



NATIONAL RESEARCH
UNIVERSITY

Institute for Statistical Studies and Economics of Knowledge
Centre for Business Tendencies Studies

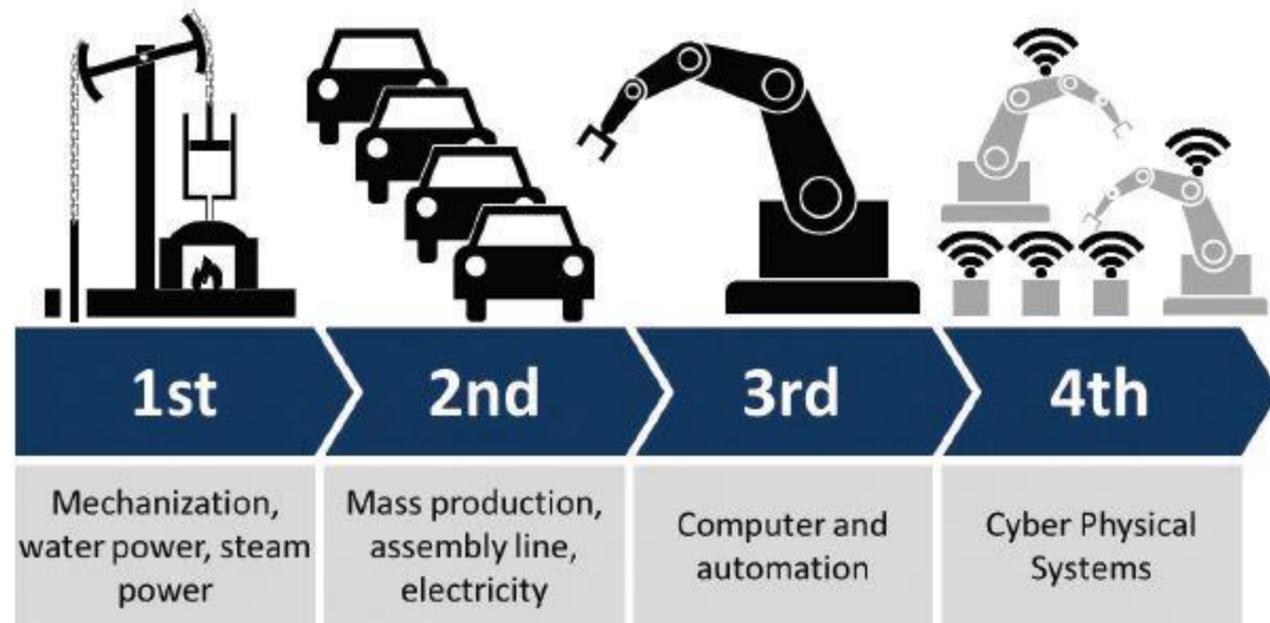
DIGITAL TRANSFORMATION OF MANUFACTURING: DRIVERS, BARRIERS, AND BENEFITS

Inna Lola
Murat Bakeev (speaker)

Moscow, 2020



TOPICALITY AND RESEARCH QUESTIONS



The four industrial revolutions. Source: AllAboutLean

- What are **the drivers of business and digital activity**, as well as **barriers associated with the level of digital transformation** of manufacturing enterprises in the current phase of digital development in Russia?
- What **benefits** do manufacturing enterprises **receive** from the introduction of **digital technologies**?

- The current stage of digital transformation is characterized by a wide diffusion of digital technology into manufacturing value chains: **Industry 4.0** and the **Fourth Industrial Revolution**
- Covering all aspects of the enterprise's activities, digital transformation requires a wide range of participants, as well as following a clear and coherent roadmap, and, as a result, **special metrics** become necessary for its assessing, which may be irrelevant for the development and implementation of individual innovations
- The results of our paper may be useful primarily for studying the experience of **developing and transition economies**, which are often characterized by catch-up innovative development and the large role of state innovation policy



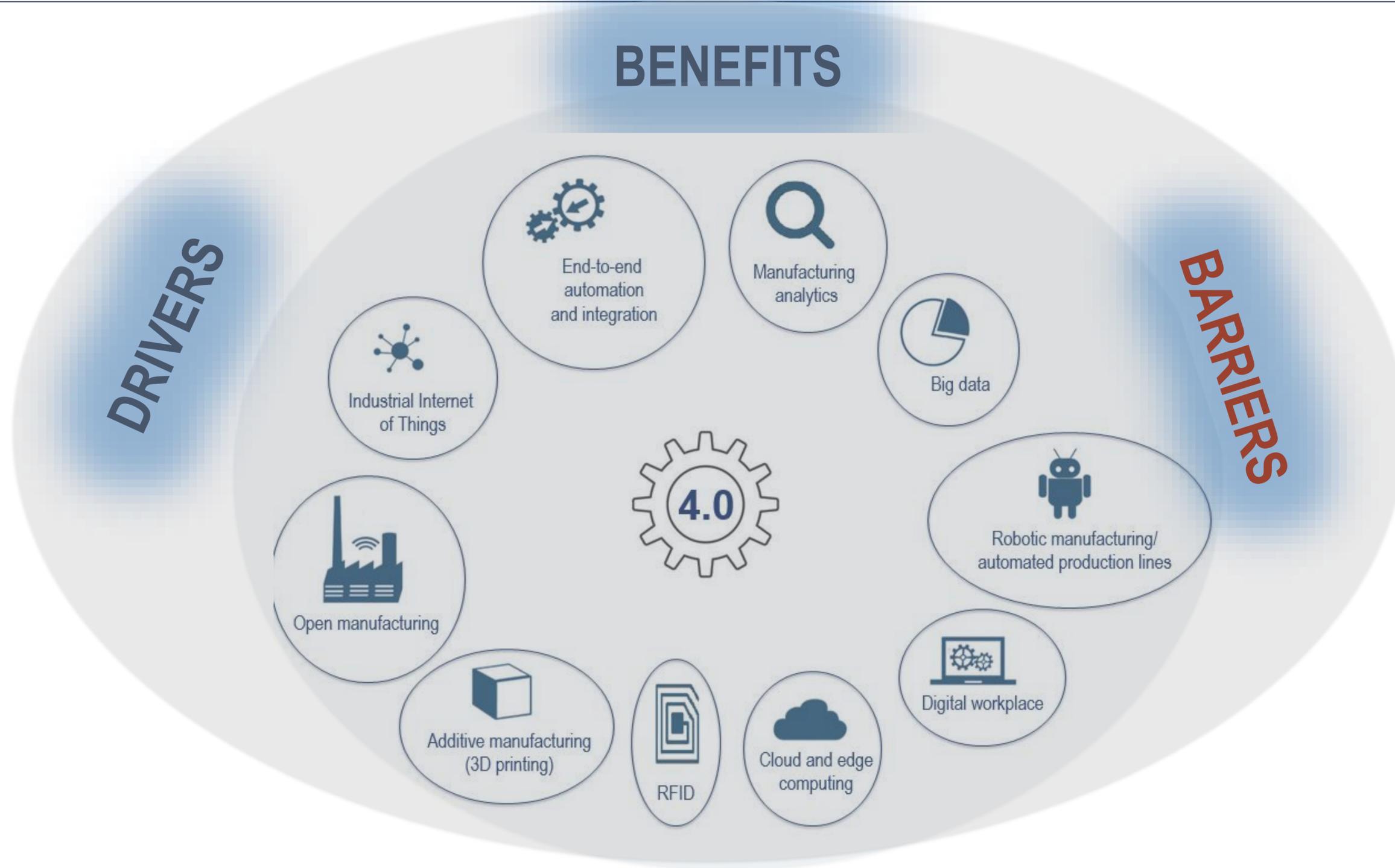
BUSINESS TENDENCY MONITORING: A TURN TO DIGITAL

- ❑ Survey of business tendencies and digital activity in **manufacturing**
- ❑ The sample covers more than **1100** companies
- ❑ The first pilot surveys were conducted in mid-**2018**, the second – in mid-**2019**
- ❑ The survey programme is based on international experience in measuring digital progress:
 - European Commission's practice in digital agenda and conducting annual surveys of the information society
 - European Digital Economy and Society Index (DESI) – key blocks, construction methodology and results analysis





EXAMINED TECHNOLOGIES





DRIVERS, BARRIERS, AND BENEFITS

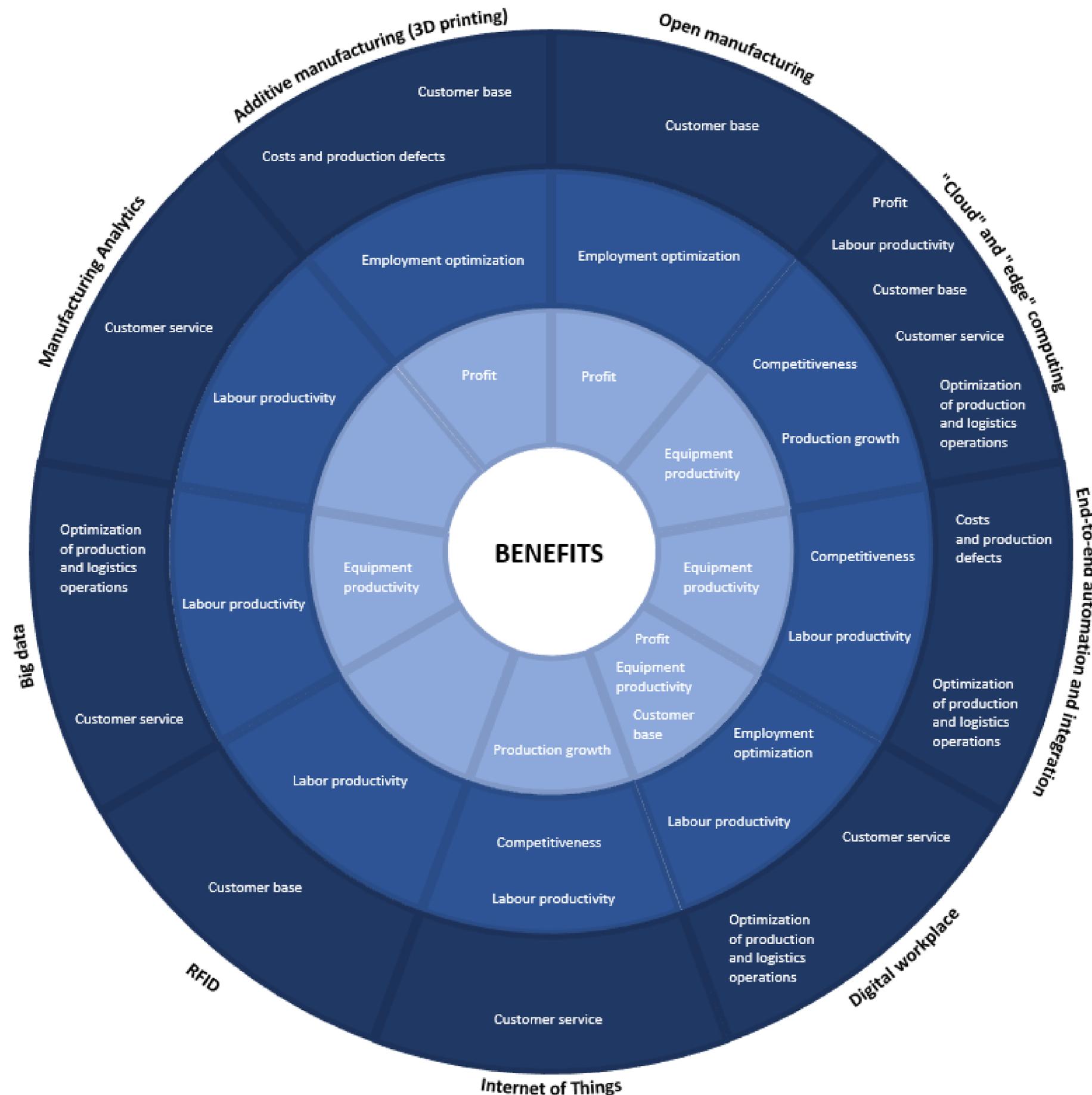
Presence / absence of increase (improvement) in the current year compared to the previous year	Expectation of positive impact / lack of expectation or difficulty in answering	Presence / absence
Business Activity Drivers <ul style="list-style-type: none">• Demand for products (DEMAND)• Primary product output in kind (OUTPUT)• Production investment (INVESTMENT)• The economic situation at the enterprise (SITUATION)• Competitiveness of the main product (COMPET)	Digital Activity Drivers <ul style="list-style-type: none">• The number of ICT specialists in the enterprise (SPECIALISTS)• Presence of a digital technology strategy (STRATEGY)• State program "Digital Economy of the Russian Federation" (PROGRAM)	Barriers <ul style="list-style-type: none">• Lack of sufficient budget (BUDGET)• Infrastructure restrictions (INFRASTRUCTURE)• Low digital literacy (COMPETENCE)• Low payback (PAYBACK)• Lack of favorable and stable economic conditions in the country (CONDITIONS)



RESULTS (1)

Variable	Coefficient	p-value
Economic situation	0.833	0.003***
ICT specialists	1.183	0.026**
Digital strategy	0.603	0.0792*
State program	0.978	0.002***

Note: *, **, *** are significant on levels $p < 0.1$; $p < 0.05$; $p < 0.01$ respectively.



RESULTS (2)

The second iteration:
Benefits relevant
to the implementation
of certain digital technologies
(2019)

	“High” level of benefits
	“Moderate” level of benefits
	“Low” level of benefits



DISCUSSION AND CONCLUSIONS

- ❑ One of the main common factors of digital transformation in our sample is the number of hired **ICT specialists** at the enterprise. Along with ICT specialists, the **digital technology strategy** and the positive perception of the impact of the **Digital Economy of the Russian Federation** program turned out to be significant drivers of digital activity
- ❑ The indicators that directly affect the economic parameters of the enterprise, such as sales or profit, turned out to be relatively insignificant for decisions on the introduction of digital technologies on the general data set compared to a more general indicator reflecting the respondents' assessments of the **economic situation** at the enterprise
- ❑ The counterintuitive result, which is that respondents' assessments of the presence of certain barriers to digital transformation positively correlates with the introduction of digital technologies, can also be explained by the **high impact of awareness** in the initial stages of technological transformation
- ❑ The second part of the study shows that digital technologies so far mostly act as a tool for **optimizing individual operations** and **more efficient work with clients**, and to a lesser extent benefits are expected from digital technologies in the field of increasing productivity and optimizing the number of employees, which implies a fundamental restructuring of business models
- ❑ In general, we are witnessing the **initial stage of digital transformation**, which, most likely, determines the large role of human capital, company management and the overall stability of the economic situation as the most significant factors in introducing digital technologies



NATIONAL RESEARCH
UNIVERSITY