toward issues related to the social and economic framework for community revitalization.
Target Groups	- Achievement of international visibility. - Gathering additional resources (information, knowledge, funds). - Valorize human resources by improving the knowledge and skills of staff. - Enhancing the creation and development of networks with stakeholders at local, regional, national, and international levels. - Promotion of local heritage and connected mobility (especially in tourism).	- Different international standards must be followed when implementing policy. - Scarce internalization level of partner organizations. - Scarce collaboration and conflicts among project units. - Political and economic barriers for Universities, High Schools, and Research Centers.

	- Improve awareness regarding the relevance of local heritage to country development.	- Emerging conflicts among internal and external employees.

Note: compiled by authors

The Adequacy of Government Policy for Incentives to Entrepreneurship and Regional Development

The growth of competitiveness in transition countries is closely linked to the ability of local systems to organize a viable territorial offer in terms of infrastructure. Efforts by central and local governments and international cooperation have often focused on financial support and facilitation measures, including logistics, equipped areas, and grants to motivate investors and entrepreneurs. According to Bianchi (2011), these incentives include: no corporate taxes for 20 years, followed by a 10% rate; 5% personal income tax for five years, increasing to 10%; exemption from VAT and customs duties for export production; free connections to piped natural gas, electricity, water, and sewage systems; immediate access to major international airports, railroads, and key corridors; financial incentives for SMEs, including training cost subsidies; benefit package for eligible investors approved within ten business days.

Many of these incentives would focus on cooperation among small firms. Cooperation can be developed by building particular institutions, which would help mitigate the problem of small-scale production, for example, by forming an effective procurement system for agricultural products, a network of machine and tractor stations, service and procurement centers, etc.

Recently, some attentive scholars (Scherrer, 2004) attached importance to the nonmaterial conditions, such as the local attitude to entrepreneurship, the skills of local labor forces, and the orientation of local government. Other researchers consider the capability of local entities, public and private, to act as a system or the approach to consider the territory as a park in its different issues: cultural, technological, scientific, and entrepreneurial ones. Finally, some authors focus on their critical analysis of business creation, which is not a bureaucratic process, as imagined in International Cooperation Projects. All these new approaches can be discussed as the previous one because the situation constantly changes, orienting managerial theories to a dynamic perspective like Actor-Network Theory or ad hoc solutions. By the way, it can be an exciting challenge for researchers and applied scientists in business subjects to reconsider the components of the local entrepreneurial system, the cause of competitiveness as enterprises, and the relations among them.

The study on this area initially attempted to detect the relevance of relational management and relational borders individuated using concepts from the social research weak and strong ties (Bianchi & Barzanti, 2003; Bianchi, 2017). The continuity of business relationships with customers and suppliers limits the control area and, at the same time, the boundaries of organizational behaviors. The initial research target was afterward changed into an extension of the hypothesis aiming to explain the complexity of the business system and profitable hyperlinks. This last organizational category defines the established and deep roots coming from the enterprise's internal framework that projects its initiatives in a wide range of activities. Hyperlinks keep enterprises in touch with other organizations very differentiated, allowing them to create profitable situations and a stable network of exchanges (Bianchi, 2008). The experience of international collaboration projects for the development of entrepreneurship (and particularly of SMEs) further enforced these researches to consider the process of enterprise start-up and growth in different contexts (Bianchi, 1999). This process is considered in connection to the capability to create a profitable and stable network of contacts less than the availability of financial and economic resources (Table 6).

TABLE 6. Key areas policy in territorial knowledge management

Policy Areas in the TKM Approach	Metropolitan Areas (High-tech Sectors, Large Enterprises)	Industrial Clusters (Medium-tech Sectors, Innovative SMEs)	Peripheral Regions (Low-tech Sectors, Traditional SMEs)
1. Innovation Stimulus	Product innovation in specialized markets	Customer needs and supply chain integration	Cost competition in the global market
2. Accessibility	High international accessibility - low local accessibility	Low international accessibility - high local accessibility	Low international accessibility - low local accessibility
3. Receptivity	High internal diversity	High internal specialization	Low quality of human capital
4. Identity	High organizational and cognitive proximity	High local embeddedness and local identity	Fragmentation and external dependence
5. Creativity	High investments in R&D	Networking and interactive learning	Technology adoption
6. Governance	National industrial policies and strategy	Multi-level governance	Public finance and public regulations

Note: compiled by authors

Finally, a thought on the progress of Kazakhstan's agribusiness. Key indicators provided by the Bureau of National Statistics Agency for Strategic Planning and Reforms of the Republic of Kazakhstan show that in 2023, the gross production of products (services) of agriculture, forestry, and fishery in the Republic amounted to 7 625.2 billion tenge, which is 8.3% less than the previous year (Bureau of National Statistics Agency, 2023). The dynamics of gross output (services) of agriculture, forestry and fisheries in Kazakhstan for the period 2010-2023 is shown in Figure 2.

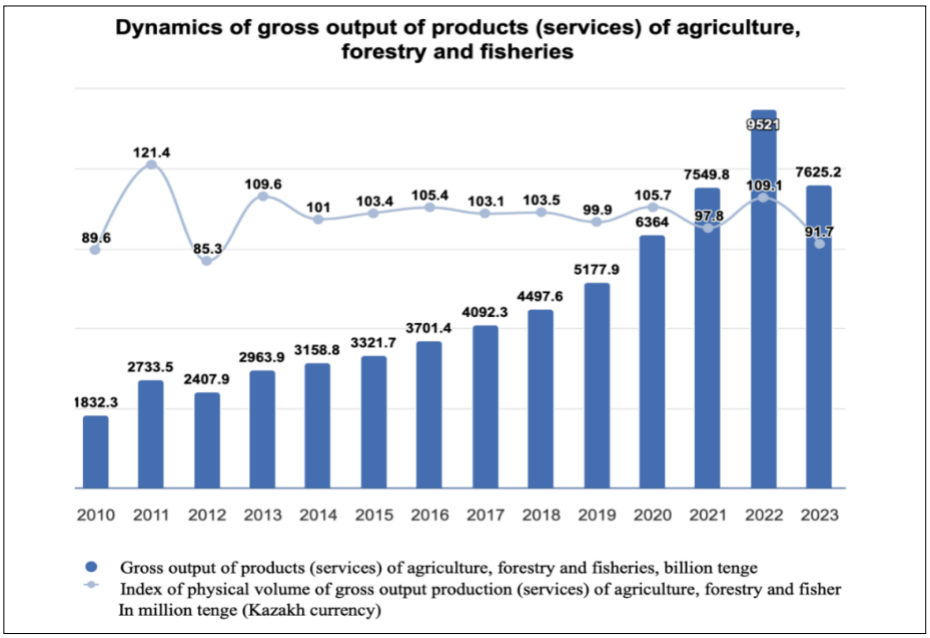

FIGURE 1. Trends in Environmental taxes for 2016-2022

Note: compiled by authors

The data presents the dynamics of the gross output of the agriculture, forestry, and fisheries sectors in Kazakhstan from 2010 to 2023. The graph shows the gross output values in billion tenge, represented by the vertical bars, alongside the index of the physical volume of gross output, expressed as a percentage change from the previous year, indicated by the line graph. The gross output of the sectors has shown a consistent upward trend over the period from 2010 to 2023, indicating a significant increase in value from 1,832.3 billion tenge in 2010 to 7,625.2 billion tenge in 2023, with a peak of 9,521 billion tenge in 2022. During this time, the index of physical volume has fluctuated, with notable spikes in 2011 (121.4%) and decreases in years like 2013 (85.3%). More recent years have seen stable performance, with the index peaking at 109.1% in 2022 and then decreasing slightly to 91.7% in 2023. These growth trends reflect periods of both expansion and stagnation in agricultural output, which are influenced by various economic and sector-specific factors.

4. CONCLUSIONS

Within the framework of this study, we are exploring the possibilities of enhancing the competitiveness of Kazakhstan's agricultural sector through the use of innovative technologies and by studying the experience of Emilia-Romagna in Italy. Our findings indicate that the integration of cutting-edge technologies such as the Internet of Things (IoT), robotics, and blockchain has the potential to significantly boost agricultural productivity, sustainability, and market appeal. Kazakhstan is working to fully integrate its agricultural and industrial chain, develop a sustainable development strategy to enter new markets, and use predictive information systems. The country is in the process of transitioning to the implementation of smart technologies such as real-time environmental monitoring, spatial analysis tools, and farm land mapping, aimed at modernizing agriculture and increasing its global competitiveness.

Rural development through agriculture can be achieved in two main ways:

1. Enhancing government intervention to foster the formation of cooperatives, which will make efficient use of resources, improve infrastructure, and innovate collectively.

2. Supporting privatization and establishing partnerships with domestic and international stakeholders to expedite the introduction of advanced technologies.

The future of agriculture in Kazakhstan is closely linked to the potential for establishing collaborative systems with international partners, such as Italy. Through joint ventures and knowledge exchange, we can contribute to the development of automated processes, utilizing robotics, AI-driven decision-making systems, IoT technologies, and blockchain for supply chain transparency - essential elements for promoting organic farming and sustainability.

Sensors that communicate the best weather conditions, agricultural machines capable of talking to other production nodes and at the same time capable of transmitting sound information to the players in the commercial chain and a university system that inspires innovative startups are some of the areas in which European FinTech more reactive will have to invest in Kazakhstan to create an economy of awareness that innovates agriculture, the oldest and most solid of a country (Nurbatsin & Gazzola, 2022).

In addition to technological innovations, it is important to increase the level of education and cooperation between the regions of Kazakhstan and international partners. The creation of training programs and mentoring mechanisms, as well as the use of “learning by doing” methods, contributes to increase the competitiveness of agriculture.

In the future, it will be necessary to pay more attention to creating pilot projects that use an integrated approach on the regional level. It will also be important to assess long-term outcomes of the implementation of digital and

eco-friendly methods in agricultural development in Kazakhstan.

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REFERENCES

Ansa. (2024, September 25). Università, accordo per Politecnica Marche in Kazakistan. Retrieved from: https://www.ansa.it/canale_terraegusto/notizie/mondo_agricolo/2024/09/25/universita-accordo-per-politecnica-marche-in-kazakistan_3d5216e3-86cb-4b87-82b3-66b29391ccde.html

Bartlett, C., & Ghoshal, S. (2000). *Transnational management*. Irwin McGraw Hill.

Bianchi, M. (1999). Cross-border public centres of support and technical assistance for small business development. *Ekonomska Istraživanja – Economic Research*, *12*(1–2), 21–35.

Bianchi, M. (2008). Clustering and networking in economy's competitiveness growth. Paper presented at the conference Competitiveness of the National Economy: Growth Factors, Conditions and Mechanisms, University of International Business, Almaty.

Bianchi, M. (2011). The Networking in Transition Countries Project Management. *The Seventh International Critical Management Studies (CMS) Conference University of Naples Federico II*. Retrieved from: https://www.academia.edu/3471350/_2011_The_neworking_in_transition_countries_Project_Management

Bianchi, M. (2017). Clustering and networking in Business Start-up. A managerial approach to push and pull intervention for Entreprise creation. *Economia Aziendale Online*, *7*, 339-347. https://doi.org/10.13132/2038-5498%2F7.4.339-347

Bianchi, M., & Barzanti, L. (2003). Stabilizzazione delle relazioni interaziendali e apprendimento organizzativo. Paper presented at the International Symposium on Learning Management and Technology Development in the Information and Internet Age, Bologna. Published online in *Economia Aziendale 2000 WEB*, 1, 2004.

Bureau of National Statistics (2023). Retrieved from: http://www.stat.gov.kz

Dinis Sousa, R., Boranbayeva, A., Satpayeva, Z.T., & Gassanova, A. (2021). Management of successful technology transfer in agriculture: The case of Kazakhstan. *Problems and Perspectives in Management*, *19*(3), 488-501. https://doi.org/10.21511/ppm.19(3).2021.40

Dondi, M., Klier, J., Panier, F., & Schubert, J. (2021, June 25). Defining the skills citizens will need in the future world of work. McKinsey & Company. Retrieved from: https://www.mckinsey.com/industries/public-sector/our-insights/defining-the-skills-citizens-will-need-in-the-future-world-of-work

Gramlinger, F. (2000). *Die Übungsfirma auf dem Weg zur Lernfirma? Eine empirische Darstellung in Form zweier Portraits*. Hobein.

Gualdi, D. (2016). Indagine sulle motivazioni e aspettative degli studenti di Forlì e Parma. Università di Parma Research Paper.

Ibyzhanova, A., Bogdashkina, I., Jakupova, A., Kopbulsynova, B., & Bazarova, B. (2022). Top trends of agriculture in Kazakhstan under transformation of economics. *AIP Conference Proceedings*, *2661*(1), 040001. https://doi.org/10.1063/5.0107512

Livingston, L. S. (2007). Control sales in family firms. *Family Business Review*, *20*(1), 49–64. https://doi.org/10.1111/j.1741-6248.2007.00083.x

Mella, P., & Gazzola, P. (2015). Sustainability and quality of life: The development model. In *Enterprise and the Competitive Environment* (pp. 542–551).

Nurbatsin, A., & Gazzola, P. (2022). The role of "Special Economic Zones" (SEZ) of the ICT industry for the development of the creative industry in Kazakhstan. *Economia Aziendale Online*, *13*(3), 493–511. https://doi.org/10.13132/2038-5498/13.3.493-511

OECD/FAO. (2021). *OECD-FAO Agricultural Outlook 2021–2030*. OECD-Publishing. https://doi.org/10.1787/19428846-en

Pavione, E., Gazzola, P., Amelio, S., & Magrì, J. (2020). Smart industry e sviluppo sostenibile: Imprese intelligenti e SDGs 2030. *Economia Aziendale Online*, *11*(1), 41–53. https://doi.org/10.13132/2038-5498%2F11.1.41-53

U.S. Department of Agriculture, Foreign Agricultural Service. (2022). *Kazakhstan finalizes 2021–2030 agricultural development policy document* (Report No. KZ2022-0010). Retrieved from: https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Kazakhstan%20Finalizes%202021-2030%20Agricultural%20Development%20Policy%20Document%20_Nur-Sultan%20%28Astana%29_Kazakhstan%20-%20Republic%20of_KZ2022-0010.pdf

RRINET Regione Emilia Romagna. (n.d.). Retrieved from: http://www.irriframe.it/Irriframe

Smagulova, S. A. (2020). Digitalization of agriculture in the Republic of Kazakhstan: Experience and problems. *Problems of AgriMarket*, *1*, 149–155.

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