

# EFFECTIVE MANAGEMENT OF A SCIENTIFIC ORGANIZATION IS A NECESSARY FOUNDATION FOR ITS PARTICIPATION IN OPEN R&D

## INTRODUCTION

Research costs have risen exponentially in recent decades, while scientific organizations' productivity has declined, slowing overall innovation [1]. Transition to open R&D – through collaboration, knowledge sharing, and joint use of scarce resources – is seen as a key way to reverse this trend [1,2,3].

However, effective participation in open R&D first requires strong internal management. Without streamlined processes, organizations risk losing intellectual property control, wasting resources, and facing personnel issues.

Traditional hierarchical structures have proven inefficient in today's dynamic environment. Matrix management offers a better alternative by enabling strategic planning that accounts for complex patterns, proactive staffing solutions, and flexible task allocation [4]. Participatory management, involving employees in decision-making, further boosts motivation, job satisfaction, and engagement [5,6,7]. Therefore, in our opinion, the implementation of matrix and participatory management can contribute to improving the management effectiveness of scientific organizations.

Previous studies have examined in detail the outcomes of changes in organizational structure. However, studies focusing on organizational changes in healthcare research organizations are currently limited and primarily theoretical. Furthermore, we were unable to find any studies devoted to the practical assessment of the effectiveness of implementing comprehensive matrix-participatory management mechanisms in medical research organizations.

The purpose of this study is to analyze the results of implementing these approaches in a scientific organization as a necessary foundation for the transition to open R&D.

## METHODS

We have introduced a set of management solutions that include the implementation of matrix and participatory management in our scientific organization, as well as activities to develop personnel potential.

Matrix management implementation included the development of a unique “Task Matrix” tool, which fosters an open and trusting scientific environment and supports realistic three-year KPI planning (Figure 1). The tool is based on newly established approaches to KPI and researcher workload rationing, complemented by the introduction of a dual reporting system – employees report both to administrative and functional managers – enabling more flexible and efficient task distribution.

Действия	Номер КИЗ	Название КИЗ	Ссылка на задачу БЭА	Новая ссылка на задачу БЭА	Дата постановки задачи	Прогноз	Квартал 1		Квартал 2		Квартал 3		Квартал 4		Итого ЛД
							План	Факт	План	Факт	План	Факт	План	Факт	
															100
															80
	26.3.1.1.	Оценка точности и клинической применимости комплексного ИИВ-сервиса для анализа КТ органов грудной клетки		<a href="#">Ссылка</a>		1	65	0	25	0	10	0	0	0	0

Figure 1. "Task Matrix" tool

Participatory management was implemented by enabling employees to take part in strategic development sessions, independently select methods and team compositions for scientific tasks, receive delegated authority within standardized processes, request additional specialists with needed competencies, and propose optimizations to scientific workflows and procedures.

Personnel potential development included the creation of individual professional development plans aligned with organizational goals during one-on-one meetings, establishment of a financial incentive system (bonuses for technology commercialization, Q1/Q2 publications, major events, scaling achievements, and key tasks), and a non-financial incentive program offering free training at leading Russian institutions.

To assess the effect of the implementation of the proposed management decisions, a comprehensive study was conducted, which included general scientific methods of systemic, structural-functional, institutional, and comparative analysis; sociological methods of data collection (questionnaire surveys and expert interviews); and statistical data processing.

The proposed set of organizational changes included not only professional development for employees but also the ecosystem creation for scientific activity (a scientific environment, a talent incubator, and educational programs for employees), as well as the implementation of matrix and participatory management mechanisms. To assess the effectiveness of the organizational changes, we also took into account the following factors: financial, personnel, methodological, and psychological, as well as factors related to the external institutional and political environment.

**Financial factors.** The organization's funding expanded systematically over each three-year period, driven by previously achieved results and clearly defined plans for subsequent cycles. Although an isolated increase in the budget itself would have neither ensured a comparable increase in the number and quality of KPIs nor the transition from research to R&D without parallel development of human resources, the absence of such expansion would have made the observed result unlikely.

**Personnel factors.** During the study period, there were no instances of key employees joining or leaving the organization. The only personnel changes involved internal career development: top specialists were appointed to lead newly created departments, and the organization regularly recruited young scientists (university graduates) in need of mentorship. Without the implemented organizational changes, such integration of young staff would inevitably have led to a diversion of attention from experienced employees and a decline in overall productivity.

**External factors.** Although international and interorganizational collaborations are recognized predictors of increased publication output, they can lead to a dispersion of resources and a loss of focus if internal organization is ineffective. The implemented set of organizational changes ensured structured and targeted management of partnerships, eliminating negative effects.

**Methodological factors.** The transition from conducting basic research to undertaking more complex and resource-intensive R&D would objectively have led to a decline in the number and quality of research outputs in the absence of organizational changes. The observed increase in productivity occurred despite the growing complexity of research tasks.

**Psychological factors.** Annual anonymous employee surveys tracked awareness of changes and satisfaction with working conditions. The steady increase in satisfaction over several years indicates that the rise in engagement was not temporary (the "Hawthorne effect") and could not be explained solely by a desire to "check a box."

## RESULTS

Firstly, we were able to increase our research staff in a timely manner in line with the volume and complexity of future R&D, which enabled us to achieve planned indicators [8].

Secondly, thanks to the principles of KPI rationing, we managed to reduce the time for the preparation and publication of scientific articles by almost a half, and for the preparation and approval of methodological recommendations by 1.5 times [9].

Thirdly, the implementation of matrix and participatory approaches to the management of a scientific organization has improved not only the quantity (Figure 2) but also the quality of annually achieved KPIs. For example, the number of published articles in journals indexed in Web of Science increased 3.7 times, in journals of Q1-Q2 by Scopus — 2.2 times.

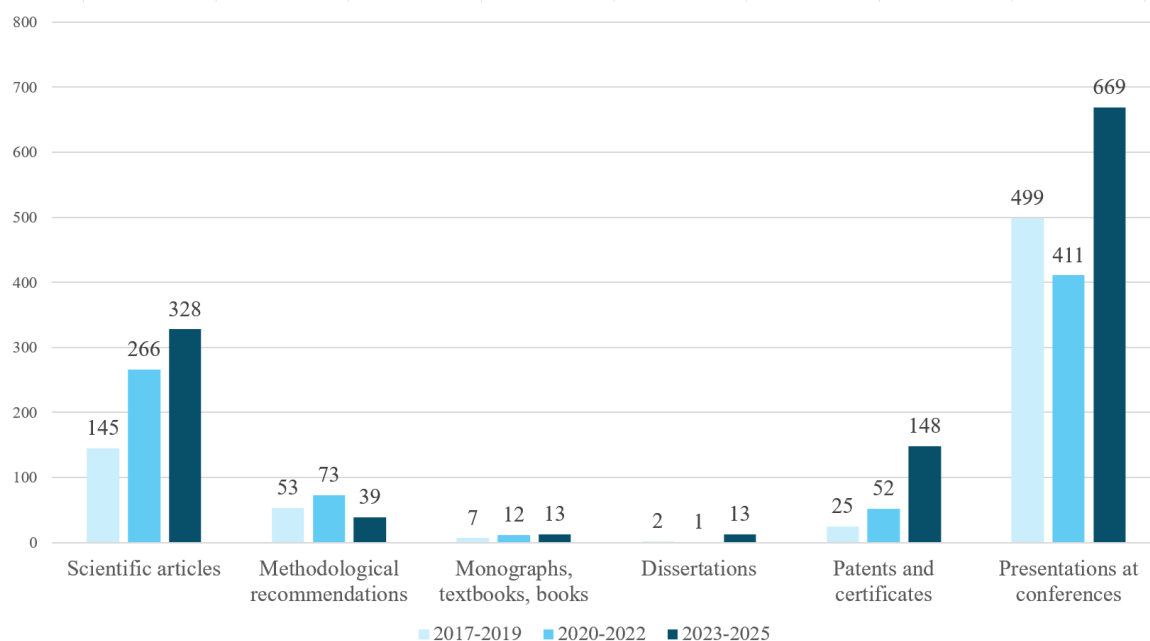


Figure 2. Quantitative changes in KPIs achieved by our organization

Fourthly, a transition from purely scientific research to R&D has been completed — in-house production of high-technology products (16 types of phantoms) has been implemented [8].

Fifthly, a 2024 survey among researchers revealed high levels of psychological comfort (96%), awareness of the R&D plan (83%), confidence in successful plan implementation (98%), and involvement in R&D activities (98%).

Thanks to effective management, our organization was able to switch to open R&D in 2023-2025. Thus, scientific research was conducted in partnership with seven medical facilities of the Moscow Health Care Department, 27 federal organizations, and 4 international organizations.

## CONCLUSION

So, the implementation of a set of management solutions, including matrix and participatory approaches, as well as personnel changes, enabled our scientific organization to successfully transit from pure scientific research to R&D. Improving the management effectiveness of the scientific organization ensured the necessary foundation for the transition to open R&D, including at the international level.

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