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CONTENT

AGRICULTURAL SCIENCES

Ghukasyan A., Galstyan M., Matevosyan L.

EFFICIENCY OF INCREASING DOSES OF ZEOLITE IN
CROPS OF POTATOES ON THE BACKGROUND OF
MINERAL FERTILIZERS AND MANURE IN
TECHNOGENICALLY POLLUTED SOILS OF ARMENIA.....3

ECONOMIC SCIENCES

Akselrod R.

TRANSFORMATION OF OPERATIONAL ACTIVITIES AS
AN ECONOMIC AND MANAGEMENT INNOVATION OF
MODERN ORGANIZATIONS: METHODOLOGICAL
ASPECT8

Ryzhakova H., Homenko O.

METHODOLOGICAL REGULATION OF THE ECONOMIC
AND MANAGEMENT ENSURING THE INNOVATIVE
PLATFORM OF BUILDING DEVELOPMENT.....13

Kishchak N.

ECONOMIC AND MANAGERIAL INNOVATIONS IN THE
ADMINISTRATION OF THE PORTFOLIO OF
CONSTRUCTION PROJECTS OF THE DEVELOPER
COMPANY: DIAGNOSTICS AND ASSESSMENT OF
OPERATIONAL PRODUCTIVITY20

Onysko S., Lyzak M.

IDENTIFICATION OF THE PROBLEM AND
MANAGEMENT ASPECTS OF THE FORMATION OF
FINANCIAL AND ECONOMIC RESULTS OF
AGRICULTURAL ENTERPRISES26

Ihnatovich A.

THE ROLE OF WORLD RANKINGS IN INVESTMENT
DECISION-MAKING32

AGRICULTURAL SCIENCES

EFFICIENCY OF INCREASING DOSES OF ZEOLITE IN CROPS OF POTATOES ON THE BACKGROUND OF MINERAL FERTILIZERS AND MANURE IN TECHNOGENICALLY POLLUTED SOILS OF ARMENIA

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ЭФФЕКТИВНОСТЬ ПРИМЕНЕНИЯ ВОЗРАСТАЮЩИХ ДОЗ ЦЕОЛИТА В ПОСЕВАХ КАРТОФЕЛЯ НА ФОНЕ МИНЕРАЛЬНЫХ УДОБРЕНИЙ И НАВОЗА В ТЕХНОГЕННО ЗАГРЯЗНЕННЫХ ПОЧВАХ АРМЕНИИ

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Abstract.

The development of effective technologies for the reclamation and neutralization of contamination of technogenically polluted soils and the production of environmentally friendly products are topical problems of agriculture.

The purpose of this work is to study the effectiveness of the use of zeolite doses in potato crops against the background of NPK and manure. The article presents the results of studies on the reclamation of polluted soils in the Republic of Armenia. It was found that against the background of NPK and manure, the best dose of zeolite is 8 t/ha, which ensures a high yield and income. In the studied soils, the combined use of zeolite mineral fertilizers and manure is an effective method for regulating the level of HMs in agricultural products.

Аннотация.

Разработка эффективных технологий по рекультивации и нейтрализации загрязнённости техногенно загрязнённых почв и получение экологически чистой продукции является актуальными проблемами сельского хозяйства.

Цель данной работы - изучить эффективность применения доз цеолита в посевах картофеля на фоне NPK и навоза. В статье приведены результаты исследований рекультивации загрязнённых почв Республики Армения. Выяснено, что на фоне NPK и навоза наилучшей дозой цеолита является 8 т/га, обеспечивающая получение высокого урожая и дохода. В исследуемых почвах совместное применение цеолита минеральных удобрений и навоза является эффективным приёмом регулирующим уровень ТМ в сельскохозяйственной продукции.

Keywords: *heavy metals, soil, zeolite, organic and mineral fertilizers, productivity, anthropogenic impact.*

Ключевые слова: *тяжелые металлы, почва, цеолит, органические и минеральные удобрения, урожайность, антропогенное воздействие.*

Особая проблема возникает в связи с загрязнением почвы, воды и воздуха редкими и рассеянными элементами (свинец, ртуть, кадмий, цинк, никель), обладающими биоцидным действием. Загрязнение окружающей среды этими элементами создает во многих регионах Земного шара постоянный фон, обеспечивающий их стабильную концентрацию в продукции и продуктах питания.

Из антропогенных источников поступления тяжёлых металлов (ТМ) в окружающую среду (ОС) выделяют: выбросы и отходы металлургических предприятий и предприятий, производящих минеральные удобрения, выбросы теплоэлектростанций и катаген, автотранспорта, твердые бытовые отходы, осадки сточных вод и т.д. Особенность за-

грязнения окружающей среды тяжёлыми металлами состоит в том, что для них не существуют механизмов самоочищения, они в большей части своей перемещаются от одного природного объекта к другому, взаимодействуя с живыми организмами, оставляя при этом, негативные последствия [5].

Примерно 90-95% тяжелых металлов, поступающих в ОС, аккумулируются почвами. Затем они мигрируют в природные воды, поглощаются растениями и поступают в пищевые цепи. Почва является депонирующим компонентом ТМ окружающей среде. При загрязнении она становится источником вторичного загрязнения ТМ приземного слоя воздуха, природных и сточных вод в растениеводческой продукции.

На территории Армении более 50 тыс. га почв, находящихся в зоне интенсивного ведения сельского хозяйства, техногенно загрязнены. Содержание в них токсических веществ в том числе и тяжёлых металлов (Pb, Cu, Zn, Mn, Co, Ni и др.), намного превышает предельно допустимые концентрации (ПДК), что представляет серьёзную опасность для здоровья населения [1; 2].

Разработка эффективных технологий по рекультивации и нейтрализации загрязнённости этих земель и производство экологически чистой продукции являются актуальной проблемой сельского хозяйства.

Цель данной работы- изучить влияние возрастающих доз природного мелиоранта (цеолит), вносимого совместно как с минеральными удобрениями, так и полуперепревшим навозом, на урожайность картофеля и интенсивность накопления тяжёлых металлов и нитратов в клубнях при возделывании на техногенно загрязнённых почвах.

Исследования проводились в Ноемберянском регионе Тавушской области в 2019-2020гг. Полевые опыты закладывались на территории с.Ахтанак, где обрабатываемые земли орошаются загрязнёнными водами реки Дебед.

Опыты ставились в 5 вариантах с 3-кратной повторностью.

Первый опыт: 1. Контроль; 2. $N_{120}P_{90}K_{90}$ - фон; 3. Фон + цеолит 4т/га; 4. Фон + цеолит 8 т/га; 5. Фон + цеолит 12 т/га.

Второй опыт: 1. Контроль; 2. Навоз 30 т/га-фон; 3. Фон + цеолит 4т/га; 4. Фон+ цеолит 8 т/га; 5. Фон + цеолит 12 т/га.

Опыты были заложены в остепенённых коричневых лесных почвах на посевах картофеля (сорт «Марфона») с нормой посадки 38 ц/га. В обоих опытах минеральные удобрения, навоз и цеолит были внесены в почву в разброс под основную обработку почв. Площадь опытных делянок - 50 м². Картофель выращивали по технологии, соответствующей данной природно-климатической зоне Армении. Лабораторные анализы в основном проводились в лаборатории научного центра земледелия, а анализы по определению содержания тяжёлых металлов в почве и клубнях картофеля в аналитическом центре Национальной службы сейсмической защиты Республики Армения.

Почвы опытных участков характеризовались как мощные, карбонатные, слабогумусированные, легкоглинистые коричневые лесные, слабо обеспеченные легкогидролизующим азотом средне- подвижным фосфором и обменным калием.

Примечание: в числителе - валовое содержание; в знаменателе - содержание подвижных форм.

Исследования показали, что почвы опытного участка сильно загрязнены свинцом, медью и марганцем, средне- молибденом и цинком (табл.1).

Таблица 1

Содержание тяжёлых металлов в почвах опытных участков

Генетические горизонты, см	Тяжелые металлы, мг/кг почвы						
	Ni	Mn	Fe	Cu	Zn	Pb	Mo
А 0-25	<u>71,8</u>	<u>832,0</u>	<u>4947,6</u>	<u>221,6</u>	<u>71,3</u>	<u>50,3</u>	<u>13,8</u>
	13,2	249,0	907,0	39,7	31,7	6,9	2,13
В 26-45	<u>64,7</u>	<u>1259,6</u>	<u>3407,3</u>	<u>113,6</u>	<u>65,6</u>	<u>84,1</u>	<u>11,4</u>
	12,7	268,0	256,3	24,7	26,1	10,0	2,0

Таблица 2

Влияние различных доз цеолита на клубнеобразование и урожай картофеля на фоне минеральных удобрений

№	Варианты	Вес клубней по фазам развития, г			От бутонизации до полной спелости		Урожай по годам, ц/га		Средний урожай за 2 года, ц/га	Прибавка урожая	
		бутонизация	цветение	полная спелость	дни	клубне-образ. за 1 день, г	2019	2020		ц/га	%
1	Контроль (без удобрений)	52	310	521,2	46	10,2	198,0	186,0	192,0	-	-
2	N ₁₂₀ P ₉₀ K ₉₀ - фон	60	442	785,2	49	14,8	296,0	284,0	290,0	98,0	51
3	Фон + цеолит 4 т/га	62	451	816,6	49	15,4	310,0	306,8	308,4	116,4	60
4	Фон + цеолит 8 т/га	62	465	830,0	48	16,0	340,0	332,0	336,0	144,0	75
5	Фон + цеолит 12 т/га	63	462	831,0	48	16,1	342,6	335,4	339,0	147,0	76
Sx, %							1,8	2,8			
НСР _{0,95,ц}							5,6	10,2			

Как видно из результатов в полевых опытах, на фоне минеральных удобрений и навоза с повышением дозы цеолита увеличивается клубне- образование картофеля, в результате чего и его урожайность (табл. 2 и 3).

Таблица 3

Влияние различных доз цеолита на клубнеобразование и урожай картофеля на фоне навоза

№	Варианты	Вес клубней по фазам развития, г			От бутонизации до полной спелости		Урожай по годам, ц/га		Средний урожай за 2 года, ц/га	Прибавка урожая	
		бутонизация	цветение	полная спелость	дни	клубне-образ. за 1 день, г	2019	2020		ц/га	%
1	Контроль (без удобрений)	54	315	527,8	46	10,3	197,0	191,4	194,2	-	-
2	Навоз 30 т/га - фон	61	432	757,0	48	14,5	290,0	282,0	286,0	91,8	47
3	Фон + цеолит 4 т/га	62	445	791,6	48	15,2	299,0	303,8	301,4	107,2	55
4	Фон + цеолит 8 т/га	63	455	821,4	48	15,8	331,6	326,8	329,2	135,0	69
5	Фон + цеолит 12 т/га	63	460	826,2	48	15,9	332,8	329,2	331,0	136,8	70
Sx, %							2,0	2,7			
НСР _{0,95,ц}							5,0	8,9			

Так, если в варианте фон (N₁₂₀P₉₀K₉₀) +4 т/га цеолита по сравнению с фоном урожайность картофеля увеличилась на 18,4 ц/га, то в вариантах фон (N₁₂₀P₉₀K₉₀) + 8 и 12 т/га цеолита соответственно на 46,0 и 49,0 ц/га. Аналогичная закономерность наблюдалась и на фоне навоза. Несмотря на то, что вариантах фон (N₁₂₀P₉₀K₉₀) +12 т/га цеолита и фон (навоз) +12 т/га цеолита по сравнению с аналогичными вариантами с 8 т/га цеолита урожайность картофеля повысилась, однако это повышение несущественные и находится в пределах НСР [3].

Результаты исследований также показали, что совместное внесение цеолита как с минеральными удобрениями, так и с навозом, по сравнению с контрольными и фоновыми вариантами повысили и товарность клубней картофеля. Товарность клубней

картофеля по сравнению с фоном (NPK) повысилась на 2,8-6,8 8%, а с фоном навоза - на 1,0- 2,6% (табл. 4 и 5).

Одновременно выяснено, что минеральные органические удобрения оказали существенное влияние на содержание крахмала, аскорбиновой кислоты и нитратов в клубнях. Если при внесении минеральных удобрений по сравнению с контролем содержание крахмала увеличилась на 1,4%, витамина С - на 1,3 мг % и нитратов на 88 мг/кг, то при внесении 30 т/га навоза данные показатели увеличились соответственно на 1,4%; 1,48 мг% и 60 мг/кг (табл. 6). Несмотря на то, что при внесении минеральных и органических удобрений по сравнению с контрольными вариантами содержание нитратов увеличилось, однако их содержание находится в пределах ПДК [4].

Таблица 4

Влияние различных доз цеолита на структурные элементы урожая картофеля на фоне минеральных удобрений

№ п/п	Варианты	Средний урожай клубней картофеля, ц/га	Фракции картофеля, г			Товарность клубней, %	Сред. вес клубней, г
			100	50-100	до 50		
1	Контроль (без удобрений)	192,0	23,5	38,5	38,0	62,0	69,5
2	N ₁₂₀ P ₉₀ K ₉₀ - фон	290,0	33,2	39,0	27,8	72,2	83,5
3	Фон + цеолит 4т/га	308,4	32,4	42,6	25,0	75,0	86,0
4	Фон + цеолит 8 т/га	336,0	32,6	45,4	22,0	78,0	92,0
5	Фон + цеолит 12 т/га	339,0	39,0	46,0	21,0	79,0	92,0

Таблица 5

Влияние различных доз цеолита на структурные элементы урожая картофеля на фоне навоза

№ п/п	Варианты	Средний урожай клубней картофеля, ц/га	Фракции картофеля, г			Товарность клубней, %	Сред. вес клубней, г
			100	50-100	до 50		
1	Контроль (без удобрений)	194,2	24,8	39,0	36,0	64,0	72,4
2	Навоз 30 т/га - фон	286,0	32,5	43,5	24,0	76,0	85,5
3	Фон + цеолит 4т/га	301,4	31,5	45,5	23,0	77,0	86,0
4	Фон + цеолит 8 т/га	329,2	33,0	45,8	21,2	78,8	89,0
5	Фон + цеолит 12 т/га	331,0	34,0	44,6	22,4	78,6	89,5

Таблица 6

Влияние различных доз цеолита на качественные показатели клубней картофеля на фоне минеральных удобрений и навоза

№ п/п	Варианты	Сухие вещества, %	Крахмал, %	Аскорбиновая кислота (вит.С), мг%	Содержание нитратов, мг/кг
На фоне NPK					
1	Контроль (без удобрений)	25,8	15,8	10,72	140
2	N ₁₂₀ P ₉₀ K ₉₀ - фон	26,9	17,2	12,02	228
3	Фон + цеолит 4т/га	27,2	17,8	12,05	232
4	Фон + цеолит 8 т/га	27,6	18,3	12,17	226
5	Фон + цеолит 12 т/га	27,7	18,3	12,05	220
На фоне навоза					
1	Контроль (без удобрений)	26,0	16,0	10,72	135
2	Навоз 30 т/га - фон	27,2	17,4	12,20	195
3	Фон + цеолит 4т/га	27,3	17,5	12,17	200
4	Фон + цеолит 8 т/га	28,0	17,8	12,24	190
5	Фон + цеолит 12 т/га	28,2	17,8	12,24	195

Из данных таблицы 6 видно, что как на фоне минеральных удобрений, так и на фоне навоза, возрастающие дозы цеолита не оказали существенного влияния на содержание крахмала, витамина С и нитратов.

По данным двухлетних исследований, внесение минеральных удобрений и навоза способствовало понижению содержания ТМ в клубнях картофеля (табл. 7).

Внесение фосфорных удобрений и навоза способствует понижению накопления ТМ в клубнях, так как при этом образуются труднорастворимые

соединения- фосфаты цинка, свинца и меди и комплексные соединения ТМ с органическим веществом, малодоступные растениям.

Из данных таблицы 7 видно, что вариантах с минеральными удобрениями и навозом возрастающие дозы цеолита по сравнению с соответствующими фоновыми вариантами понижают содержание ТМ в клубнях картофеля. Так, в вариантах фон (N₁₂₀P₉₀K₉₀) + возрастающие дозы цеолита содержание Zn снизилось на 12,5- 35,2%, Cu- 8,9- 27,8%, Pb -15,0-25,0%, Ni -11,1-25,9%, а в вариантах фон (навоз) + возрастающие дозы цеолита соответственно на 18,0-34,0; 8,0-18,0; 10,1-33,3 и 20,0-40,0%.

Таблица 7

Влияние различных доз цеолита на накопление тяжёлых металлов в клубнях картофеля на фоне минеральных удобрений и навоза, мг/кг сух. в-ва

№ п/п	Варианты	Zn	Cu	Fe	Mn	Ni	Pb	Mo
На фоне NPK								
1	Контроль (без удобрений)	13,0	14,0	40,5	6,2	2,8	3,0	0,8
2	N ₁₂₀ P ₉₀ K ₉₀ - фон	8,5	9,0	38,2	6,1	2,7	2,0	0,7
3	Фон + цеолит 4т/га	7,5	8,2	36,4	5,9	2,4	1,7	0,6
4	Фон + цеолит 8 т/га	6,0	6,6	36,0	5,4	2,0	1,5	0,6
5	Фон + цеолит 12 т/га	5,8	6,5	36,2	5,3	2,0	1,5	0,6
На фоне навоза								
1	Контроль (без удобрений)	12,5	14,5	39,0	6,0	2,9	3,1	0,7
2	Навоз 30 т/га - фон	10,0	10,0	38,0	5,0	2,0	2,9	0,5
3	Фон + цеолит 4т/га	8,2	9,2	37,4	5,0	1,6	2,6	0,5
4	Фон + цеолит 8 т/га	6,5	8,2	36,9	4,8	1,4	2,0	0,4
5	Фон + цеолит 12 т/га	6,6	8,2	36,8	4,7	1,2	2,1	0,4

Существенному снижению поступлений ТМ в растениях и способствует и то, что цеолиты, обладая высокими абсорбционными свойствами, поглощают подвижные формы элементов и тем самым снижают их поступления в них.

Аналогичные закономерности были отмечены и при проведении полевых и лабораторных исследований в третьем - 2021г.

Расчёты экономической эффективности разработанной технологии показали, что при внесении под посевы картофеля 8т/га цеолита на фоне минеральных удобрений (N₁₂₀P₉₀K₉₀) получают 46,0 ц/га дополнительного урожая клубней, а на фоне навоза -43,2ц/га, что обеспечивает получение дохода соответственно в 610 и 568 тыс. драммов.

Результаты проведённых исследований дают основание сделать следующие выводы:

1. На фоне с полным минеральным удобрением и навозом наилучшей дозой цеолита, обеспечивающей получение прибавки урожая клубней картофеля на 43,2-46,0 ц/га и следовательно, дохода в 568-610тыс. драммов с гектара является доза 8т/га.

2. Как применение полного минерального удобрения и навоза, так и применение цеолита на их фоне способствовали понижению содержания ТМ в клубнях картофеля.

3. В техногенно загрязнённых почвах совместное применение цеолита, минеральных удобрений

и навоза является эффективным и универсальным приёмом, регулирующим уровень ТМ в получаемой сельскохозяйственной продукцией.

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ECONOMIC SCIENCES

TRANSFORMATION OF OPERATIONAL ACTIVITIES AS AN ECONOMIC AND MANAGEMENT INNOVATION OF MODERN ORGANIZATIONS: METHODOLOGICAL ASPECT

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Abstract

The article is devoted to solving the scientific task of developing theoretical and methodological provisions and providing methodological and applied recommendations for improving approaches to economic evaluation and substantiation of projects of construction enterprises based on the postulates of value engineering and process-oriented management. The relevance of scientific research is due to the need to implement a large-scale program of updating the technical and technological base of most domestic enterprises on the basis of replacing outdated types of equipment, technologies and models of construction production management, as well as improving the economic and management methodical approaches of the organization and administration of the enterprise. Especially in the current conditions, when the key task for any company is to reduce costs, both at the construction stage and during the operation of the facility. Value engineering of investment and construction projects is closely related to concepts such as: project risk management, complex project cost management, construction object life cycle management, since the operational (economic) activity of a construction enterprise is the realization of the stages of construction project implementation. From our point of view, a comprehensive evaluation of the transformation of operational activity should be carried out according to a certain algorithm of coordinated actions, which are systematized by blocks: a preparatory block, the main part of the study and a resulting block with elements of forecasting the further development of the enterprise as an open operating system and its level of competitiveness.

Keywords: change management, investment project cost management, transformation project investment evaluation, construction cost formation, construction enterprise.

Awareness of the content and regularities of globalization, the growth of the scale of transnationalization, and within it the intensification of competition create not only economic, political and other problems for ensuring the overall economic acceleration in the state. But they also generate opportunities for the comprehensive expansion of inter-industry ties and access to foreign markets of national product manufacturers. It is objective to recognize that in order to reduce the susceptibility of the national economy to external threats and internal risks, the goal-oriented implementation of the declared innovative model of economic development has the priority of solving the problems of forming and introducing into business practice an effective economic mechanism of inter-industry participants (stakeholders) interaction on the platform of implementation of transformation projects operational activity, since the operational (business) activity of a construction enterprise is the realization of the stages of implementation of a construction project [1].

Regarding the implementation of the policy of inter-sectoral cooperation in construction projects under conditions of resource limitations, the implementation of the specified strategic management tools for the Ukrainian economy is a difficult task both in the internal socio-economic environment and at the level of project stakeholders. Since, ensuring a sufficient level of competitiveness of business entities and their products faces administrative and forceful actions and "opportunities" of rapidly changing political elites in Ukraine.

Therefore, comprehensive measures in this area are reduced, mainly, to the implementation of:

a) technical and economic evaluations of projects as a type of state (public) investment, determination of levels of competitiveness;

b) cost-free innovations related to updating the personnel potential of production and economic systems, etc. [2-4]. At the current historical stage of the development of the national economy, the experience of solving problems related to increasing the efficiency of functioning due to the consolidation of inter-sectoral interaction at different levels of economic regulation is not used. At the same time, the target programs for the development of public-private partnership as a type of economic activity in Ukraine, developed by the subjects of state administration, do not allow: a) to identify the phase trajectory of their dynamics in the context of their acquisition of information features; b) to activate and carry out fundamental transformational processes in the field of construction in order to eliminate the threats arising in connection with the intensification of competition in the specified field of industrial and economic activity.

In addition, modern institutional mechanisms and legal support for the processes of restructuring the Ukrainian economy do not enable the formation of organizational and economic prerequisites for solving most of the economic problems that exist in the construction industry. This determines: a) steady degradation of the progressive sphere of social activity; b) large-scale losses of the strategic resource of industrial

growth and underdevelopment of the state's intellectual capital; c) low product quality and efficiency of innovative and production processes in construction. And also the fact that according to most indicators of the level of competitiveness, the construction industry of Ukraine remains at the bottom [5-7]. This requires the urgent implementation of organizational and economic change mechanisms for the forced development of domestic construction enterprises with: a) taking into account international achievements in this field of activity and national economic interests; b) ensuring close cross-sectoral interaction and structural transformations in accordance with the requirements of project implementation [8].

On the basis of the conducted research, the generalized system of indicators of the efficiency of the operational activity of the enterprise, which most thoroughly characterizes the main parameters of the efficiency of the operational system of the construction enterprise, can be combined within four approaches:

1) resource-based, when the economic result is compared with the economic assessment of production resources used during production;

2) cost-effective, when the economic result is compared with the current costs that are directly related to its achievement;

3) resource-intensive, which, as can be seen from the name itself, is a certain compromise between the two previous ones. That is, both a certain assessment of available resources and an assessment of current costs are taken into account. However, the application of this approach should be very balanced and careful, because there is a problem of double counting, as well as a significant influence of industry specifics of production (capital intensity, capital intensity, labor intensity, etc.;

4) target, when efficiency is defined as the degree of achievement of the target parameters of the enterprise's functioning, and therefore the result and the target value of the indicator are set in the same units of measurement [9-13].

This system includes indicators, the values of which are calculated both on the basis of internal management accounting information and on the basis of the results of special hardware and statistical measurements, which makes it possible to comprehensively assess the effectiveness of the use of both elements and the effectiveness of the operation of the enterprise's operating system as a whole.

The next stage is the planning and implementation of measures to increase the efficiency of the company's operational activities. The main problem in the process of finding possible ways to optimize the operation of the enterprise's operating system is the complexity of its structure and component content, which ensures the complexity of formalization and optimization of the main processes, without losing essential characteristics and relationships that ensure the normal functioning of the enterprise.

Among the main ways of increasing the efficiency of the enterprise's operational activity, three can be distinguished, aimed at increasing the above-mentioned indicators: organizational, technical and technological, and resource [9].

Within the organizational direction, the search for opportunities to improve the efficiency of those processes taking place at the enterprise is carried out by identifying and restructuring (or optimizing) inefficient operational processes that do not create value for the external and/or internal customer.

As a result of such measures, the enterprise gets the opportunity to use potential reserves of increased labor productivity (as a result of shortening the processes of the operational cycle in time), reduction of production and management costs, which as a result of the cumulative effect will open opportunities for increasing the efficiency of the operational activities of this enterprise (Table 1).

Table 1.

The results of the effectiveness of the implementation of innovative tools

The effect of use	Expected cost reduction, %
Reduction of energy consumption. Optimization of utilities. <i>By identifying and analyzing the most expensive consumers, cases of wasteful use of energy</i>	2–10
Reduction of energy consumption costs. Use of utilities through peak load management. <i>Management of energy-consuming consumers to avoid unnecessary peak loads</i>	5–20
Confirmation, documentation of energy consumption. <i>Minimize the cost of creating consumption reports through the use of data on objects and meters from the system</i>	50–90
Reduce documentation costs. <i>Thanks to fast systematization of information, use of templates, direct access of reports to actual data</i>	30–70
Reducing the cost of searching, improving the quality of information. <i>Reducing the cost of finding and providing up-to-date and correct information, reducing problems with insufficient and erroneous information</i>	30–70
Equipment availability. <i>Reducing the number of failures of equipment and structures due to automated control of service life</i>	1–10
Scheduled maintenance. <i>Reduce the cost of scheduled maintenance and repairs through effective planning and preparation</i>	10–30
Distribution of outfits / tasks. <i>Reduction of service costs due to consolidated centralized accounting and distribution of correct orders / tasks (eg maintenance, cleaning)</i>	10–30

Changing not only the organizational structure of the enterprise and the work organization regulations, but also its sectoral and functional stakeholder-oriented structure, the transition to a qualitatively new level is both an end in itself and the result of transformational processes, a manifestation of transformational shifts, the achievement of which is possible when forming a model of transformational shifts based on an in-depth perspective analysis taking into account the institutional, technological and socio-economic prerequisites and interests of all groups of agents of the economic system, which is reflected in the author's model of transformational shifts, the mathematical content of which is the function $TCh \rightarrow \max (+)$:

$$TCh = f(TCh_{IS}; TCh_{TS}; TCh_{CES}), \quad (1)$$

where TCh – transformation shifts; TCh_{IS} – transformation changes of the institutional structure; TCh_{TS} – transformation changes of the technical-and-technological structure; TCh_{CES} – transformation changes of the social-and-economic structure.

The competitive environment forces companies to increase the efficiency of their operations by improving day-to-day operations and reducing non-productive activities. An effective tool in this case is the management concept called "process approach".

According to the latest research, 47% of the surveyed respondents report using a process approach. 34% of them are large holding companies, 53% are large and medium-sized state enterprises, and 13% are small enterprises.

The composition and content of business processes is determined based on the analysis of the enterprise's activities. The set of business processes depends on the types of products and services it produces or provides. When singling out and structuring business processes, it is necessary to consider them from the point

of view of completeness and the possibility of measuring the costs of their implementation.

The importance of business processes in the creation of products is not the same because of their different roles in the production process. Every enterprise has important and secondary processes.

When solving a problem related to the reengineering of business processes of an enterprise, it is necessary to identify:

1. What processes need to be improved;
2. What exactly needs to be improved in these processes.

Process improvement often requires significant time and financial resources to identify and implement improvements. Therefore, it should be carefully examined whether improving the given process is the most suitable solution to increase the ability to generate value before making the corresponding investment.

Major improvements in secondary processes usually do not lead to any significant results in the company's activity, while small improvements in important processes can significantly improve the company's performance.

Before reengineering business processes, it is necessary to determine:

- a set of those business processes that are related to the production of finished products;
- the most important business processes for the enterprise;
- bottlenecks in the implementation of these business processes.

Management of business processes, based on the process paradigm, includes four interrelated stages, which are presented in fig. 1:



Fig. 1. The sequence of implementation of the process paradigm of managing business processes (transformation of operational activities)

Each of the factors listed in formula 1 affects the defined goals, but has a different weight, the calculation of which is carried out through the previous procedure of ranking the factors with an assessment in points of each of them. Accordingly, on the basis of their assessment, a decision is made regarding the priority factors in the development of the BP business process project, which must be flexible and adaptable to changes in the internal management and external economic environment.

For each user, the information support system is evaluated from the point of view of achieving different, sometimes contradictory, goals that determine the internal structure of the business and its integration into the external economic environment. The goals must be properly structured, which is required by the logic of building information processes.

The value engineering system includes a number of subsystems that can be separated as independent systems (Fig. 2).

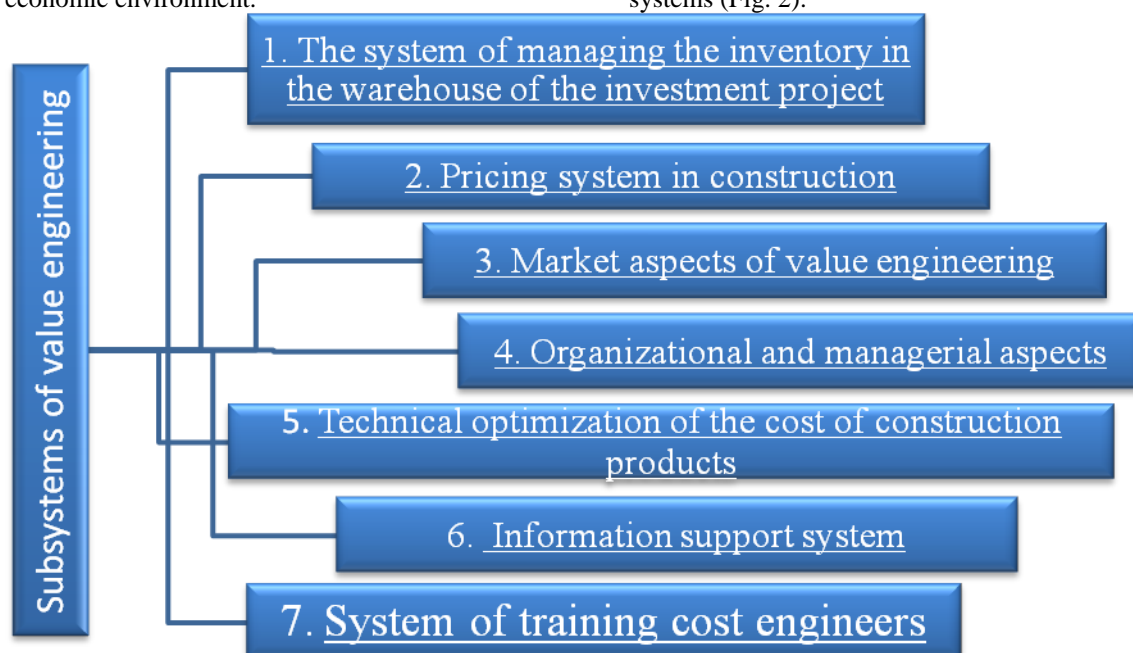


Fig. 2. The structure of the cost engineering system in construction

The author proposes the calculation of the transformation index of the operational (economic) activity of a construction enterprise, which involves determining the main propulsive dominants of development in each individual case according to the following algorithm:

$$RCI_{Ti} = \sqrt[4]{\frac{InvI_{i(1)}}{InvI_{i(0)}} \times \frac{InnovI_{i(1)}}{InnovI_{i(0)}} \times \frac{IntII_{i(1)}}{IntII_{i(0)}} \times \frac{InfI_{i(1)}}{InfI_{i(0)}}}, (2)$$

where RCI_{Ti} – (Transformation index of competitiveness) is the transformation index of competitiveness of the i -th enterprise; $InvI_i$ (Investments index) – index of investment processes; $InnovI_i$ (Innovation index) – index of innovation processes; $IntII_i$ (Intellectualization index); $InfI_i$ (Informatization index); 0 – initial (base) period; 1 – the next period.

The operational activity transformation index is a complex multidimensional indicator that includes four main components that reflect each of the specified stages of the transformation of the operating system,

except for the initial stage of transformations, at which the second level is determined based on the use of the established and revealed resource-image potential. Thus, the proposed transformation index is an approach to determine the prerogative of investment, innovation, intellectualization, or informatization development of the particular enterprise being analyzed. Moreover, the transition to a new stage of transformations is impossible without achieving a certain level of competitiveness at the previous stage, just as it is impractical to move on to winning higher competitive positions without deciding on the effectiveness of internal transformations.

The efficiency of the innovative model is enhanced by complementarity, synergy, which provides additional benefits that cannot be achieved when the "portfolio of tasks" is a simple sum of individual projects. Synergy is achieved through mutual support and accumulation of results of various ongoing projects. The "portfolio of tasks" to create value for consumers and increase the value of the enterprise can be presented in the form of sequential and parallel implementation.

Therefore, there is a need for effective planning and organization of the lifecycle of the task in order to make timely management decisions, which will reduce the impact of possible disturbances. Unlike most matrix models used for “portfolio” analysis and planning, it is recommended to use the method of dynamic programming in the management of the “portfolio” of the innovative model.

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METHODOLOGICAL REGULATION OF THE ECONOMIC AND MANAGEMENT ENSURING THE INNOVATIVE PLATFORM OF BUILDING DEVELOPMENT**Ryzhakova H.,***Academy of Financial Management, Ukraine***Homenko O.***PhD (Econ.), Associate Professor,**Kyiv National University of Construction and Architecture, Ukraine*<https://doi.org/10.5281/zenodo.7061495>**Abstract**

The increase in the influence of market mechanisms in the economy, the deepening of integration processes and access to world markets as a result of the transition from a planned economy to market forms of management have increased the task of achieving and maintaining a high level of competitiveness for domestic enterprises. Solving this problem requires a deep functional analysis and, based on it, making a balanced multi-criteria structured decision using the mechanism for evaluating the effective formation and use of resources of construction enterprises as specific operational systems of development management.

The main requirements that are put forward to the methods of modeling the risks of the financial and economic activity of the enterprise are the adequacy of the assessment under conditions of information uncertainty, adaptability to the country, time period, specific industry, taking into account the unique features of the enterprise, its economic and managerial specifics, accounting for quantitative and qualitative factors.

This article proposes a project-vector approach to building development management systems. The objective function of optimal control of the project-vector environment of construction enterprises is proposed.

The results of the assessment can be used to develop the project management system and its transition to a new level. The evaluation of excellence can be carried out according to the model developed by the International Project Management Association. To ensure success in improving the organizational system for managing projects, programs and portfolios, the top management of the organization needs to determine the primary goals, establish and maintain communications with stakeholders, analyze the possibility of measuring excellence in this period, and consistently implement further improvements. Model excellence assessment focuses on a holistic analysis of project management in an organization. This model is based on the concept of organizational competence in the field of project management, which involves the analysis of both individual competencies and the organization's values ("assets").

The need to develop a complex methodological approach to assessing the financial condition of enterprises based on the application of the theory of fuzzy logic is proven. The conceptual basis of modeling the financial and economic activity of the enterprise and with further prospects for determining the appropriate level of risk are considered.

Keywords: *construction enterprise; transformation of operating systems; digitalization methodology; project administration of digital transformations of construction system, building development.*

A decisive factor in the success of an organization is the ability to respond to changes in the environment, harmonizing with them the desire to survive or the desire for development. At the same time, global trends confirm that tasks related to the development of organizations can be successfully solved through projects. Therefore, the project of transformational changes in the operational activity of the construction enterprise at the stages of its implementation life cycle is considered in the concept of the development management process, which is aimed at changing the existing business processes of the organization, and the rules of their transformation are determined by the development procedure, which requires generalization and formalization.

In the context of the rapid development of technology and the intellectualization of labor, the main tool for forecasting, planning and management are working mathematical models of operated systems. It is known that the construction of mathematical models for complex, open, developing systems begins with the process of their structural decomposition.

The organizational and technical system is understood as an automated system for managing resources, data, models, which ensures the management of all information and related processes throughout the entire life cycle of the control object.

The number of organizational and technical systems is determined by a specific the project system, but, as a rule, the presence of design, production and operational systems is mandatory. Accordingly, we will distinguish:

- a design system consisting of a subsystem for managing design work, a design model and a design environment;
- production system, consisting of production management, production model and production environment;
- an operational system consisting of a subsystem for managing the operation and maintenance of the technical system and the operational environment

The problem of decomposition is that in complex systems there is no one-to-one correspondence between the law of functioning of subsystems and the algorithm

that implements it [1]. Therefore, a decomposition variant is formed, where the system is displayed as a hierarchical structure of subsystems.

When constructing a structural decomposition, the main problem is the observance of two contradictory principles:

- completeness (the problem should be considered as comprehensively and in detail as possible);
- simplicity (the whole tree should be as compact as possible).

It should be noted that the decomposition should be limited at the stage of transition to the description of the internal algorithm of the subsystem functioning instead of the law of its functioning. In this case, we are talking about changing the level of abstraction, i.e. going beyond the structural decomposition of the system.

In modern methods, the decomposition of the model to a depth of 5-6 levels is typical. One of the subsystems is usually decomposed to such a depth. Functions that require this level of detail are often very important, and their detailed description provides the key to the basic operation of the entire system [2].

It has been proven in general systems theory that most systems can be decomposed into basic representations of subsystems. These include: serial connection of elements, parallel connection of elements, connection using feedback [3].

Let us take the concept of its life cycle as a reference point for the decomposition of a complex the project system. The life cycle describes the state of the system in different periods of time, starting from the emergence of the need for this system and ending with the moment of its collapse.

Representation of the life cycle of a the project system in a structured form (in the form of a hierarchically decomposed object into its constituent parts), one of the necessary conditions for the effective implementation of the process of its management in the interests of various participants.

We propose the following periods of the life cycle of a the project system (Fig. 1):

- period of system development;
- period of target functioning;
- a period of progressive degradation.

The activities of the development period are associated with research, planning, design and

production activities, target functioning is associated with professional activities aimed at maintaining the specified indicators of system efficiency over time, and the period with gradually developing degradation is associated with the curtailment of project activities, restructuring of the system and other actions leading to the termination of the existence of the system in this form.

The ongoing changes in the system under external influence accumulate, as a result, the the project system loses stability and moves to a different trajectory and develops further within other boundaries of stability.

Such a loss of stability in systems theory is called a bifurcation, and the moment of a break in the trajectory, or transition, is called the bifurcation point. Based on external and internal conditions, a particular system can go through several bifurcation states, which, as a result, will determine the trajectory of its life cycle.

Let us demonstrate one of the possible variants of the trajectory of the life cycle of a complex the project system (Fig. 1).

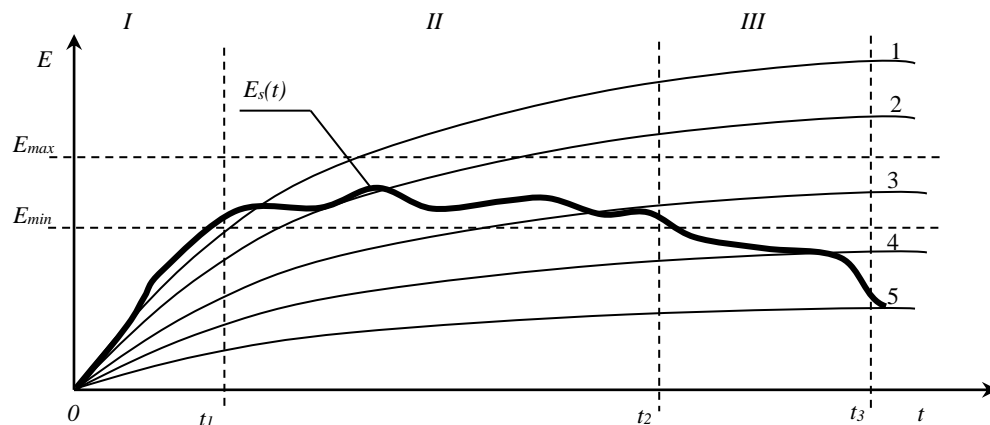


Fig.1. System life cycle trajectory:

I - period of development of the project system;

II - period of target functioning;

III - period of gradually developing degradation;

1-5 - possible trajectories of the life cycle of the project system

Consider the trajectory of the life cycle based on the totality of external and internal conditions at the time of the birth of the the project system. The beginning of the development of the project system goes along *trajectory 1*, but very quickly there are changes in important parameters for its development in the external or internal environment. The efficiency of the E_s system decreases and the system is forced to switch to

the *trajectory 2* closest to it, corresponding to the new conditions. For some time, the system develops steadily, but the changes taking place in the external environment accumulate so quickly that the control subsystem does not have time to make timely, effective decisions and the life cycle trajectory changes the trend.

Thus, the development of the project system like any other complex dynamic system, proceeds according to the following scheme. Until some time, the system develops along a given trajectory, there is a slow accumulation of new features, the system passes into a more stable state - the period of target functioning, and at some point its development loses stability or consistency with the development of a higher-level system, the transition to the trajectory occurs gradually developing degradation.

When studying the behavior of the project systems, it should be remembered that any system under consideration is just an element of some other, also non-linear dynamic system. And these systems, developing according to their own laws, determine many properties and circumstances of the development of their subsystems [4].

In connection with the foregoing, we note that the period of the target functioning of the the project system is the interaction of a number of organizational and technical subsystems, each of which consists of a control system, a control object and an environment.

Indeed, any the project system is a kind of integrity, in which, as in the evolution of any non-linear dynamic system, periods of calm development are replaced by a period of bifurcations, a period of transition from one development channel to another. At the same time, its organization is in constant motion, from spasmodic fluctuations to a relatively stable state.

The functioning of any material system is aimed at its preservation by using all available potential. In this case, development involves constant updating of forms and types of activities depending on changes in technologies, value orientations, behavior in the markets of both consumers and competitors. It is related to any changes occurring in the organization and its relations with the surrounding world. Thus, the following pattern appears: if the organization does not function, it cannot develop, and if it does not develop, it cannot function [5; 6]. Therefore, one of the urgent tasks of management is the development of organizations due to a quick, clear and adequate response to market changes by releasing new (modernization of old) products, introducing new production and sales technologies, reengineering, improving the internal management system, using the latest marketing approaches, etc. As a result, development becomes an effective market mechanism for managing modern organizations, being a way of preserving enterprises and companies, helps to create new niches in the market, increase consumer loyalty, etc. [7; 8].

Many important decisions related to the vision of the organization's goals and operations arise from a series of questions related to the development of a strategic position. The answers to them lead to making deci-

sions about development, which is most often an atypical activity of the organization, but affects it and can change it [9].

Let the functioning of the organization be ensured by a set of business processes $P = \{p_1, p_2, p_3, \dots, p_J\}$. During development, these processes are transformed into a set of new business processes $N = \{n_1, n_2, n_3, \dots, n_I\}$ aimed at preserving the organization in difficult economic conditions, i.e., a transformation of the type is implemented:

$$f: P \rightarrow N, \forall n_i \in N \exists p_j \in P: f(p_j) = n_i, \quad (1)$$

where the display rule will be set by the organization's development management procedure. The basis of the development management procedure is a descriptive multi-level model of the interaction of approaches (a model based on the analogy of Euler's circles), proposed in [11] for solving goal achievement tasks in project management based on a system of balanced indicators (Table 1).

The structure of the model of the process of evaluating the content and stages of transformational changes allows changing the indicators, taking into account the field of operation of the enterprise (including construction, if the operational activity of the enterprise consists in the execution of general construction works), the state of economic development and the changing influence of the external and internal work environments of sub object of management. The hierarchy of the proposed model allows to simplify the process of evaluating the effectiveness of the implementation of investment and construction projects.

According to the algorithm, proposed in work, at the first level, with the help of the "Balance Sheet" and "Report on Financial Results", the set of K - initial input parameters is formed. These parameters correspond to the financial ratios that are used to predict the company's insolvency: k_1 – equity; k_2 – currency of the balance sheet; k_3 – raised capital; k_4 – absolutely liquid assets; k_5 – current liabilities; k_6 – current assets; k_7 – long-term payables; k_8 – current assets minus inventories; k_9 – net income; k_{10} – accounts receivable; k_{11} – accounts payable; k_{12} – cost of goods sold; k_{13} – material reserves; k_{14} – non-current assets; k_{15} – gross profit; k_{16} – net profit. The second level involves the formation of a set X of evaluation parameters of transformational changes based on a set K (Table 1). At the third level, set X ensures the formation of such parameters as financial stability (Y_1), liquidity and solvency (Y_2), business activity (Y_3) and profitability (Y_4). At level A , the decision Z_j is identified, which determines the effectiveness of transformational changes in operational activity construction enterprises, from the set of possible states $j=1, \dots, J$.

Table 1

A set of evaluation parameters of the effectiveness of transformational changes in the operational activity of construction enterprises

Indicator		The formula for calculating
Financial stability		
Coefficient of independence	x_1	k_1 / k_2
Coefficient of financial stability	x_2	k_1 / k_3
Coefficient of financial stability	x_3	$(k_1 + k_1) / k_2$
Coefficient of maneuverability and own resources	x_4	$(k_1 - k_{14}) / k_1$
Coefficient of provision of own working capital	x_5	$(k_1 - k_{14}) / k_3$
Liquidity and solvency		
Monetary solvency ratio	x_6	k_4 / k_5
Estimated solvency ratio	x_7	k_6 / k_5
Critical liquidity ratio	x_8	k_8 / k_5
The ratio of receivables and payables	x_9	$k_{10} / (k_5 + k_7)$
Asset mobility ratio	x_{10}	k_8 / k_{14}
Business activity		
Asset turnover ratio	x_{11}	k_9 / k_2
Accounts receivable turnover ratio	x_{12}	k_9 / k_{10}
Accounts Payable Turnover Ratio	x_{13}	k_9 / k_{11}
Inventory turnover ratio	x_{14}	k_{12} / k_{13}
The turnover ratio of fixed assets	x_{15}	k_9 / k_{14}
Equity turnover ratio	x_{16}	k_9 / k_1
Profitability		
Cost effectiveness	x_{17}	k_{15} / k_{12}
Profitability of sales	x_{18}	k_{16} / k_9
Profitability of all assets	x_{19}	k_{16} / k_2
Return on equity	x_{20}	k_{16} / k_1

It should be noted that today, many organizations, in the course of their activities, are limited, unfortunately, only to monitoring compliance with the budget and deadlines, and very little attention is paid to other criteria for the effectiveness of project management. Therefore, the value of the results of this activity is highly questionable. It is in the context of economic turmoil that comes the understanding of how low the degree of perfection of the project management system is, what advantages the organization should take advantage of, what shortcomings need to be eliminated - in other words, what needs to be done to make the project management system meet the requirements of today. The assessment of the excellence of an organization in the field of project management can be characterized as follows: it is "the analysis, certification and assessment of the level of quality, excellence or competence of an organization and individuals in the field of project management according to certain criteria ..." [14]

This assessment defines the organization's status quo in project and program management and is based on specific norms, standards or regulations that help answer questions about what needs to be reviewed and how to review.

Let us consider in more detail the assessment of the perfection of the project management system in the organization. The project management system is understood as "a system of rules, organizational structures, processes, methods and regulations for planning, monitoring and managing projects." When an organization intends to evaluate excellence, the expected benefits of the process are often overstated, but there is also a high level of skepticism about the costs and possible side effects. What opportunities are realized through the assessment of excellence and what risks are most likely? First of all, the state of project management in the organization at the moment is assessed - the state "as is". The results of this assessment allow management to draw a conclusion about the level of development of the project management system in the organization. Next, using a reference model or standard, set the goal to be

achieved, that is, describe the “as it should be” state, and by comparing the “as is” and “as it should be” states, assess the strengths and weaknesses of the organization and determine the steps, needed to move the organization from the “as is” state to the “as it should be” state. It should be noted that the evaluation of excellence can help set the direction for action, but the implementation of any activities, as a rule, is not an integral part of it. The reference model can also be used to define a long-term strategy. Excellence assessment is also used to orient management to make the best decisions regarding the direction of development and the

necessary investments in the project management system. Often, analytical work reveals elements of good management practice that can be used in the creation of new standards.

Excellence assessment can be both internal, carried out by the organization itself, and external, which involves external organizations. The external assessment of excellence also includes certification of the organization's compliance with a certain level (class) of project management, carried out by an authorized certification body (Table 2).

Table 2

A fragment of the table of expert-diagnostic assessment of the developer's activity according to the updated system of business indicators of the multi-project environment

3	Prospect				
3.1	Strategy				
	Target	It will allow the manager to understand the strategy and strategic processes, which provides the opportunity to manage the project, program or portfolio in the environment			
	Assessments	1	2	3	5
3.2	Management, structures and processes				
	Target	It will allow the manager to effectively participate and manage influence, manage, understand the structure and processes in projects, programs or portfolios.			
	Assessments	1	2	3	5
3.3	Compliance, standards and regulations				
	Target	It will allow the manager to influence and manage on the basis of relevant, interconnected standards and rules within the framework of the permanent organization, legislation, standards and norms, both in the organization and in society as a whole, to improve the organization's approach to these areas of knowledge			
	Assessments	1	2	3	5

The results of the excellence assessment can be used to develop the project management system and its transition to a new level. Excellence assessment can be carried out according to the model of the International Project Management Association analyze the possibility of assessing excellence in a given period and consistently implement further improvements.

The excellence assessment focuses on a holistic analysis of project management in an organization. This model is based on the concept of organizational competence in the field of project management, which involves the analysis of both individual competencies and the organization's values (“assets”).

Its further specification makes it possible to obtain a functional model of the project-oriented development management procedure with:

- with in the framework of the system approach, the current state of the organization is assessed and possible directions of development are determined;
- with the help of a project approach, projects are formed, the system of goals of which is compiled in the context of the development of the organization;
- the process approach helps to choose and implement a specific development project by carrying out regulated and unified actions;
- the operational approach ensures the integration of project results into operational activities with the transfer of "best practices" to the functions (operations) of the organization. Thus, the obtained model of managing the development of the organization, formed on the basis of the results of the interaction of systemic,

project, process and operational approaches, makes it possible to implement the direction of development within the allocated budget and with the use of determined resources with further integration of the results into current activities. This helps to increase the consistency of the decisions made and the effectiveness of the application of typical methods in specific subject areas.

The implementation of this scientific and methodological scheme is proposed to be carried out within the framework of the vector approach to building a project management system. Based on the presented classification of projects, namely, traditional, operational and procedural projects, it is proposed to identify the directions in which the products of information projects are formed in the project-vector space by classes of vectors: project-informational (for traditional projects), project-procedural (for procedural project) and design-technological (for operational projects). A set of changes, which are the essence of the named projects, will be represented by a set of vectors in some space. We will call this space project-vector.

Two main advantages over other concepts for creating control systems can be seen from the vector approach.

First, it is a decomposition of a rather complex organizational-technical system of solving functional tasks into simple, development-oriented components of individual project entities, described by project-informational, project-procedural, and project-technological vectors.

Secondly, if it is possible to determine whether this type of activity is implemented through a project, then, accordingly, a project approach can be applied to the implementation of this activity. And this allows you to use a sufficiently powerful project management tool to improve management processes.

The vector approach, in contrast to the matrix (two-component) technologies of project management, is an n-component structure (each component is one dimension of the project-vector space of the university), which are based on different subsets of methods and means of project management and implementation, but collectively represent a unique, albeit differently oriented, development process of both the internal environment and product projects.

$$\forall N_p : \sum_j \sigma_j \int_t (\nu_p(t) - l(A^{(j)}, t)) dt \rightarrow \min,$$

subject to restrictions:

$$p, \nu_p(t), \sigma_j, N_p, A^{(j)}$$

where

N_p	–	– measurement of the project-vector space;
σ_j	–	the priority of the essence of the project-vector space Q_j;
$\nu_p(t)$	–	given maximum displacement rate in the N_p direction (required development rate at the moment t in the N_p direction);
$l(A^{(j)}, t)$	–	is the length of the vector $A^{(j)}$ (the actual rate of development at the moment t in the direction N_p).

The main tasks of the structure are the implementation of the policy and strategy of the project activity of the system, the implementation of strategic decisions and the implementation of tactical (situational) management.

Many researchers are inclined to single out individual characteristics of a sociotechnical system that are key to its effective functioning in modern conditions, and at the same time could characterize the level of structural interaction.

From the point of view of project management, the following can be distinguished:

1) organizational awareness, based on the understanding by employees of their goals and the purpose of the entire system, their constant readiness to share with top management the full responsibility for the results of the implementation of a particular project;

2) an organizational management structure that provides ordinary team members with real rights to participate in project management;

3) a new approach to the development of jobs and the role of the contractor in project activities;

4) new approaches to the maintenance and repair of technical systems that are part of the socio-technical system;

5) new forms and methods of training and retraining of personnel, a more flexible personnel policy aimed at increasing the level of competence;

6) new criteria in assessing the economic efficiency of using modern technology and investing in the development of a sociotechnical system.

It is in the information aspect that the structural interconnection of subsystems is manifested. Indeed,

Based on the proposed representation of the project-vector space, it is possible to proceed to the formulation of the task of optimal management of the project-vector environment of the university. The basis of this management is the understanding that movement in the direction of the coordinate axes of the project-vector space is equivalent to the development of some component of the project. Ego products, stakeholders, organization, technology, quality, and project management. That will lead to a reduction in the terms of project implementation, a reduction in cost and the achievement of the required level of quality. Then the target function of the optimal management of the design vector environment of the project will have the form:

operational, working information, reflecting the content of the subsystem, creates, forms and improves various, relatively stable structures. In turn, the newly formed structures cause new cycles of operational information. And this happens until irreversible processes begin in the system, leading it to a state of gradually developing degradation.

Indeed, any socio-technical system is a kind of integrity, in which, as in the evolution of any non-linear dynamic system, periods of calm development are replaced by a period of bifurcations, a period of transition from one development channel to another. At the same time, its organization is in constant motion, from spasmodic fluctuations to a relatively stable state.

It is important to note that the subsystems we have identified are characterized by different levels of organization, and, accordingly, the processes taking place in them differ in the pace and intensity of information flows.

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ECONOMIC AND MANAGERIAL INNOVATIONS IN THE ADMINISTRATION OF THE PORTFOLIO OF CONSTRUCTION PROJECTS OF THE DEVELOPER COMPANY: DIAGNOSTICS AND ASSESSMENT OF OPERATIONAL PRODUCTIVITY

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Abstract

The scientific hypothesis of the research adopted in the work determined that the dominant business trajectory of the processes of formation and administration of the portfolio of housing construction projects of the developer company (PHCP-DC) is the economic and organizational mechanism of interaction of the institutional participants of the projects. If the includes commercial housing construction projects, then the interaction of the developer company with other institutional participants of the project must take place in the format of joint investment institutes (in particular, CFF), which requires the presence of a manager of the housing construction fund (asset management company - AMC).

In accordance with the new concepts regarding the purpose of the operating system of the developer company (in the field of commercial housing construction), an analytical toolkit has been developed and substantiated, which corresponds to the format of the Eurocodes of BIM technologies, as well as to the procedures and indicators of regulation and evaluation of the operational activities of construction participants. which are defined by the International Financial Reporting System and National Accounting Standards (Regulations). Based on the phases of the investment and operational-production cycle of projects, the toolkit based on work is preventive, it should be attributed to the "pre-start project" stage (as part of the pre-investment phase) of the project. According to the final target orientation, the toolkit should predict the future results of the operational system of the developer enterprise, which implements projects as part of the PHCP-DC autonomous (within separate budgets, consolidated estimates and the institutional environment of the participants, subordinated to the AMC) strategic economic units and has and the structure of PHCP-DC to ensure both the greatest synergy (from the accepted alternative of combining individual projects into a single portfolio) and the lowest possible (in the circle of institutional participants and stakeholders) risk levels of implementing a housing construction investment program as part of several real projects.

Keywords: *portfolio of housing construction projects of the developer company (PHCP-DC), asset management company (AMC), construction financing fund (CFF), strategic economic unit (SEU), functional and operational cycle (FOC), developer company (DC)*

With the deployment of destructive processes in the economy, a significant slowdown in the pace of development in commercial residential construction is felt, which leads to numerous "long-term buildings" and significant financial losses for both enterprises participating in construction projects and individuals who were left without the expected housing.

In order to activate the market of commercial housing construction and overcome the situation when investments in housing construction become the riskiest type of business, and, first of all, to ensure the alignment of the economic interests of construction participants with the motivation of investors, one should turn to instrumental and analytical means of improving the operational activities of development companies. It is these companies, in the conditions of a decline in the activity of the investment market of commercial housing construction, that must ensure the growth of business activity in this segment of construction and overcome the urgent problems that accompany the business processes of the cycle of preparation, investment and construction of housing - destruction in the organization of investment and budgeting, violation of deadlines progress of construction, improper coordination of the interaction of the main participants (stakeholders) of construction [1-4].

Therefore, the issue of improving the scientific and methodological support for the activities of development companies in construction is on the agenda. The economic problems of forming a portfolio of projects for a developer company working in the field of commercial housing construction, which must coordinate the composition of the portfolio both with its own strategic priorities and with offers on the segment of the residential construction investment market that is promising for it, are practically ignored. In the future, to successfully integrate own administration activities for individual projects into a complete project portfolio and to coordinate these project activities with other institutional participants. Unresolved number of issues of operational activity of the developer company in the residential construction market during the formation and administration of a portfolio of projects in residential construction determines the scientific and applied orientation of this work [5].

The state of such an industry as housing construction is highly dependent on the existing construction financing system. According to statistics, about 60% of housing in Ukraine is built at the expense of public funds, up to 5% - at the expense of budget funds, about 1.5% - bank loans, the latter - means of enterprises of various forms of ownership. Construction investment

and the insecurity of investors during the last decades still remain problematic issues, which are not related to the complex regulation of these institutions and non-fulfillment (improper fulfillment) by the manager and/or developer of their obligations [6].

It is worth noting that according to Art. 4 of the Law of Ukraine "On Investment Activities", investment and financing of the construction of residential construction objects using non-state funds can be carried out exclusively through construction financing funds, real estate transaction funds, joint investment institutes, as well as by issuing targeted bonds.

Also, it would be worthwhile for the benefit of the investor to prescribe in detail in the law the norms regarding the change of an inefficient developer. The problem is that no one controls the double, triple sales schemes. The reputation of the builder plays a significant role here. However, currently in Ukraine, the developer's system folder (investment portfolio of the developer company) is opened only after the building is put into operation. Although, in fact, he can know all future project decisions at the stage when he has property rights and makes a sale. If the property rights to the apartment were immediately entered into the register of property rights after the sale, it would be impossible to sell this apartment a second time. It is only necessary to add this information to the register of property rights. It would be appropriate to supplement Art. 4 of the Law of Ukraine "On State Registration of Property Rights to Immovable Property and Their Encumbrances" (and other derivative norms) by the clause on state registration of property rights to acquire ownership of immovable property when investing in construction.

Therefore, the analysis of scientific, methodical and applied sources from the field and the subject of the study allowed us to reveal that the leading methodical and applied problem is the adaptation of the conceptual foundations of the "suit-to-built" development and methodical approaches regarding PHCP-DC to the realities of the commercial housing construction market, first of all, to the peculiarities of the economic interaction of construction project participants, when the developer company works under conditions of strict restrictions on the movement of financial funds from the side of the asset management company (ACM), which requires updating the approaches, content and algorithm of the developer's interaction with institutional

participants and stakeholders of construction projects housing, under the condition of consideration of projects as part of PHCP-DC as specific strategic economic units (SEU) of business. This, in turn, requires both a change in the system of indicators when evaluating projects regarding the expediency of their inclusion in the composition of PHCP-DC, and ensuring the developer's ability to formalize the ability to detect the impact of the progress of the project administration work in the portfolio on the financial results of its operational activities, the change in the value of its assets and the growth of the image as a leading stakeholder in the selected segment of the commercial residential construction market [7-11].

PHCP-DC is considered as a special property, economic-administrative and functional-technical complex, the components of which (residential buildings) require the organization of business processes for their administration in the format of a separate construction financing fund, headed by a separate manager. This manager (FCU) will be subordinated to the movement of cash and other assets of the project in the interaction system "developer-builder→FCU→minority investors (individuals, home buyers)".

Peculiarities of the organization of financing of commercial housing construction projects make it impossible to maneuver the resources of the builder and developer between different projects (as components of PHCP-DC), which requires autonomous administration of individual projects within the framework of a single operating system of the developer company.

The specified hypothesis provided the scientific basis for the modernization of the approach to the formation of the portfolio of construction projects of the developer company of the development company and the further implementation of the specified approach in the form of a practically configured methodological and analytical toolkit. formation of PHCP-DC (Table 1). The technology implemented in the work is a component of the functioning of the operating system of the developer company, as a result, it ensures the synergy of the results of the implementation of the specified portfolio for the developer company (which works as a leading stakeholder in several housing construction projects (in parallel or in series) as strategic economic units.

Table 1.

Content-process diagram of the toolkit for the formation and administration of a portfolio of construction projects

№	The name of the stage	№	Content and regulation of the stage, structured by its business elements
1.	The formation of applied prerequisites for the selection of proposals for the administration of commercial housing construction projects as SEU as part of the developer's project portfolio	1.1.	Initial ongoing study of the state and dynamics of external environmental factors in relation to construction development for housing construction projects, including the indirect influence of trends in the market of commercial housing construction and the possible effects of changes in the order of normative and regulatory activities of the organization of administration, financing, preparation, construction and commissioning of the product of projects - objects of housing construction.
		1.2.	The initial evaluation of the proposals of potential customers regarding the conclusion of contracts with this DC for the preparation and administration of the functional-operational cycle (FOC) of the project (s) in commercial residential construction - regarding the content of the tasks and duration of the FOC, the distribution of responsibilities and economic results for the intermediate and finished product of the project.
		1.3.	The primary analytical evaluation of the projects presented under clause 1.2., according to the system of analytical indicators, which is formalized for the needs of the DC, evaluates the economic, functional-technical, administrative-personnel and image characteristics of the DC's participation in each of the projects.
2.	Preparation and selection of PPBZh_DC alternatives in the format of a single visual-analytical model.	2.1.	Clarification (including involving the opinions of independent experts) of project characteristics, their coordination with potential customers.
		2.2.	Adoption of the final decision on the participation of DC as a leading stakeholder in housing construction projects as an SEU as part of the PHCP-DC
		2.3.	Formalized analytical presentation of the operating system of the DC as a system of interaction of the subsystems of the operating system of the DC (1- subsystem of development strategy and business planning; 2- subsystem of financial and resource-logistic support; 3 – subsystem of regulation) with local subsystems of administration of housing construction projects as strategic economic units and the administrative environment for the implementation of their projects, which is regulated by the AMC.
		2.4.	Development of options for synergistic arrangement of the content of cycles for individual projects.
		2.5.	Visual and graphic presentation of variants of a complete PHCP-DC.
		2.6.	Evaluation of variants of a complete PHCP-DC according to an innovative system of criteria, taking into account the evaluation of the reactions of the operational system of the DC as a project-adapted synergistic economic-administrative complex of the SEU. (description is given below)
3.	Adjustment of the operating system and organizational structure of the developer company to the content of the PHCP-DC implementation cycles	3.1.	Coordinating the composition of project administration work on the side of DC with other institutional participants - AMC, the customer and its co-investors.
		3.2.	Initial formation of the content of agreements between the developer company, institutional participants and stakeholders (executors) of the project.
		3.3.	Final coordination of agreements (contracts) that reflect the content and essence of the economic-administrative and functional interaction of the DC with the participants of the projects that are included in the PHCP-DC.
		3.4.	Implementation of the necessary economic, technological, information-analytical and organizational-administrative measures to adapt the current operating system and organizational structure of the company to the process of real implementation of projects (elements-SEU).
4.	Management of FOC projects as part of PHCP-DC	4.1.	Completion of project-estimating, organizational-technological, budgetary and management documentation for projects as part of PHCP-DC.
		4.2.	Implementation of projects. Operational adjustment of the completion of functional and operational cycles of projects. Intermediate budgetary and economic, technological and administrative control over the implementation of SEU projects
		4.3.	Assessment of the impact of the results of the implementation cycle of individual projects and the portfolio as a whole on financial results, the overall productivity of the DC operating system and the growth of its qualified assets.

During the formation of the toolkit, a number of scientific and methodological innovations were implemented regarding the economy and management of the operational activities of the developer company as a stakeholder of the project portfolio (investment and property complex).

1. In terms of the content and direction of the stages of formalized processing, selection of housing construction projects for the portfolio of the developer company and their subsequent productive implementation, this toolkit successfully combines: effective development platforms, with modern concepts of construction management and budgeting, and a productive information and analytical basis for decision-making in construction.

2. The toolkit has modernized the approach in evaluating construction projects as elements of SEU as part of the business portfolio (project portfolio) of the

$$R_{int}(m) = \sum_g \psi(g) * R_g; R_g = Z_g(m) / Z_{et_g}(m); R_g \leq 1; g = 1-6; \quad (1)$$

$$Z_1(m) = NPV(m) / T^{ok}(m) = \sum_{t=t_{uh}^{uh}-T^{uh,3}} [SP^{(+)}(m;t)/(1+\mu)^t] - \sum_{t=t_0^{0,3,1}} \{ [Bd(m,t)/(1+\mu)^t] \} / T^{ok}(m); t^0 < t^{31} < t^{uh} < T^{ok} < T^{np} < T^{u3} \quad (2)$$

$$Z_2(m) = IDp(m) * IRR(m) \quad (3)$$

$$Z_3(m) = \sum_t QW^{ag}(m) / T_j = \sum_t [dReg^{NPV}_j(t)/dt] / T_j \quad (4)$$

$$Z_4(m) = 10000 / \sigma^2 \{ NPV(m) \} \quad (5); Z_5(m) = Y^{inv,act}_6 = 10000 / \sigma^2 \{ SP^{(+)}(m) \} \quad (6)$$

$$Z_6(m) = \sum_{k=1-3} \{ K_k / B^{B*}k \} \quad (7)$$

where

g - serial number of the indicator;

m - serial number of the project in the primary general list of projects that are subject to an initial assessment regarding the feasibility of their inclusion in the PHCP-DC composition;

Z₁(m) – the first indicator, calculated as the net consolidated (discounted) income of the project, weighted by the payback period of the project, million hryvnias/year; the growth of the indicator maximizes the volume and intensity of the project's profitability during all phases of the FOC of the project;

Z₂(m) - the second indicator, calculated by the product of the project's profitability index and the project's internal rate of return (in units); the growth of the indicator ensures a predominant growth of the project's income assets over the investor's liabilities, and, at the same time, minimizes the types of investment risk covered by the project's internal profitability, primarily inflationary, speculative and other types of industry and project risks;

Z₃(m) is an indicator of the current rate of growth of the project value, determined by the ratio of the sum of the ordinates of the current rate of growth of project assets to the total duration of the project cycle. The maximization of this indicator ensures an increase in the positive (income) intensity of the FOC project and the minimization of its negative (expenditure) part, promotes the selection of projects with a more rational structure of assets and a better correlation of the duration of the investment and operational phases of the cycle;

Z₄(m) is the fourth criterion that ensures the minimization of NPV variation, which is estimated through the root mean square deviation; in this way, the methodical and applied sequence of the stages of project

developer company. For the needs of the primary local assessment of the cycle of housing construction projects regarding the expediency (from the standpoint of the DC) of their inclusion in the composition of the PHCP-DC, a modernized system of R-indicators (1)-(4) was applied, which assess the competitiveness of the project as an investment object in the profitable commercial real estate, as well as the leading determinants of the stability of the functioning of the real estate customer and the investment object;

The indicated indicators are presented in a universal dimension (as a result of the correlation of local estimates of projects **Z₁(m).... Z₆(m)** according to these indicators with their statistically or imperatively determined exemplary counterparts **Z₁(m).... Z₆(m)** for the region and industry) and further - combined into the "integral indicator for assessing the economic reliability of the PHCP-DC cycle":

selection and the increase in the reliability of the obtained forecast project characteristics of PHCP-DC as a whole are ensured;

Z₅(m) - the fifth indicator - ensures the maximum reliability of the investment pre-selection of projects to the composition of PHCP-DC through the minimization of the root mean square deviation of the most difficult forecasted project variable - the net flow of income **SP⁽⁺⁾(m)**;

Z₆(m) - the sixth indicator, which provides the developer with a picture of the liquidity of assets and the solvency of the client company for the m-th project in terms of anti-bankruptcy for the client company; is calculated as the average share of the organization's net working capital in the total amount of its sources for the last 3 years for the customer enterprise;

Rg(m) - relative assessments of the project according to the indicators, determined by the ratio of the actual values according to the indicators **Zg(m)** to their exemplary (reference) values **Zg(m)**, which are determined by the developer based on the results of the market evaluation of investments in commercial residential construction;

Rg (m) is an integral indicator of assessing the economic reliability of the housing construction project cycle;

ψ(g) - coefficients of the specific weight of the values in the integral indicator **Rint(m)**; are determined through the ranks of indicators established by expert heuristics;

t - number of the current period of project cycle implementation (month); **T_{ok}(m)** the payback period of the project;

T_{et} with the estimated life cycle duration;

t_{uh} - the time of the start of net income (net cash flow) for the project, counting from the moment of the start of the cycle (t₀);

$t_{a,i}$ – the time of completion of investment, counting from the moment of the beginning of the cycle (t_0);

Tpr - the term of exiting the estimated project capacity (according to the directive level of achieving a certain volume of housing sales);

NPV(m) - net present value (net discounted income) of the project, determined for the estimated duration of the cycle $T_{r,ts}$;

Bd(m,t) - the amount of investment costs determined for a separate t-current period (according to the investment budget, the consolidated estimate and the resource-calendar investment development plan)

Bd(m,t)/(1+μ)^t – similar value to **Bd(m,t)**, but discounted (consolidated) at the beginning of the cycle of the mth project;

SP(+)(m;t) is the volume of the net flow of income for a separate t-current period (during the operational phase, which for projects of this type lasts from the beginning of sales to their completion, and may partially occur in parallel with the investment phase of the cycle), for projects of this content are determined by the current difference: net proceeds from housing sales and all operating costs of the operational phase (including both costs for servicing sales and costs for administration of this flow from the side of DC and AMC);

SP(+)(m;t)/(1+μ)^t - similar value to **SP(+)(m;t)**, but discounted (consolidated) at the beginning of the cycle of the mth project;

Σt = t₀ - t_{z,i}{Bd(m,t)/(1+μ)^t} - the sum of discounted investment volumes for the entire duration of sales calculated by the accumulated total;

Σt = t_{CH} - T_{U,3} [SP(+)(m;t)/(1+μ)^t] - calculated by the accumulated total, the amount of the net income stream discounted at the current moment of the cycle, million hryvnias.

IDp(m) is the project profitability index, determined by the ratio $\Sigma t = t_0 - t_{z,i} \{ [Bd(m,t)/(1+\mu)^t] \}$ to $\Sigma t = t_{CH} - T_{U,3} [SP(+)(m;t)/(1+\mu)^t]$

RegNPVj(t) - a function established by regression (polynomial of the 5th degree), which models the distribution of the net combined income NPV for the given m project;

dRegNPVj(t)/dt - the first derivative of the RegNPV(t) function at time t;

QWag(m) - current growth rate cheap cost of the mth project;

The indicated final indicator and the simple percentage interpretation scale corresponding to it provide grounds both for revealing the comparative advantages of the project among other analogues (potential SEU), and for making a decision regarding the feasibility of its inclusion in the PHCP-DC composition.

The defining scientific and methodical innovations of the tools introduced in the work are:

a) the adaptability of the toolkit for the formation of the PHCP-DC to the specifics of the implementation of commercial housing construction projects and the corresponding need for a multi-faceted consideration of the elements of the DC portfolio in terms of:

- strategic economic units of the economic portfolio of the developer's enterprise;
- a temporary enterprise that, during the pre-investment (preparatory) and investment (construction)

phases of the operational and production cycle of projects, is subordinate to the environment of institutional participants headed by the AMC;

- the resource-property, economic-administrative and operational-production complex of investment and construction facilities (within the framework of the autonomous budget for each of the projects, the summary estimate and the resource-calendar plan), according to which the developer administers the content of business processes (resource- logistical support; preparation, administration and control; construction; implementation).

b) meaningful, methodical and calculation-analytical adaptation of the toolkit to European development standards, the international financial reporting system and modern project administration technologies. With the use of the indicated means of visualization, justification, unification and standardization of decision-making, which was implemented by the toolkit through a fundamentally new operational structuring - production cycle - the toolkit offers options for subsystems and elements for organizational structures of project administration (both within the operating system of the developer company and at the level of near-object structures) and provides analytical support for the development of a construction project for the construction of housing as a separate strategic economic unit as part of the PHCP-DC during the entire duration of the operational and production cycle - from the approval of the development agreement to the termination of this agreement (completion of the interaction of the DC with the customer, subcontractors, AMC and other stakeholders and the achievement of the target longing for the project as an object of commercial residential construction.

c) realized by the economic and analytical components of the toolkit, the capacity of productive modeling of project cycles as part of PHCP-DC and the subsequent manifestation of their impact on the growth of productivity of the developer enterprise, identified and evaluated through:

- an increase in the success of the operating system of the developer enterprise, in particular, an increase in financial results from the main activity; an increase in the value, structure of sources and resources of the return of its assets;

- improvement of the administration system of the development company at all its levels, divisions and elements of the organizational structure, as a result of which there is a significant increase in its image as an administrator and leading stakeholder of commercial housing construction projects.

As evidenced by the implementation of the work in the practice of development and construction and investment companies working in the field of commercial housing construction, the defining applied advantage of the toolkit introduced in the work is the possibility of successful formalized administration and adjustment of the parameters of the operational and production cycles of projects as part of the PHCP-DC with economic requirements dictated by: articles of the capital and operating budgets; sections of the consolidated estimate, the

content of the works performed (assigned by the sub-contractors of the development project) and the directives of the asset management company.

The functional and product specifics of commercial housing construction projects and the features of mandatory regulation of the course of their execution cycle from the side of the asset management company - make it impossible to use traditional ideas, approaches and applied tools for the formation of a business portfolio to the needs of this study. On the basis of such an analysis, an urgent need for a fundamental update of the methodical approach regarding the content and operational technology of the processes of forming PHCP-DC has been determined - in the direction of introducing and substantiating the modernized toolkit of forming PHCP-DC as a specific business portfolio for the developer enterprise.

The methodological and applied basis of the research was chosen, the basis of which was laid: modern construction development platforms, "management by goals", productive concepts of budgeting and the synthesis of applied tools of economic-analytical and economic-diagnostic decision-making tools, which made it possible to build an updated system of indicators of the functioning of the operational system of the DC through the prism of implementation of operational and production cycles of projects.

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IDENTIFICATION OF THE PROBLEM AND MANAGEMENT ASPECTS OF THE FORMATION OF FINANCIAL AND ECONOMIC RESULTS OF AGRICULTURAL ENTERPRISES

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Abstract

On the basis of an expert survey of managers and specialists of agricultural enterprises of the Lviv region of Ukraine, the following characteristics were determined: quality of planning of financial and economic results of agricultural enterprises; measures of formation of the organizational and management subsystem of the mechanism of formation of financial and economic results of agricultural enterprises; the state of the institutional and regulatory basis of the mechanism of formation of financial and economic results of the enterprises of the industry; efficiency of production and technological activity of agricultural enterprises; level of work motivation at agricultural enterprises; the rationality of the analytical and monitoring apparatus of the mechanism of formation of financial and economic results of the activities of enterprises of the industry; measures of realization of the economic and resource potential of agricultural business entities; problematic aspects (restrictions) of income formation and final financial and economic results of agricultural enterprise management; availability of processes of extended reproduction and sustainable business development at agricultural enterprises. On the basis of the obtained results, conclusions were drawn regarding the problematic aspects and obstacles of managing the financial and economic results of agricultural enterprises in the region.

Keywords: *agriculture, enterprises, financial and economic results, efficiency management, mechanism of formation of results.*

In the context of implementing the policy of improving the mechanism of formation of financial and economic results, it is important not only to summarize the relevant key parameters and performance indicators of agricultural enterprises, but also to identify problematic aspects in terms of organization and management in this area. Since we are talking about problems in the part of management, it is possible to identify the degree of realization of the potential, as well as obstacles to achieving the planned financial and economic results of enterprises, using the tools of sociological research.

Therefore, the analysis of the quality of management of these processes acquires special relevance and importance in relation to the formation and further implementation of an effective policy of agricultural enterprises to improve their financial and economic results. That is why the study of the quality of management of the processes of forming the financial and economic results of the management of agricultural enterprises was carried out by means of an expert survey (questionnaire of managers and specialists of enterprises in the Lviv region of Ukraine), which was conducted in the fall of 2021 at the analyzed agricultural enterprises.

3 persons from each of the analyzed enterprises, who are managers or leading specialists of structural subdivisions, were involved in the expert study. Thus, a total of 21 people were interviewed.

Methodologically, the questionnaire consisted of 10 questions, the answers to which together allowed to obtain information regarding the following 5 aspects:

1) measures of implementation of basic management functions (planning, organization, motivation, control) in the field of management of financial and

economic results of agricultural enterprises (2 questions);

2) the quality of the activities of agricultural enterprises in relation to the construction and functioning of structural and functional subsystems of the formation of financial and economic results (4 questions);

3) the level of realization of the economic and resource potential of business entities in order to achieve appropriate financial and economic results (1 question);

4) underutilized opportunities (shortcomings) to ensure income, as well as profit and profitability of economic entities (2 questions);

5) the state of ensuring reproductive processes, achieving sustainable development of enterprises (1 question).

The most important and even integral aspect of the quality management of business processes is the implementation of the planning function. Planning allows you to outline in advance both the totality and the sequence of measures that need to be implemented to achieve the set goal and objectives. On the other hand, planning involves determining the quantitative parameters of functioning, the achievement of which, in fact, signals the realization of the corresponding goal and tasks, and, on the contrary, deviation from these results will be evidence of non-fulfillment of the set plans. Accordingly, with the use of planning, the ability of the enterprise to optimally allocate available resources and potential to achieve financial and economic interests is achieved. When it comes to financial and economic results, the importance of planning is further strengthened mainly from the position that the results of financial and economic activity are, in fact, the final end point of the operating cycle, and, therefore, are determined by the consequences of the entire spectrum of events from the

moment of the first and to the last iteration in the entity's business processes. Without proper planning, there are no grounds for concluding that the enterprise has quality management of financial and economic results.

Despite this, only 14.3% of respondents gave an affirmative answer that plans for the financial and economic state / development of the enterprise are being developed on an ongoing basis at the enterprises they represent. At the same time, another 9.5% noted that such planning is not carried out at the enterprise.

It is obvious that in the conditions of the complicated business environment, the objectively existing crisis and external obstacles caused first by COVID-19, and later by the war, a significant number of enterprises have personnel limitations, especially in specialists not related to production activities, and carry out management processes of production and financial and economic activity to a large extent intuitively. However, this cannot serve as an acceptable reason for the low level of planning of financial and economic results of agricultural enterprises. In our opinion, there is a rather acute problem in improving this management function within the mechanism of forming the financial and economic results of enterprises, including the introduction of modern methods of forecasting, modeling and programming of various scenarios of behavior, changes in the situation and their consequences for the financial and economic results of management.

Although it is positive that, for example, 33.3% of analyzed enterprises practice periodic forecasting of key financial and economic indicators, and 23.8% financial and economic planning is carried out at the preparatory stage of the implementation of new business projects (related to investments) and/or starting new lines of business.

In our opinion, the results of the respondents' answers to the question regarding the formation of the mechanism of formation of their financial and economic results in the enterprises of the organizational-management subsystem can be considered to be largely favorable. The complete absence of such a subsystem was declared by 9.7% of the respondents, and in the general structure of all answers, this option scored only 4.2%.

For some reason, other options for answers that characterize certain aspects of the specified subsystem of the mechanism of formation of financial and economic results of agricultural enterprises turned out to be sufficiently "scattered", which may or may not be evidence of a complete understanding of the essence of individual elements of the subsystem, the existence of the fact of their existence, or the non-building of their structure within a single complex with interconnected elements. Thus, the majority (38.9% in the overall structure and 71.4% within this answer option) believe that the organizational and management subsystem in the field of ensuring the financial and economic results of enterprises is embedded in the general system of business management, which is both positive and No. The reverse argument may refer to a certain substitution of concepts and the desire to hide highly specialized management in this area within the general management system.

Certain confirmation of such a conclusion can be served by the lack of clear delegation of the organization's function (only 9.3% in the overall structure and 19.1% within this answer option), as well as the presence of an almost even distribution of answers among three key aspects of the organizational and management subsystem – management of business activity (13.4% and 28.6%, respectively), budgeting of production and economic activity (16.3% and 33.3%) and management of financial and economic results within the general organizational and management system of management (20.9 % and 42.9%).

In our opinion, there are no critical problems with the organizational and management subsystem at agricultural enterprises. However, there is a need to implement more modern practices of organization and management, their focus around the final financial and economic results of management in order to ensure economic security, competitiveness and sustainable business development.

At the same time, we notice a slightly worse situation in terms of the state of the institutional and regulatory basis of the mechanism for forming the financial and economic results of the analyzed agricultural enterprises. Because, in general, this problem is characteristic not only of financial and economic results, but of management in general, and not only for agricultural, but for most domestic enterprises in most branches of the national economy. We are talking about a low level of standardization of management as a set of requirements, rules, instructions and principles for the implementation of reference measures and actions at business entities in relation to business management as a whole, and in this case - ensuring proper (including planned) financial and economic results management. The institutional and regulatory basis of the mechanism for the formation of financial and economic results of agricultural enterprises is a set of relations between the subjects of the internal and external environment using communication tools, mechanisms and means of managing processes in the analyzed sphere. Therefore, its institutionalization requires a significant amount of work in the field of standardization of quality management. But at present, there is still no sufficient corporate understanding of the importance of such changes, which may also be due to a lack of appropriate resource (mainly financial) support.

From the answers of the respondents, we can state at the moment only separate manifestations of the construction of the institutional and regulatory basis in the analyzed field at agricultural enterprises. Accordingly, it is positive that 18.8% of the analyzed enterprises have already implemented procedural regulations for the development of business processes, 15.6% have clearly defined the parameters of the formal and informal institutional business environment, and 6.3% have developed and implemented normative and legal regulation of financial management economic results. However, activities in this direction are still not sufficient, and enterprises should work on improving the institutional and regulatory basis of the mechanism of formation of financial and economic results of management. This is despite the fact that within the relevant

options, 19.1% of respondents affirmatively answered that institutional and regulatory support at enterprises has not been implemented. The specific weight of this option is also high in the overall structure of experts' answers - 12.4%.

In our opinion, the introduction (institutionalization) of a full-fledged institutional and regulatory basis for the mechanism of formation of financial and economic results will contribute to better management of the processes of production and technological activity efficiency. This conclusion is based on the fact that, at present, in the situation of a low level of standardization of the quality of business management, agricultural enterprises still manage to guarantee a relatively high level of efficiency of production and technological processes. Thus, 71.4% of respondents believe that the level of efficiency of production and technological activity of enterprises of this type of economic activity corresponds to the average level of the industry (in the overall structure of answers, this option gained about a third - 29.4%).

14.4% of managers and specialists of enterprises spoke of low efficiency in this area, and 28.6% of respondents said that it was lower than the industry average. The corresponding indicators in the general structure of answers were 5.8% and 11.8%. As we can state, in general, the efficiency of production and technological activity of a fairly large part of agricultural enterprises is still low, and this is a negative factor in the context of the formation of proper financial and economic results of management.

On the other hand, some positive manifestations are also present. These are, for example, the formation of a rational industry-production structure at enterprises (57.1% of respondents believe so; in the general structure, this answer option was 23.5%), the completeness of the measure of logistical support of enterprises (42.9% and 17.7% respectively), adequate supply of material and technical base and use of innovative technologies by business entities (28.6% and 11.8%).

Thus, there are reasons to assert about the significant reserves of agricultural enterprises in relation to the further efficiency of their production and technological activities, the implementation of which has direct positive consequences in terms of increasing the amount of profit and increasing the level of business profitability, improving other characteristics of the financial and economic results of management.

This can be greatly facilitated by increasing the level of labor productivity, one of the leading factors of which is a high level of its motivation. Currently, according to the results of the expert survey, this management function is implemented only partially and more than half consists exclusively of remuneration (this answer option was 28.1%) and the material component of motivation (23.4%), as well as to a greater extent applies to management personnel of enterprises (18.8%).

Confirmation of insufficient rationality and quality of work motivation systems at agricultural enterprises is also the fact that only a small part of the respondents defines its condition as high (9.4%). The imbalance of the work motivation system is evidenced by the low level of its distribution to the workforce (only

9.4% of responses), as well as the limitation of non-material staff stimulation practices (10.9%).

Stimulating work is considered one of the key factors of increasing efficiency and prerequisites for improving the financial and economic results of organizations in modern management. Therefore, it is very important for the management of agricultural enterprises to improve their activities in this direction. Moreover, the priority should be the formation of a work motivation system with a balanced set of elements, tools and means, a mandatory connection of the level of remuneration and non-material incentives in accordance with the obtained final business results.

Despite motivation, the basic and integral function of management is the function of control, the proper application of which solves a number of tasks at once: first, tracking whether all processes are taking place as planned; secondly, observing the temporal characteristics of the course of changes; thirdly, observation of the absence of deviations in the quantitative values of key parameters and indicators of volumes and efficiency of management, their consequences for the financial and economic condition, security processes and reproduction of capital and assets of business entities; fourthly, the formation of conclusions regarding the implementation of the goal and the achievement of the financial and economic interests of enterprises.

In this context, it is positive that 9 out of 10 (90.5% in the structure of respondents' answers to this question) enterprises have established monitoring of financial and economic activity. This indicator is also high in the general structure of respondents' answers - 37.3%.

Periodic tracking (and also on a permanent basis) of the values of indicators of financial and economic activity, including financial and economic results, is evidence of high attention to control of the relevant processes. However, such work is still not systematic, which is negative. 11.8% of respondents stated that the enterprise has implemented a permanent system of research into the financial and economic status and business results, and at the same time operational control of key indicators is carried out (in the structure of answers to this question, the indicator was 28.6%).

At the same time, the values of the answers were high (80.9% within the answer option and 38.3% in the general structure), that the corresponding analysis is carried out within the general system of analyzing the financial and economic activity (state) of the enterprise at the end of the analyzed period (mostly - calendar year). And this is positive. However, it does not meet the modern realities of competitiveness and security. In particular, enterprises to a very limited extent develop and implement their own (taking into account the branch and specifics of the organization and business) methods and techniques (5.9% in the general structure and 14.3% within the response option); apply modeling of the influence of alternative options of management decisions on the financial and economic results of management (3.9% and 9.5%, respectively).

Even more negatively, in our opinion, it is necessary to consider the presence of manifestations of a complete lack of implementation of the function of analysis and control of financial and economic results

at agricultural enterprises. Currently, this is typical for every fifth answer (19.1% within the relevant option) and for 7.8% of enterprises in general. Therefore, there is a need to improve the analytical and monitoring apparatus of the mechanism of formation of financial and economic results of agricultural enterprises. At the same time, the key vector should be the creation of an ongoing system of analysis and control with preliminary modeling of the consequences of internal and external trends, ongoing monitoring of the course of processes and their consequences, periodic comprehensive analysis of financial and economic results and factors of their formation with the use of modern effective methods of analysis and diagnostics.

At agricultural enterprises, the connections between the elements of the mechanism of formation of financial and economic results of management are still not formed and are currently characterized by a certain diversity, which does not correspond to leading foreign practices. We can assert this by comparing, for example, the results of evaluating the efficiency of production and technological activity and the degree of realization of the economic and resource potential of agricultural enterprises. The obtained values testify in favor of the predominance of the second characteristic. In particular, 34.2% of the interviewed experts believed that the realization of the economic and resource potential of enterprises is at an above average level, and another 26.3% claimed that it is at an average level.

Respondents' answers related to the low degree of realization of the economic and resource potential were relatively low, namely 2.6% indicated that the level of realization was low and 10.5% - below average.

However, here too there is potential for further improvement. Thus, there is a certain dissonance between the mentioned high results and, for example, the fact that only 7.9% of experts indicated that the economic and resource potential of the business is fully realized. In addition, there are characteristic differences in the levels of implementation of the managerial and resource components of the potential, currently in favor of the managerial one (13.2% versus 5.3%). However, the very fact of recognition of differentiation is rather negative and is evidence of the existence of problems both in terms of effective use of resources (production, material and technical, technological, personnel, etc.), and in terms of full realization of management potential.

These arguments provide grounds for concluding that there is an urgent need for better management of the processes of formation and realization of the economic and resource potential of agricultural enterprises, as well as taking into account the relevant processes both during the justification of policy provisions and the assessment of the degree of its implementation in relation to the achievement of high values of financial and economic results management.

As noted in the theoretical and methodological part of the study, financial and economic results go beyond the purely final results of management, which are profit and profitability, and are determined by parameters of safety and competitiveness, increase of own cap-

ital, trends towards expanded reproduction and sustainable development, etc. However, in any situation, at the initial stage, everything is determined primarily by the volume (production and sales) of economic activity, which ultimately forms the income of enterprises. Income maximization is a direct way (with an effective cost management policy) to the growth of the final business results. Therefore, it is important to identify which components are characteristic of certain obstacles and restrictions for enterprises in terms of increasing income.

The results of the expert survey made it possible to state that these are mainly problems in the field of the material and technical base, first of all its availability and level of modernization (80.9% within this answer option and 17.2% in the general structure of the problems of increasing the income of enterprises), production economic infrastructure, the state of its development and modernity (61.9% and 13.1%, respectively), yield and efficiency, as well as price policy (52.4% and 11.1% respectively) of agricultural enterprises.

At the same time, the problem of the quality of production and marketing activity (42.9% and 9.1% respectively) of the enterprises of the industry remained sufficiently high. A much lower level of problems was characteristic of the quality of the used raw materials and planting material (2.0% in the overall structure and 9.5% directly according to this component of income formation), the development of the logistics system (23.8% and 5.0%), security of enterprises by sowing areas / production and economic premises, the available assortment structure of agricultural products (33.3% and 7.1% respectively).

Therefore, the obtained results provide grounds for asserting that the increase in the amount of income of agricultural enterprises is closely correlated to a significant extent with the modernization of the material and technical and technological base of production, the development of the production and economic infrastructure, as well as the improvement of the marketing system of enterprises, its evolution in accordance to modern progressive trends, including the formation and development of Internet marketing systems and digital marketing communications.

For the most part, production factors also determine the level of profitability and profitability of agricultural enterprises, which is logical when the industry belongs to the real sector of the national economy with a high content of cost-intensive management. Thus, 61.9% of experts pointed to the production cost as one of the key factors in the formation of profit (profitability) (in the overall structure of answers, the indicator was 21.0%).

Accordingly, the value of the impact on profitability of such a factor as the management of the total costs of enterprises also became quite high (42.9% within this answer option and 14.5% in general). Thus, only the production cost and general costs of enterprises by about 35% serve as limitations (obstacles) to further increase in the level of profitability of agricultural business. At the level of cost management, managers and specialists of agricultural enterprises determined the

importance of the "Liquidity" factor. Obviously, this can be due to the difficulties of quickly selling products and making calculations in conditions of critically high external instability. Instead, its storage and maintenance leads to increased costs and, accordingly, a decrease in profitability.

At the same time, a fairly large part of the interviewed experts considers the probability of further growth in the profitability of the existing agricultural business to be a sufficiently pessimistic scenario (including from the standpoint of high cost-intensiveness) and as a way out of the situation points to the need to diversify activities (including horizontal) in order to receiving additional income from other sources. This opinion was held by 57.1% of enterprise representatives, and this answer took the second position in the overall structure, reaching a value of 19.4%.

On the other hand, as the results of the analysis showed, such factors as business activity, financial stability and asset management affect the profitability of agricultural enterprises, but to a somewhat lesser extent. Yes, everything is equal, a total of about 30%.

Therefore, in order to ensure further growth of profitability, it is important for the management of enterprises to form a system of tools, the implementation of which will generally ensure this, but with a higher level of attention to resource and energy saving, the introduction of more productive (in particular ICT) technologies, vertical and horizontal diversification (including the creation of diversified corporate structures), acceleration and efficiency of business processes.

Measures in the specified areas have a direct positive impact not only on the growth of profits and the increase in the level of profitability, but also closely correlate with the provision of better prerequisites for expanded reproduction and sustainable development of agricultural enterprises. However, they are already sufficiently typical for the subjects of this industry, when 42.9% of experts consider the development of enterprises to be stable, at the same time, against the background of an increase in the volume of economic activity, assets and the number of employees of enterprises (Fig. 1).

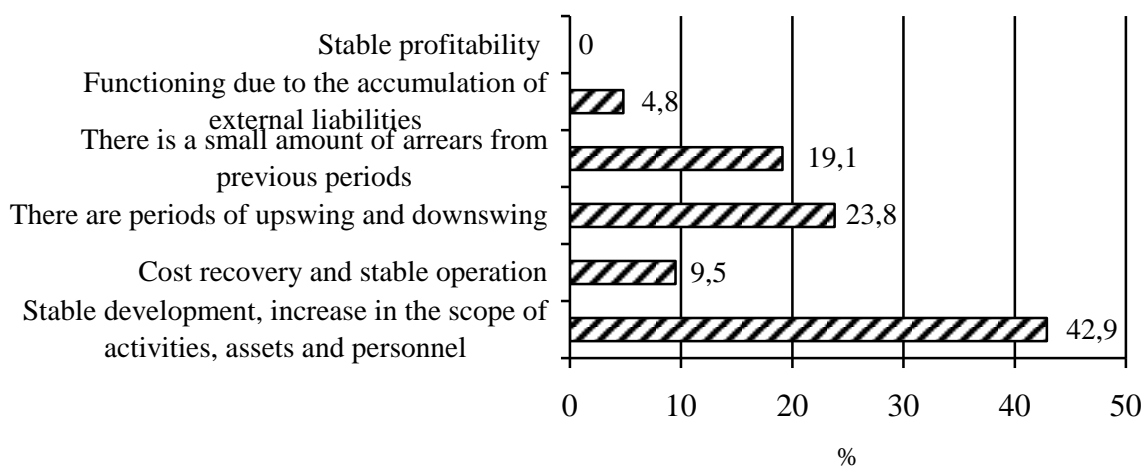


Fig. 1. Results of experts' assessment of the availability of extended reproduction and sustainable business development processes at agricultural enterprises, 2021.

Note: only 1 answer option

Source: compiled based on the results of an expert survey

For representatives of another 9.5% of business entities, stable functioning and full system coverage of expenses is characteristic. Thus, every second enterprise, in fact, successfully implements the processes of its extended reproduction, which is positive. At the same time, none of the interviewed experts indicated the answer option that enterprises are characterized by stable unprofitability.

It is important to maintain these trends, but a number of business entities are not so stable. The option "There is a small amount of debt from previous periods" is still typical for 19.1% of representatives of agricultural enterprises, "There are periods of boom and bust" - for 23.8%. Another 4.8% of enterprises function not so much due to income and profit as due to the accumulation of external liabilities. Thus, achieving stability in sustainable functioning and development, expanded reproduction (as the most systemic characteristics of the best financial and economic

results of management) are still relevant issues for domestic agricultural enterprises. Moreover, to achieve this goal, it is expedient to direct the entire set of measures in all other directions of the policy of improving the financial and economic results of business.

CONCLUSIONS.

With the application of the expert survey method, problematic aspects of the elements of the mechanism of formation of financial and economic results of agricultural enterprises were revealed. This is mainly due to: lack of practices of careful planning of final generalizing indicators of production and financial and economic activity, processes of structural changes in capital, liabilities, safety parameters, competitiveness, extended reproduction of enterprises; the existence of a need for institutionalization of the institutional and regulatory basis and modernization of the

organizational and management subsystem of management in the analyzed area; insufficiently high efficiency of production and technological activity, implementation of economic and resource potential, reproduction and sustainable development of agricultural enterprises and the imbalance of the system of motivation of the work of their personnel, its untargetedness and weak connection with the achievement of the planned values of the parameters of the financial and economic condition and efficiency; limited practices of modeling the impact of management decisions (their alternatives) on the final results of management, the use of modern, including our own, methods of assessment and diagnosis of financial and economic results of management;

there is a high need (in view of the realization of the potential for increasing income and increasing the profitability of business) in the modernization of the material and technical and technical and technological base, the production and economic infrastructure of enterprises, the problems of productivity and quality of production, as well as the marketing, especially price, policy of enterprises, their management costs and processes of vertical-horizontal diversification. The effective policy of improving the financial and economic results of agricultural enterprises should be primarily directed to the elimination of these shortcomings.

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THE ROLE OF WORLD RANKINGS IN INVESTMENT DECISION-MAKING

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РОЛЬ МИРОВЫХ РЕЙТИНГОВ В ПРИНЯТИИ ИНВЕСТИЦИОННОГО РЕШЕНИЯ

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<https://doi.org/10.5281/zenodo.7061584>**Abstract**

The need to understand the process of making an investment decision pushes us to study the factors and their assessments that affect the conclusions of a potential investor. One of these factors is the aggregated assessment of an individual country - the world rating, which sometimes forms a false idea of the investment attractiveness of the state.

Аннотация

Необходимость понимания процесса принятия инвестиционного решения толкает нас на изучение факторов и их оценок, влияющих на умозаключения потенциального инвестора. Одним из таких факторов является агрегированная оценка отдельной страны – мировой рейтинг, который формирует порой ложное представление об инвестиционной привлекательности государства.

Keywords: world ranking, investments, investment attractiveness.

Ключевые слова: мировой рейтинг, инвестиции, инвестиционная привлекательность.

В процессе принятия инвестиционного решения инвестор пытается решить вопрос насколько тот или иной объект вложений привлекателен. Инвестиционная привлекательность объекта зависит не только от внутренних факторов (например, размера дивидендов), но и от условий, в которых функционирует данный объект.

Если потенциальный инвестор рассматривает организацию как объект инвестирования (например, в виде займа, покупки доли или приобретения ценных бумаг), то немаловажную роль в принятии решения должен сыграть страновой фактор: географические, экономические, правовые, политические, социальные и демографические условия, то есть все то, что оказывает внешнее прямое или косвенное влияние на функционирование объекта инвестиций.

Однако иностранному инвестору сложно самостоятельно вникнуть и сравнить инвестиционные факторы различные страны с целью выбора одной или нескольких из них как наиболее благоприятных для инвестирования. Для сравнительной объективной оценки страновых факторов используются различные рейтинговые системы, которые уравнивают на основе выбранной методологии особенности различных стран и приводят результат данной операции в количественном или качественном выражении. Единая методология с одной стороны позволяет приводить показатели к единой базе сравнения, но с другой стороны не позволяет учесть специфические качественные особенности страны, отсекая их в связи с невозможностью приведения данных особенностей к единому эталону, что в свою очередь лишает важной информации потенциального инвестора.

На сегодняшний день почти каждая финансово-экономическая организация составляет свой рейтинг. Наиболее известными из них являются:

- индекс лёгкости ведения бизнеса от Всемирного банка (англ. Ease of Doing Business Index);
- рейтинг лучших стран для ведения бизнеса от американского финансово-экономического журнала «Форбс» (англ. Best Countries for Business);
- различные рейтинги BAV Group, характеризующие отдельные аспекты стран;
- индексы Департамента организации Объединённых Наций по экономическим и социальным вопросам (ДЭСВ ООН), которые составляются на основе статистических данных, получаемых от национальных институтов и международных организаций и др.

Каждый рейтинг позволяет сравнить страны между собой и сделать вывод на сколько страны продвинулись в своем экономическом развитии относительно своей прошлой позиции и относительно лидеров рейтинга, сделать вывод об общем экономическом уровне развития той или иной страны. Так, в частности, индекс лёгкости ведения бизнеса от Всемирного банка позволяет составить общее представление о зарегулированности процедур открытия и ведения бизнеса, доступа к кредитным ресурсам, об уровне налоговой нагрузки в сравнении с другими странами и пр.

Однако дает ли страновой рейтинг ответ на вопрос об эффективности потенциальных инвестиций (например, о сроке возврата или рентабельности)? На наш взгляд, нет. Поскольку, как отмечено выше, любой рейтинг дает усредненные макроэкономические показатели страны, то есть инвестор получает представление о бизнес-климате страны, но не об

инвестиционной привлекательности страны или ее отдельных инвестиционных объектах.

Наш вывод ни в коем случае не говорит о бесполезности рейтингов от ведущих мировых финансово-экономических организаций или институтов. Составление и публикация данных рейтингов может быть рг-компонентом инвестиционной стратегии отдельного государства и макроэкономическим ориентиром для правительства.

Так, индекс «Начало бизнеса или Регистрация предприятия» от Всемирного банка, который включает в себя прохождение административных процедур по регистрации компании, стоимость данной регистрации, временные затраты, стимулирует правительства стран упрощать административную процедуру, чтобы продвинуться в рейтинге Всемирного банка.

Однако мировые рейтинги могут наносить ущерб инвестиционной привлекательности отдельной страны, поскольку методология расчета показателей не может быть на 100% объективна (рейтинг составляется людьми на основании мнений или отчетов людей, пусть и профессионалов высокого уровня, т.е. здесь имеет место быть человеческий фактор и манипулирование методологией при составлении рейтинга). Методология рейтинга, как было отмечено ранее, не учитывает страновые особенности некоторых государств, например, стран Азии или Латинской Америки.

Так, в 2018 г. главный экономист Всемирного банка Пол Ромер сделал заявление о некорректности индексов в отношении Республики Чили и пообещал, что индексы в отношении данной страны будут пересчитаны. В 2021 г. юридической компанией Америки WilmerHale по поручению Международного банка реконструкции и развития было проведено расследование, результатом которого был вывод о манипулировании рейтингом Китайской Народной Республики, Королевства Саудовской

Аравии и Азербайджанской Республики в 2018 и 2020 г. Также результатом расследования стал отказ Всемирного банка в дальнейшем составлять и публиковать индекс лёгкости ведения бизнеса.

Таким образом, мировые рейтинги позволяют сформировать у инвестора представление об уровне развития экономики и состоянии бизнес-климата в отдельной стране. Однако данное представление носит скорее ознакомительный, вводный характер и не может быть основой для принятия инвестиционных решений или для оценки инвестиционной привлекательности отдельного государства или его инвестиционных объектов. Для оценки инвестиционной привлекательности потенциальному инвестору необходимо детально изучить страновые факторы (внешние) и проанализировать с инвестиционной точки зрения финансовую документацию объекта инвестирования (внутренние).

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