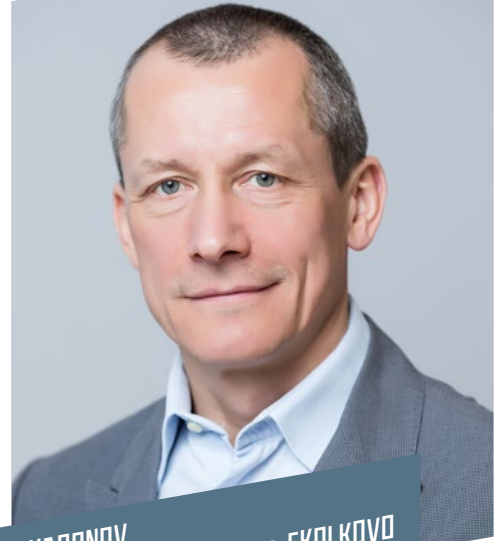


AGENDA OF RUSSIAN CHIEF DIGITAL OFFICERS

How to Read the Digital Transformation 2







Andrei SHARONOV,
Moscow School of Management SKOLKOVO

Two years ago, Moscow School of Management SKOLKOVO issued the *How to Read Digital Transformation?* working paper discussing the background technology and possible economic digital transition strategies. The topic has gained ground since. Digital transformation is a key to accelerating economic growth and social development in Russia. It defines a company's capacity to be competitive in both domestic and international markets. The question, 'What should be done?' has evolved to, 'How should it be done?'

Equally important is the question, 'Who should do it?' The new report by Moscow School of Management SKOLKOVO looks into the Chief Digital Officers' agenda in contemporary business, including their responsibilities, interaction with colleagues, and set of competences. Digital transformation requires focused executives with completely new knowledge and competencies that are not only technology-related. CDOs should be at the forefront of developing new business models and re-designing existing business processes to create new strategies based on the technological advances of the digital age. CDOs are the leaders of major changes transpiring in business processes as well as in the minds of people — employees, partners, and customers. This is a psychologically challenging role as they will face serious cultural barriers, scepticism and resistance on the part of their colleagues. The CDO must therefore have great social skills, emotional intelligence, tact, as well as the ability to win supporters and create coalitions.

The CDO competency model presented here has direct practical applications. In February 2019,

Moscow School of Management SKOLKOVO launched the first CDO training programme, providing participants from diverse business backgrounds with the knowledge and competencies required for the challenging role of the successful digital transformation leader.

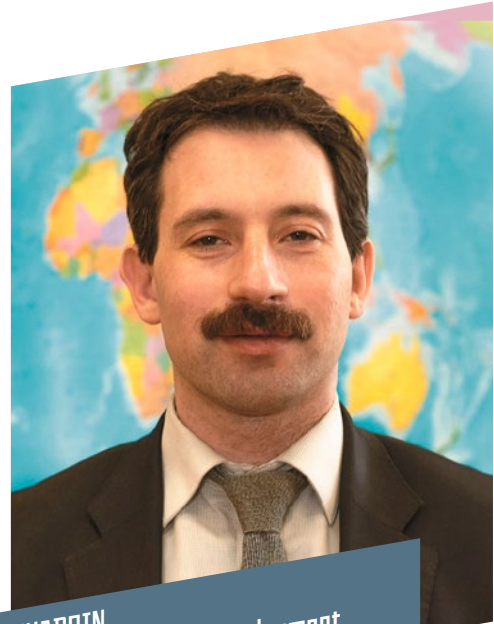


Alexander IVLEV,,
Managing Partner in the CIS, EY

Digital transformation gives companies a strategic competitive edge by creating new business models and profoundly re-building internal processes. This is a challenging task, and in the real world, it often runs into serious cultural resistance. Of course, the successful digital transformation rests on many factors. Having a strong leader is of crucial importance — one who is, on the one hand, proficient in state-of-the art technologies, and on the other, has good knowledge of the business strategy, value-creation for customers, and change management. The Moscow School of Management SKOLKOVO report provides a convincing profile of such a leader, describes their various responsibilities, interactions within the company, and competencies required for success. The section overviewing various digital transformation strategies and Chief Digital Officer (CDO) archetypes is of particular interest. With this model, any company can elaborate its specific requirements to an effective CDO depending on its goals.

Most of our customers in Russia and the CIS have achieved great progress on the path of digital transformation, and hopefully, the insights of this study will be helpful for refining the road map of organisational changes towards effective pursuit of a given strategy.

It is our pleasure to offer continued support to the SKOLKOVO Institute for Emerging Market Studies, a leading Russian centre for creating and disseminating up-to-date knowledge with practical value and academic depth.



Artem SHADRIN,
RF Ministry of Economic Development

The Digital Economy programme adopted nearly two years ago is a key focus area for the Russian Government as it seeks to drastically accelerate the country's economic growth. Among other things, the programme calls for the digital transition of all major Russian enterprises. This is an indispensable prerequisite for a stable, competitive position in today's markets of high value-added products, both in Russia and across the world.

Digital transition is a new stage of business computerisation. While in the past it was about digitising the existing business processes, the agenda now is to profoundly change the business models. This may include, for example, supplier interaction in the value chain, digital design, marketing (both B2B and B2C), talent acquisition and management.

One major step on the digital transformation path is the introduction of the Chief Digital Officer position in the corporate governance structure. Under the new conditions, this is a crucial executive role. On one hand, the CDO must understand digital technologies, and on the other, they must understand the business processes and be proficient in the company's strategic vision and innovative development. The CDO's specific set of roles and responsibilities is defined by the profile of a given company, industry, and markets in which it operates, as graphically illustrated in this report. The report overviews the possible digital transformation strategies that define a variety of CDO agendas in Russian companies.

A number of Russian companies have already successfully implemented the CDO position. Most of them took part in the pilot digital transformation strategy project by the Ministry of Economic Development. The initial results of their work demonstrate that the Ministry's methodical recommendations, which are based on very flexible approaches, catered to specific industries and companies.

The Ministry of Economic development, in collaboration with other agencies, considers it crucial to create a professional community of managers that can effectively lead the digital transformation processes. Tens and hundreds of world-class professionals have to be found, trained, and recruited into companies. A number of educational institutions, including Moscow School of Management SKOLKOVO, have launched such training programmes. It is important that these programmes not only skim the cream off international best practices, but are intricately connected to real, pressing problems in the Russian economy. Research by the SKOLKOVO Business School demonstrates that there are persistent and thorough efforts being made toward this end.

Managing the Digital Transformation

Degree Educational Program for Chief Digital Transformation Officers (CDTO) and their teams

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February 2020 г,
4 modules, five days each +
3 international internships.

Audience:

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corporate executives

Format:

Individual or teams
of 3-7 people from one
company

Admission:

Test + individual interviews

| Module 1 | Module 2 | Module 3 | Module 4 |
|--|--|---|--|
| Global context of digital transformation and new business models | Data-driven management for better efficiency | Product management. Organizational transformation | Change management. Transformation into digital company |

International internship / foreign modules: Europe, China, USA

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ДИПЛОМНАЯ ПРОГРАММА ДЛЯ ДИРЕКТОРОВ И КОМАНД
ПО ЦИФРОВОЙ ТРАНСФОРМАЦИИ КОМПАНИЙ
(CHIEF DIGITAL TRANSFORMATION OFFICER / CDTO)

**For individual consultation
please call:**

Alexey Scherbakov

+7 965 318 29 47

Alexey_Shcherbakov@skolkovo.ru

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Contents

| | |
|----|--|
| 02 | Overview |
| 04 | Introduction |
| 07 | 1. The Scene of the Strategic Choice |
| 11 | 2. The CDO's Responsibilities in the Context of Digital Strategies |
| 14 | 3. CDO Types and Roles |
| 18 | 4. The CDO's Knowledge and Competencies |
| 21 | 5. Does the CDO have a future? |
| 23 | 6. Methodology |
| 27 | Sources |

Author

Vladimir KOROVKIN,
Research in Innovations and Digital

Overview

2

Digital transformation of business is an increasingly relevant issue for companies across the world, requiring more attention on the part of top management. Appointing an executive focused on digital transformation is a popular, but not the only possible, measure undertaken in an effort to respond to the challenges of the new era. Many believe that the role of CDO (Chief Digital Officer) will prove to be “the most exciting strategic role in the coming decade”. At the same time, there is a wide range of opinions on the CDO’s actual job description and the knowledge and competencies it requires. This study by Moscow School of Management SKOLKOVO will help CEOs understand what role the CDO can and should play in each business context, formulate its range of responsibilities, and assess which knowledge and competencies these responsibilities require.

Depending on the nature and the environment of a given business, there are three possible strategic approaches: “fully digital”, “digitally wrapped”, and “digitally spiced”. Each of these requires a CDO, a digital transformation-focused executive, as an important condition for success. However, the range of tasks such a manager handles is profoundly different in each case.

In the “**fully digital**” domain, the CDO virtually becomes the corporation’s key visionary. His responsibilities include ensuring competitiveness with companies “born digital”, which look for the slightest faults in well-established business models in order to re-direct financial flows through “digital disruption” to their benefit. With the “**digitally wrapped**” strategy, the CDO is mostly the executive in charge of organisational development. His priorities are to create an innovation culture, develop human capital, and arrange for the respective re-structuring. Lastly, with the “**digitally spiced**” strategy, the CDO basically has the responsibilities of a top manager in charge of developing advanced technologies. The legacy system stack can remain with the Chief Technology Officer or Chief Information Officer, upon which the CDO will build, developing solutions based on such advanced technologies as the Internet of Things, Artificial Intelligence or cyber-physical systems.

The role of CDO, regardless of the specific industry or company, is defined by a diverse and incredibly demanding set of requirements. The perfect CDO is a super-manager with a variety of functions who actively interacts with other executives and has profound knowledge as well as managerial skills. An effective CDO's knowledge and competencies may be grouped into the following four areas:

- Strategy and organisation: understanding approaches to strategy development in the conditions of digital transformation, economic opportunities presented by digital business models, and the respective principles of platforms and ecosystems; investment-planning and investment efficiency management skills; knowledge of organisational design and change management;
- Consumer experience and design-thinking: insight into the digital consumers' experience and lifestyle, the ability to analyse the pros and cons of a new product and to turn this analysis into working prototypes, mastered methods of launching new products into markets and receiving market feedback;
- Production and logistics: knowledge of the industry's value chains, understanding of key company operations, their strengths and weaknesses; business process re-engineering skills;
- Technology and data: understanding the modern digital stack; knowledge of company data management strategies; ability to analyse data (including big data) for managerial decision-making; deep insight into corporate cybersecurity.

The relative weight of the areas of knowledge will vary depending on the transformation type: while the "fully digital" strategy primarily requires strategic and organisational thinking, the "digitally wrapped" strategy focuses on managing the consumer experience, and the "digitally spiced" strategy focuses on the technology and internal manufacturing processes.

Will the CDO role be permanently embedded in the organisational charts, or will it only exist for the duration of the relatively short period of revolutionary changes associated with the current digital technology? Digital transformation, as extensive as it is, is a finite process. It will certainly go on for many years, but eventually, the corporation will arrive at a new quality. What will happen to the CDO at that point? The opinions of our respondents were split roughly in half. Some of them indeed see the CDO as a sort of "professional revolutionary" who will be challenged in staffing a role once the revolution is complete and every corporate director has sufficient digital competencies. The other opinion is that the revolution will never end and the digitally-focused executive who ties together the entire company's digital agenda will constitute an integral part of any major company's organisational design. Which of the two is more accurate remains to be seen. ■

Introduction

4

“Life challenges the company to evolve and change faster. This requires quicker experimentation and greater risk-tolerance. These requirements are posed not by the digital age, but simply by this age. As the evolution theory suggests, it is not the strongest or most intelligent who will survive, but those who can best manage change. Digitalization for us is a significant, prominent part, but still just a part of this landscape of changes where we have to survive in the competitive rivalry.”

B. Glazkov¹, Rostelecom

“Aeroflot operates in an open, highly competitive market where a company is either innovative, or it doesn’t exist at all.”

**A. Polozov-Yablonsky², Aeroflot
M. Portnoy³, Aeroflot**

“We know that digital transformation lowers the market entry threshold, including for the high-tech aviation market.”

E. Nechepurenko⁴, UAC

“The fundamental effect of digital transformation, especially in large manufacturing companies, is related to the fact that greater connectivity between objects, data accessibility and quality, are enabling practical changes in business processes and decision-making principles. We expect that changing those processes based on data analytics can substantially improve the production efficiency.”

A. Belevtsev⁵, Gazprom Neft

1 1 Vice-President
2 CEO’s Council for Innovative Development
3 Director of the Project Management Department
4 Director of the Innovative Digital Technologies and Venture Projects Department
5 Chief Digital Officer

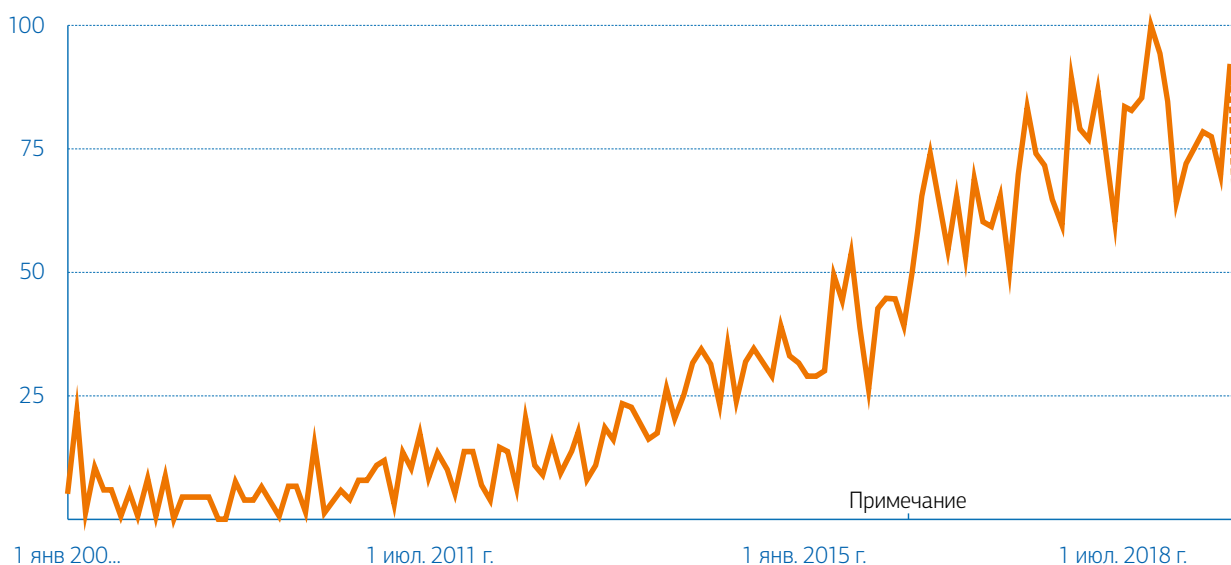
In 2012, Gartner, a research company, conceptualised digital transformation by proposing the notion of four nexus forces: sociability, mobility, cloud technologies, and big data.¹¹ The company later brought the question, “Do you Need a Chief Digital Officer?” into the global spotlight¹². The publication under this headline stated that “The Chief Digital Officer will prove to be the most exciting strategic role in the decade ahead, and IT leaders have the opportunity to be the leaders who will define it. The Chief Digital Officer plays in the place where the enterprise meets the customer, where the revenue is generated and the mission accomplished. They’re in charge of the digital business strategy. That’s a long way from running back office IT, and it’s full of opportunity.” Unlike the IT leader position (Chief Information Officer), the position of CDO was not determined by infrastructure or hardware, but by a shift in performance and innovation.

By the time the paper was published, the CDO position had already been in place for a few years. In 2005, at least one company had introduced this role¹³, and in 2012 there were hundreds of CDOs. Nevertheless, it was still relatively rare, and more importantly, there was a great deal of debate around it. Where do CDOs come from, what is their role in the company, what problems do they solve, and what results should they achieve? Throughout the six years since the Gartner’s publication, these debate topics have become more visible in the media, yet the range of opinions is still disconcertingly broad.

Digital transformation of business is an increasingly important and relevant issue for companies across the world, requiring more attention on the part of top management. Appointing an executive focused on digital transformation is a popular, but not the only possible, measure undertaken in an effort to respond to the challenges of the new era. This study by Moscow School of Management SKOLKOVO will help CEOs understand what role



Fig. 1. Google search trend for the search term “Chief Digital Officer” (months, 100 is the maximum number of searches for this term).



1 The original publication mentioned “information”, shortly thereafter specifying that this meant big data analysis.

the CDO can and should play in each business context, formulate its range of responsibilities, and assess which knowledge and competencies these responsibilities require. In conducting this research, we explored a substantial body of literature published over the last six years² and interviewed a number of CDOs at Russian state-owned corporations. The obtained data offers detailed and well-founded answers to our questions. ■

² See the Methodology section.

01

The Scene of the Strategic Choice

7

"Digital technology penetrated our industry simply because it is entirely built upon digital technology. We are the infrastructure, the lifeblood system that transmits this digital data, which is venerated by some colleagues such as new oil."

"Indeed, we are committed to being an IT-company. we want to multiply our revenues from digital services over the next 5 years."

B. Glazkov, Rostelecom

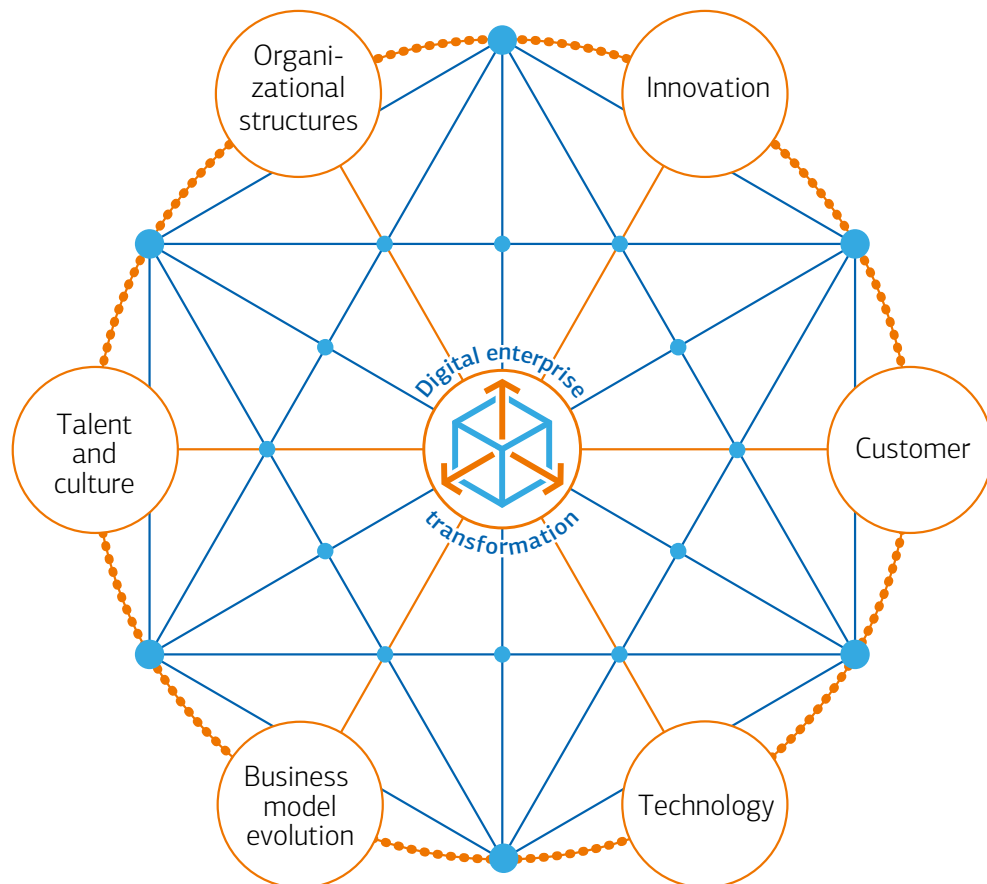
"Digital technology often eliminates the primary cause of errors — the human — from the decision-making chain. In our industry, thoughtful minimisation of human participation often directly leads to better security."

E. Nechepurenko, UAC

The difference between CDO agendas is largely determined by the difference in opinion on the essence of digital transformation in a large company operating in a traditional industry³. Firstly, digital transformation must be clearly set apart from digitalization. Digital transformation is “consumer-initiated strategic changes to business that require comprehensive structural changes along with introduction of digital technologies”^{iv}, while digitalization is a simpler process of applying digital technology to improve the existing business models.⁴ The integrity of digital transformation is perfectly exemplified by an EY model comprising six interrelated elements (see Fig. 1).

Secondly, digital transformation suggests a number of alternative strategies. In the “How to Read Digital Transformation”^{vi} report, we showed that depending on the nature and environment of a business, there are three possible strategies of transformation: “fully digital”, “digitally wrapped”, and “digitally spiced”. To implement the “**fully digital**” strategy, the product must be made of bits, not atoms; the industry must be close to the end consumer and not have significant external (for example, regulatory) constraints. The “**digitally wrapped**” strategy is implemented where the product is made of bits, but the industry is substantially constrained with

Рис. 1. The Digital Transformation Model of EY, a consulting company



³ “Born digital” companies were created to implement business models based on digital technology. They do not need digital transformation. They usually don’t have a Chief Digital Officer on staff, but sometimes have a Chief Data Officer (see the functional differences below).




⁴ “The use of digital technologies to change a business model and provide new income-generating and value-producing opportunities”, Gartner, <https://www.gartner.com/it-glossary/digitalization/>

respect to changing the business models (for example, banks), or if the product made of atoms is close to the end consumer, allowing for a fundamental re-structuring of sales channels with the application of digital technologies (airlines). And lastly, the **“digitally spiced”** strategies are best for industrial companies that are quite distant from the end consumer and have a large amount of productive tangible assets.

Interviews with Russian CDOs showed that the choice between these strategies is not fully determined by the industry. Even more significant is the company leadership’s strategic vision and willingness to expand their understanding of the industry and markets. Of course, oil companies will continue producing oil (which is made of atoms), refine it and physically relocate, which imposes the “digitally spiced” strategy (for example, “smart field” technologies). However, an oil company can at the same time be a successful venture capitalist that strategically expands its existing range of business models and effectively enters fully digital markets. One example is the Shell venture fund^{vii}, with over 200 projects in its portfolio, including management of family utility expenses, a mobile application for taxi drivers to optimise fuel consumption, and electricity generating kites. In Russia, Gazprom Neft, which actively cooperates with Russia’s leading venture funds, is an example of this approach as well⁵.

Different digital transformation strategies set different priorities for top managers. The **“fully digital”** strategy is normally implemented within the digital platform paradigm and the surrounding ecosystem.⁶ In this context, the key competition instrument is the creation and development of effective consumer behaviour management models that use data analysis to ensure maximum accuracy and performance. A typical example is consulting websites that account for a significant part of the profit surplus of e-commerce platforms^{viii}.

Three Digital Transformation Strategies

| | | |
|---|--|---|
|  <p>“FULLY DIGITAL”</p> <ul style="list-style-type: none"> • The product is made of bits, not atoms • The industry is close to the end consumer • No external regulatory restrictions on new business models |  <p>“DIGITALLY WRAPPED”</p> <ul style="list-style-type: none"> • The product is made of atoms, but is close to the end consumer (example: airlines) • The product is made of bits, but external regulators restrict business models (example: banks) |  <p>“DIGITALLY SPICED”</p> <ul style="list-style-type: none"> • The product is made of atoms • The industry is distant from the end consumer • External regulatory restrictions on new business models |
|---|--|---|

5 <https://www.gazprom-neft.ru/press-center/news/1195933/>, <https://www.rvc.ru/press-service/news/company/127868/>

6 For more about the concept, see the report, “Digital Platforms and the Ecosystem of Financial Inclusion”, Moscow School of Management SKOLKOVO <https://iems.skolkovo.ru/en/iems/publications/research-reports/492-2015-11-11/>

The “**digitally wrapped**” strategy requires, above all, that the leadership opts for the right strategic development trajectory, utilising digital creative disruption in sales and customer interaction channels, as well as organisational support to implement this trajectory. Revolutions like the transition of airlines to digital customer self-service when buying tickets and checking in for flights, inevitably run into serious resistance within the company. Back-office employees in charge of internal business processes are usually far more conservative than the front office in charge of sales. Overcoming this resistance and uniting the company around the new digital vision requires not only support from top management, but also persistent efforts on the part of the leader, who should insist that profound changes are indispensable and strategically expedient, and who will moderate emerging internal conflicts⁷.

Finally, when implementing the “**digitally spiced**” strategy, the leadership is focused on developing a long-term programme of digital projects that provide business results and are technologically feasible. Selecting and assessing such projects is a challenge given the constantly changing technological landscape, the associated inflated expectations, and high uncertainty about the projects’ actual outcomes⁸. More often than not, a strategic competitive edge in the industry is gained if the stake on new technology is made during its early development. However, it is during this very period that the likelihood of major implementation errors is greatest. This contradiction can only be resolved with top management’s participation in the selection of key technological projects and their implementation. It also requires the creation and development of a corporate innovation culture that is tolerant of errors and able to turn early failures into successes. ■



⁷ A Russian example of this is the transformation of Sberbank and G.Gref’s personal contribution to it.

⁸ The transition from deceived expectations to equally erroneous disappointment in the early period of new technology is described by Gartner’s Hype Cycle model <https://www.gartner.com/en/research/methodologies/gartner-hype-cycle>

02

The CDO's Responsibilities in the Context of Digital Strategies

11

"We have a very large customer-oriented business. We have to manage and optimise customer relations and the customer base. To manage this massive amount of data, to be more efficient in customer interaction through a variety of communication channels, we, of course, need digital technologies. We are talking here about managing interaction channels, a more profound understanding of customers' needs and the context in which these needs emerge. Ideologically, we have to adopt an approach where there is no such thing as the "mass segment". Instead, we are dealing with a massive number of individual customers with their needs and contexts."

B. Glazkov, Rostelecom

"The purpose of the company is to be there for the passenger, starting with the idea of the trip till its very end. We achieve this aim through state-of-the-art technology, big data and communication prediction. We attend to the passenger throughout the whole journey, including by offering third-party services that enable them to have the full package: hotels, cars, guided tours, etc."

A. Polozov-Yablonsky, Aeroflot
M. Portnoy, Aeroflot

Al three of these strategies require a CDO, a top manager in charge of digital transformation as an important condition to success. However, the range of problems such a manager deals with is profoundly different depending on the strategy.

In the **“fully digital”** domain, the CDO virtually becomes the corporation’s key visionary. His responsibilities include ensuring competitiveness with companies “born digital”, which look for the slightest faults in well-established business models in order to re-direct financial flows through “digital disruption” to their benefit. This opposition requires a constant search for investment opportunities into new business models that maximise the effects of digital technology. The main decision-making factor for investment becomes its ability to win and retain customers, sometimes even at the expense of short-term marginality.

This work, among other things, requires the development of new operation tools such as corporate venture funds, which enable the engagement of a substantial number of fairly independent and creative businesses in the enterprise. Culturally, the corporation should be as open as possible to bottom-up initiatives and decentralised implementation of specific projects, including the use of competing and sometimes uncoordinated technological platforms. Despite the obvious inefficiency of such competition from the standpoint of the classic business economics, the company should accept this as a cost it pays for the speed and integrity of experimenting⁹ with the new business models needed to compete in the context of “digital disruption” of markets.

With the **“digitally wrapped”** strategy, the CDO is mostly the top manager in charge of organisational development. His priorities are to create an innovation culture, develop human capital, and arrange for the respective restructuring. Developing full-fledged digital customer interaction channels often contradicts the company’s existing internal practices. Many employees, particularly in the back office, miss the fact that digital technology today is not just a marketing communication channel like traditional TV or print advertising, with the technical purpose of bringing potential customers to the point of sale, but it is rather a customer self-service system vesting the customer with authority sometimes comparable to that of employees. A common “resistance point” is security, which poses unrealistic requirements to the system’s functionality. Counter-arguments of this kind have hindered the development of business models in industries that adopted “digitally wrapped” approaches, such as airlines and banks¹⁰. In nearly all cases, the resistance was eventually overcome, while the more conservative players lost market shares.

All in all, doubts about transferring authority to the customers are not completely unfounded. As we pointed out in the “How to Read Digital Transformation” report, simple transactions become interactions, and the customer gains more bargaining power. The side effect of developing open digital systems is that effective price comparison websites come into play (anywayanyday.com or banki.ru). Such websites practically eliminate the possibility of competition based on the lack of information among consumers, which was

⁹ By “integrity of the experiment”, we mean confidence that the pilot business model was first implemented with the maximum use of all its capabilities. The decision to alter or abandon the original idea was not made prior to allowing these capabilities a chance to manifest. This is one common manifestation of the “to commit or to pivot” dilemma. See, for instance: <https://www.innovationgames.com/2011/12/the-entrepreneurs-dilemma-perseverance-or-pivot/>

¹⁰ Suffice it to recall the evolution of on-line banking from bulky individual physical “keys” to modern mobile banking with a simple numeric password and the use of text messages to confirm transactions.

quite common in markets under the classic marketing paradigm¹¹, but they also objectively erode what we usually call “brand power”. Under the “digitally wrapped” strategy, the CDO must be aware of these and similar challenges, offer effective solutions that will be popular with consumers, and insist that the customer-centred approach to digital services is the key to winning the competitive rivalry. This work requires tact and diplomacy, the ability to win internal allies and sway opponents’ opinions. In contrast to the fully digital strategy, this situation requires the creation of strong centralised technology systems and sufficient knowledge and skills to initiate them.

Lastly, with the “**digitally spiced**” strategy, the CDO basically has the responsibilities of a top manager in charge of developing advanced technologies. The legacy system stack can remain with the Chief Technology Officer or Chief Information Officer upon which the CDO will build and develop solutions with the use of such advanced technologies as the Internet of Things, Artificial Intelligence or cyber-physical systems¹². The greatest challenge here is the search for new technologies applicable in a given industry and manufacturing process. As in other cases, the maximum competitiveness effect can be achieved through quicker implementation as compared to other industry players, but such progress always entails inherent risks.

In the “digitally spiced” industries, progression to new business approaches is certainly happening much slower than in other industries, but this is offset by the high price of each investment. Therefore, the CDO who works within the “digitally spiced” strategy must incorporate profound technological knowledge, including industry-specific knowledge, with economic analytical skills to make — or recommend — investment decisions based on the cost-benefit ratio. They will often propose digitalization rather than digital transformation projects. That is, they will optimise the existing business models rather than create new ones. Still, even under the “digitally spiced” strategy, the CDO has the responsibility to closely examine the market to find opportunities for creating game-changing business models based on disruptive digital technologies. ■

¹¹ For more on customers’ limited opportunities for comparison in the classic economic system, see, for instance, Herbert A. Simon (1956), *Decision-making Theory in Economics and Behavioural Science*. Milestones of economic mind. Theory of consumer behaviour and demand. Vol. 1. eds V.M. Galperin — St. Petersburg: Economic School. 1999.

¹² For more information about digital technology within the Industry 4.0 concept, see the SKOLKOVO Business School’s report *DIGITAL PRODUCTION: METHODS, ECOSYSTEMS, TECHNOLOGIES* http://assets.fea.ru/uploads/fea/news/2017/11_november/17/tsifrovoe_proizvodstvo_112017.pdf

03

CDO Types and Roles

14

"The CDO's role is apportioned, in a sense. When it comes to digitalization, we have to understand the substantial role of the top leader: the CEO".

A. Polozov-Yablonsky, Aeroflot
M. Portnoy, Aeroflot

Three possible sets of responsibilities for the CDO make clear that different digital transformation strategies require not only different sets of knowledge and competencies, but also different psychological types. In particular, there is an interesting model of the five archetypes of a Chief Digital Officer^{ix}: the progressive thinker, the creative disrupter, the customer advocate, the innovative technologist, and the universalist.

The *progressive thinker's* mission is to look for opportunities to transform the business through digitalization and to push the company towards the fully digital strategy and operation model. Working with the CEO, the progressive thinker focuses on developing a digital strategy and innovation throughout the company.

The creative disrupter. As opposed to the progressive thinker, the creative disrupter offers a more hands-on approach geared toward developing new digital technologies and the respective business solutions. They can be especially valuable in companies facing severe and dramatic changes as a result of digitalization in end-consumer-oriented industries, such as retail. He or she will have to work directly with the CEO on revenue growth through competitive differentiation

The customer advocate. They typically report to the Chief Marketing Officer and head of sales — or could even replace them. They are primarily market-driven and customer satisfaction oriented. The customer advocate focuses on developing a convenient, engaging, and seamless customer experience across all channels, digital and physical.

The innovative technologist. Much like a highly innovative and business-focused CIO or chief technology officer (CTO), this CDO promotes the use of new digital technologies, such as the Internet of Things (IoT), mobility, social media, and analytics, to transform the company’s entire value chain, while improving internal efficiency and cutting costs.

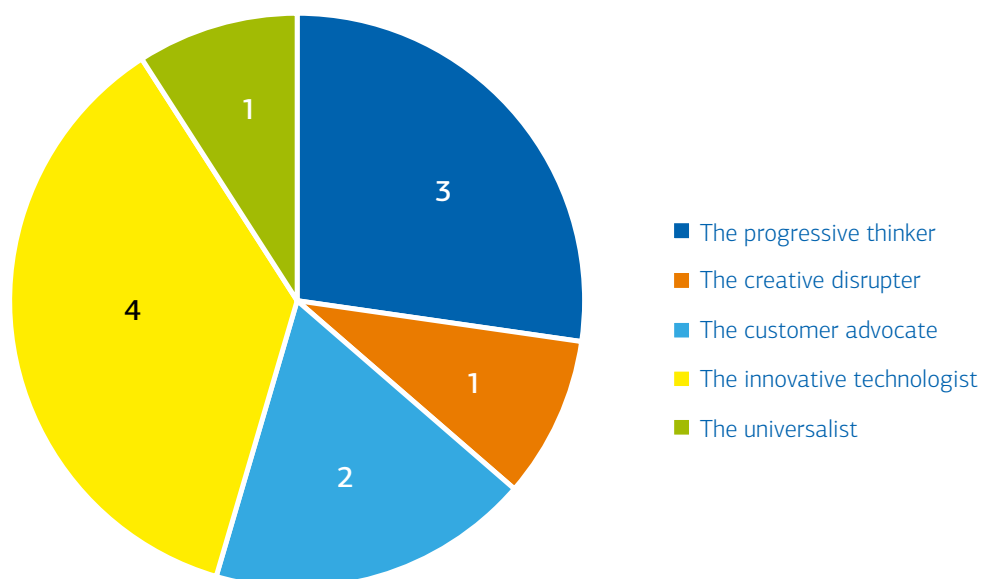
The *Universalist’s* mission is to manage all aspects and all value creation levers of a complete digital transformation. The most visionary of the five archetypes, they can succeed only by having a forceful mandate from the CEO and significant power of execution. Reporting directly to the CEO, the universalist can oversee a wide spectrum of digital tasks: strategy development, devising new business models, overseeing digital marketing and the customer experience, implementing digital technologies, boosting operational efficiency, and digitalizing the ways in which employees do their daily work. He or she should also be in charge of the cultural change management process.

We can easily see that this model is fully in line with the three digital transformation strategies and refines the possible CDO roles in a company depending on its market position and internal culture. Thus, the “fully digital” strategy requires a progressive thinker or universalist, the “digitally wrapped” strategy requires a customer advocate or creative disrupter, and the “digitally spiced” strategy requires an innovation technologist.

For any top manager, it is important to interact with directors in charge of other functions. One model^x describes the CDO’s interaction with colleagues as follows:

- CDO – CEO (*Chief Executive Officer*): be the catalyst of transformation and shape the CEO’s innovation agenda;

Fig. 2. CDO Archetypes as Seen by Respondents in a Field Survey.



- CDO – CFO (*Chief Financial Officer*): to create better financial results; with the right mandate and application, digital technology becomes a powerful driver of cost-cutting or creating new cash flows;
- CDO – COO (*Chief Operations Officer*): to supply technology for improving operational efficiency by digitalizing internal processes or reducing employee workload through customer self-service;
- CDO – CMO (*Chief Marketing Officer*): to support the transition from transactional marketing to interactions based on the use of social media, mobility, search technology, and portable digital devices;
- CDO – CSO (*Chief Strategic Officer*): to support the strategic development of the company through the development of new markets;
- CDO – CIO (*Chief Information Officer*): to create a team of technical professionals to complement the existing capabilities with a focus on front-end solutions (with the responsibility of back-end operations remaining with the CIO).

Thus, despite the differences in the primary focus of the CDO's agenda prescribed by different digital transformation strategies, there are some responsibilities that are common to every industry and company. CIO^{xi} magazine named six such responsibilities:

1. Map digital capabilities to strategic priorities. Digital has to prove its capability to lead the company to its goals;
2. Be the sponsor for digital process innovation;
3. Develop and administer the digital project portfolio. Centralised monitoring of often heterogeneous digital initiatives is critical;
4. Measure new efficiencies and ROI. Replacing manual processes with technology drives both cost savings and revenue generation; the CDO's role has great tools to measure success;
5. Develop ways to attract and retain top talent. Companies often have more mature visions for digital than they do skills to implement them;
6. Be the "intermediary" between key functionaries during the implementation, including swaying allies, re-establishing priorities, coaching, or serving as tiebreaker during the roll-out of digital projects.

As we can see, regardless of the specific industry or company, the role of CDO, the leader of digital transformation, is defined by diverse and incredibly demanding requirements. The perfect CDO is a super-manager with a variety of functions who actively interacts with other executives and has profound knowledge as well as managerial skills. ■

International Experience: How is Russia different?

When interviewing Russian CDOs, we outlined agendas that generally correspond to those of their international colleagues. However, our impression was that it takes Russian executives more effort to develop the digital culture, including changing the fellow executives' world views. Perhaps this is largely due to the fact that in Russian business, market capitalisation of companies, especially state-owned ones, plays a relatively insignificant role. Management, above all, judges success by the current dynamics of financial flows and profits.

Large Western corporations usually pay much more attention to the dynamics of their market capitalisation, often prioritising it over short-term financial goals. The successful digital transformation in this context also serves as an argument when dealing with key investors, an important growth factor for stock prices.

Quicker decision-making in Western companies is, perhaps, also psychological in nature. When interviewing Western managers, we encountered a "personal imperative for innovation", the internal commitment to look for new business models and approaches, and greater openness to changes. A company's digital transformation is inevitably associated with personal transformation and leaving the comfort zone. The average employee of an international company displays greater willingness to undergo this kind of dramatic personal change.

An important takeaway from comparing the cultural context of digital transformation of large international and Russian companies is the need to re-conceptualise the mandate of the Russian corporation. To create a favourable environment for digital transformation, the government (as the key stakeholder) must assume the position of a portfolio investor interested in the continuous growth of business capitalisation, assessing the management performance through strategic results (as opposed to setting an a priori framework) and willing to undertake bold, sometimes controversial experimentation.

04

The CDO's Knowledge and Competencies

"No CDO can be a guru in marketing, IT and sales all at once."

A. Polozov-Yablonsky, Aeroflot

M. Portnoy, Aeroflot

"CDO is a person with a deep understanding of technologies, capable of leading the process of transformation."

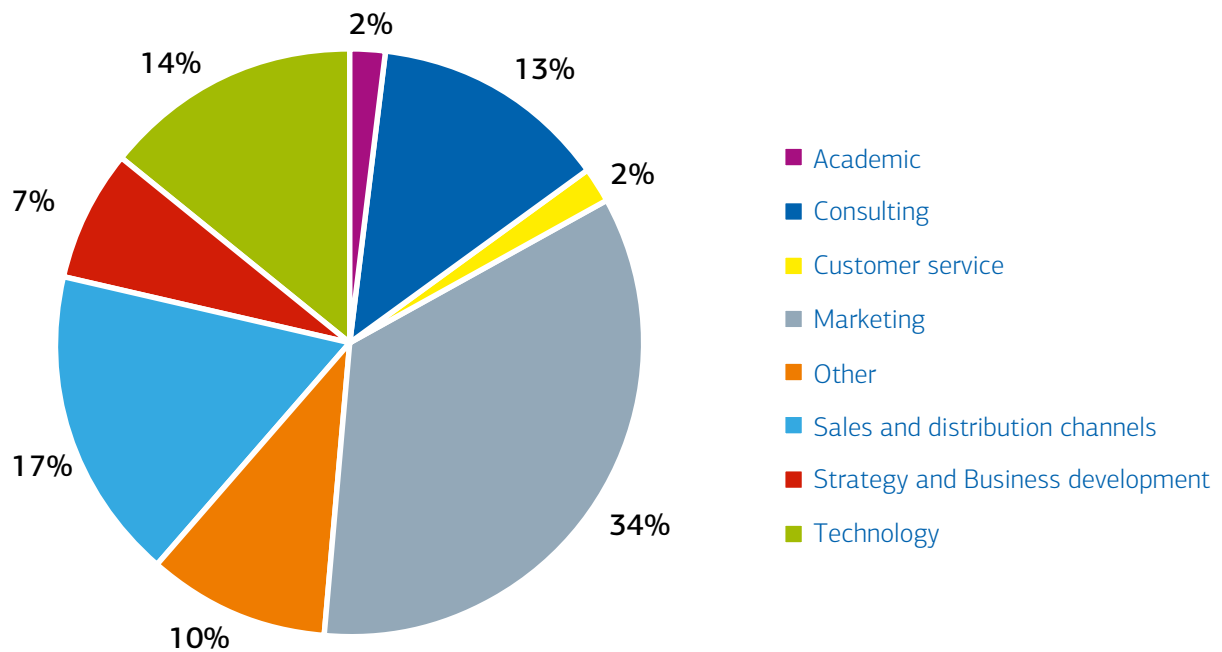
E. Nechepurenko, UAC

What knowledge and competencies should a top manager have to execute the above-mentioned agenda? As we can see, the technical side of the process is not always pivotal to success. Therefore, profound knowledge and experience in working with information technologies do not make for a good CDO^{xi}. The results of one research of CDOs of international corporations showed that only 14% had any technological background. More than half were previously employed in marketing or sales (see Fig. 3), which can likely contribute to the popularity of the "digitally wrapped" strategy.

The competencies of an efficient CDO can be divided into four categories:

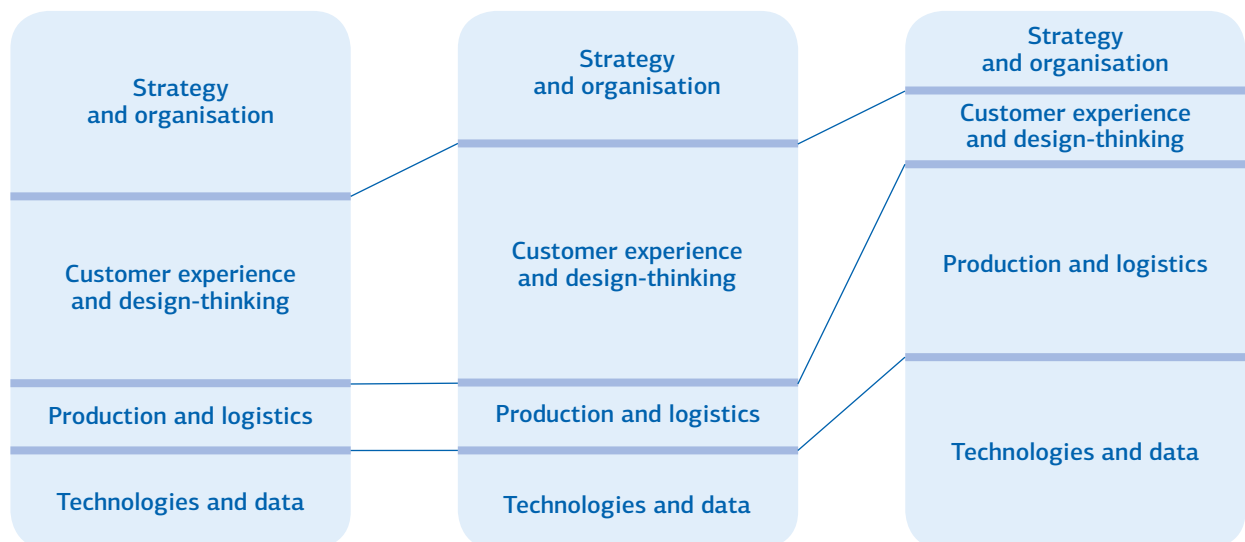
- Strategy and organisation: understanding the approaches to developing a strategy during digital transformation, economic potential of the created business models, principles of operation of platforms and platform-based ecosystems, ability to plan investments and manage investment efficiency, knowledge of organisational design and change management concepts;

Fig. 3. Professional backgrounds of CDOs of large international corporations



- Customer experience and design-thinking: insight into the digital consumers' experience and lifestyle, the ability to analyse the pros and cons of a new product and to turn this analysis into working prototypes, mastered methods of launching new products into markets and receiving market feedback;
- Production and logistics: knowledge of the industry's value chains, understanding of key company operations, their strengths and weaknesses; business process re-engineering skills;

Fig. 4. Relative weight of CDO competency categories in the implementation of different digital transformation strategies



- Technology and data: understanding the modern digital stack; knowledge of company data management strategies; ability to analyse data (including big data) for managerial decision-making; deep insight into corporate cybersecurity

The relative weight of the areas of knowledge will vary depending on the transformation type: the “fully digital” strategy relies on strategic and structural thinking, the “digitally wrapped” concept demands full attention to managing customer experience, while the “digitally spiced” transformation focuses on technologies and the company’s inner workings (see Fig. 4). On top of that, regardless of the path taken, a successful CDO should possess excellent project management skills, both for the waterfall and agile approaches. ■

Technologies in the focus of the Russian CDO

The study identified technologies that hold the attention of large Russian companies and shape technological agendas of their CDOs. “Digital twin”, “visual factory” and “customer lifecycle management” are the three main technology groups that are widely implemented across all operational areas regardless of sectoral specifics.

“Digital twin” gained popularity in machine construction as it allows manufacturers to significantly speed up new product development. Another major gain from its implementation is the cost reduction achieved by moving machine testing from the real world into the virtual realm. Virtualization of testing activities also enables the study of machinery operation in various extreme scenarios that would either be immensely difficult to replicate in real life or downright impossible for safety reasons.

The “visual factory” technology heavily employs artificial recognition systems (including with video streaming) and augmented reality. Recognition software contributes to streamlining business processes and monitoring key areas of work with regard to industrial safety (for example, it can identify whether employees are wearing personal protective equipment). Augmented reality in turn has proven invaluable in repairs and maintenance works at production assets, as well as in staff training.

Customer lifecycle management, a tool of immediate interest for companies dealing with mass consumers, uses predictive analysis to calculate the so-called client lifetime value. This technology is implemented through recommendation engines which help to create attractive and efficient exclusive offerings of products and services.

Does the CDO have a future?

“Don't make becoming a CDO your dream — it will be too short-lived”

“We've come to the conclusion that strategic KPIs — both medium-term and long-term — are unattainable without the tools provided by digital transformation”

What might seem like a premature question as we are talking about a recently-emerged, rapidly-developing role in the corporate world. Yet, this question was brought up back in 2016 in the provocative report, *The Rise (and Fall?) of the CDO*^{xiii}. The document emphasised how important it is for a corporation to have a dedicated manager in charge of digital transformation, but at the same time, it claimed that introducing the CDO position often doesn't accord with this agenda.

The task of actually finding and retaining an effective CDO is quite challenging. Difficulties are inevitable with any similar position that merges several diverse competencies. To start with, there aren't enough people capable of mastering all four categories of competencies described above, largely due to the existing professional education system and hiring practices that are aimed at developing specialists rather than universalists.

Moreover, CDOs are no ordinary universalists. Their job is to push other specialists outside their comfort zones. This turns CDOs into targets of critique that points out both real and alleged errors and missteps to undermine the entire agenda of digital transformation. Anyone taking on the responsibility of introducing systemic changes to a company is bound to face such

critique, although this fact doesn't make it any easier. Of course, certain strong-minded individuals are perfectly capable of overcoming this resistance — and our interviewees testify to that. However, it is debatable whether their experience can be replicated nationwide in large companies implementing any sort of digital transformation strategy.

In a sense, the current situation with CDOs is not unique in the history of corporate governance. In the 1950s and 1960s, the business world had great expectations for brand managers. A brand manager was intended to be a position that united all business processes pertaining to consumer value creation — a sort of “Mini CEO” of a particular brand. Even though on paper this concept sounded promising in many ways, in reality it was hardly ever fully implemented: corporate structures defied cross-functional integrators vested with considerable power. As a result, brand managers have now been reduced to mid-ranking marketing management employees with rather technical functions^{xiv}. To some degree, we can already see the same thing happening to the CDO position: quite often the role of a Chief Digital (Transformation) Officer gets substituted by a Chief Data Officer — a significantly more manageable and understandable link in the management chain, without attempting to revolutionise the structure or re-imagine the established business models.

There is also a temporal aspect to consider in regard to the CDO's future: digital transformation — however grand in scale — promises to be a finite endeavour. It will certainly go on for many years, but eventually, the corporation will arrive at a new quality. What will happen to the CDO at that point? The opinions of our respondents were split roughly in half. Some indeed see the role of the CDO as a professional revolutionary of sorts, which will not take root in the organisational structure once the revolution has succeeded. According to this concept, at some point each corporate head will develop enough digital competencies, while the current CDOs will transition to the roles of functional managers, such as to be in charge of technologies. The other opinion is that the revolution will never end and the digitally-focused executive who ties together the entire company's digital agenda will constitute an integral part of any major company's organisational design. Which of the two is more accurate remains to be seen. ■

Desk studies

We analysed all the comprehensive (longer than 1 page) documents that showed up in the Top 100 results of Google and Yandex queries of “Chief Digital Officer”, “CDO” and “Chief Digital Transformation Officer”. These include analytical reports of consulting firms, think pieces in key business media outlets, blog posts of business influencers, and academic publications.

Expert analysis of the collected material was carried out using grounded theory approaches to identifying key concepts, frameworks and real-world examples, both failed and successful.

Field studies

Field research was conducted through in-depth interviews with managers fulfilling the CDO function in participating companies of the RF Ministry of Economic Development's pilot project on Chief Digital Officers¹³. In the course of the study, we interviewed employees of the following corporations: Aeroflot, Gazprom Neft, Zarubezhneft, KAMAZ, Kontsern Okeanpribor, Almaz-Antey Air and Space Defence Corporation, NPO Energomash, United Aircraft Corporation (UAC), Rostelecom, and Rosatom.

¹³ Each interviewee was selected by the respective company.

The interviewees can be divided into the following groups based on the level of responsibility in their companies' management: 2 Vice Presidents, 4 CEOs, 5 Department Heads.

To analyse the differences in approaches to CDOs in Russia and abroad, we interviewed the CDOs of Deutsche Post DHL and Deutsche KreditBank¹⁴.

Brief backgrounds of companies that took part in the study

Aeroflot is the undisputed leader of Russian civil aviation and the unofficial national carrier. Founded on March 17, 1923, Aeroflot is one of the world's oldest airlines and one of the most recognisable Russian household names. It was ranked No. 1 in the world's most powerful airline brands rating by Brand Finance, the leading independent brand valuation consultancy. On the threshold of its 95th anniversary, Aeroflot officially re-joined the global elite of commercial aviation: in 2017, together with subsidiary airlines, Aeroflot landed in the top 20 biggest air carriers by the number of passengers and has been on the list since. In 2018 this achievement was confirmed by the two most credible sources in the aviation industry: the American publication Air Transport World and the British outlet Flight Airline Business.

Gazprom Neft is a vertically integrated oil company specialising in exploration and development of oil and gas fields, oil processing, as well as the production and sale of petrochemicals. It is the top performer in the Russian oil and gas industry. 2018 was a record year for Gazprom Neft as the company enjoyed the highest profit in its history. In achieving its strategic goals, Gazprom Neft relies on technological developments and uses state-of-the-art solutions.

Zarubezhneft is a diversified state-controlled oil and gas holding company with assets and projects in various sectors of the industry. The company's mission is to develop active oil and gas fields in Russia and abroad while ensuring the most efficient and integrated recovery of hydrocarbons.

KAMAZ Group of Companies is the largest vehicle manufacturer in the Russian Federation, one of the world's top 20 heavy-duty truck producers and ranks 16th by production volumes of heavy vehicles with GVW exceeding 16 tonnes. The company manufactures 71,000 vehicles a year. It is part of the Rostec State Corporation. The united industrial complex of KAMAZ Group handles the entire truck production cycle: from vehicle and component design, manufacturing and assembly to sales of the finished products and service support.

Kontsern Okeanpribor was founded in 2006 as an integrated company that brought together the country's scientific and production hydroacoustic capabilities. The company's integrated structure comprises R&D establishments and factories whose main product line in recent decades included sonar systems and stations for ship building, as well as various hydroacoustic equipment for the national economic needs.

Almaz-Antey Air and Space Defence Corporation was established in 2002 under the Presidential Decree and the Decree of the Government of

¹⁴ In 2017, the company was named the Digital Transformer of the Year by Microsoft's German branch.

the Russian Federation. The company united dozens of enterprises: plants, R&D associations, design offices and research institutes engaged in the development and production of anti-aircraft missile systems of small, medium and long ranges, and the main types of radar reconnaissance and automated management systems. In 2007, the corporation was enlarged, and as of today, over 60 enterprises from 18 regions of the country are consolidated under its structure. Almaz–Antey was the first large holding company created under the Reform and Development of the Military Industrial Complex for 2002–2006 Federal Target Programme. As a pioneer, the company had to deal with the challenges of establishing a corporate management system and equity capital formation.

NPO Energomash is the parent enterprise of an integrated structure that incorporates Russia's leading rocket engine manufacturing enterprises. Today the integrated structure includes two more companies: Proton-PM, manufacturer of RD-275M engines for the Proton-M heavy-lift launch vehicle, and Chemical Automatics Design Bureau, developer and manufacturer of engines for upper stages of the Soyuz and Angara launch vehicles. NPO Energomash is the leading global developer of powerful liquid propellant rocket engines (LPRE) for space launch vehicles. The company produces a unique family of LPREs with a thrust range of 60 to 1,000 tf, which can meet the requirements of developers of LVs of different capacities. Established in 1929, NPO Energomash boasts a long and rich history. It has been decorated with Orders of Lenin, the Red Banner of Labour and the October Revolution.

United Aircraft Corporation (UAC) was established on February 20, 2006. The priority areas of UAC and its member companies include civil and military aircraft development, production, sales, operational support, warranty maintenance and servicing, upgrading, repair and disposal. The company's product and market strategy consists of four main objectives. The first is to ensure the requirements to state security, including transportation security. The second objective is to maximise international sales in segments of regional, narrow-body and wide-body civil jets. The third is to preserve the existing market share in military aviation while expanding in transport and special purpose segments. Lastly, the corporation aims to achieve a balanced lifecycle stage-based product mix.

Rostelecom is the largest provider of digital services and solutions in Russia, covering millions of Russian households and present in all market segments. The company holds a leading position in the Russian market of broadband Internet access and pay TV with 13 mln Internet users and 10.2 mln TV subscribers, 5.3 mln of whom also consume media through a unique federal-scale Interactive TV product. 1.1 mln people also subscribe to the company's mobile services. Rostelecom is the unrivalled leader in telecom services for Russian government bodies and corporate customers of all levels. In the mass market segment, the company constantly develops new products for households, including basic communication services and digital solutions for Smart Home, Online Education, gaming, etc. Rostelecom is a widely recognised technology leader offering innovative solutions in e-government, cybersecurity, cloud computing, healthcare, education, security and utilities services.

Rosatom State Atomic Energy Corporation is a global technological leader that boasts resources and competencies allowing it to successfully operate at all stages of nuclear energy production, from uranium mining to decommissioning nuclear facilities and spent nuclear fuel management. Rosatom is Russia's largest energy generating company, covering more than 18% of the country's electricity demand. The corporation has the world's largest portfolio of foreign projects. It currently operates 36

power-generating units at different implementation stages in 12 countries. Rosatom ranks second globally in uranium reserves and fourth in uranium mining capacity. It also provides 17% of the nuclear fuel on the market. Other areas of the company's activities include production of equipment and isotopes for nuclear medicine, scientific research, material studies, supercomputers and software, and manufacturing of nuclear and non-nuclear innovative products. Rosatom's strategy supports the development of clean energy projects, including wind energy. The state corporation was established on December 18, 2007. It comprises about 400 enterprises and organisations, including the world's only nuclear icebreaker fleet, and employs roughly 250,000 people. ■



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THERE IS ALWAYS AN EMERGING MARKET

The Moscow School of Management SKOLKOVO is one of the leading private business schools in Russia and the CIS, was founded in 2006 by members of the business community. The school's founding partners are 10 Russian and multinational firms and 11 individuals, each a leader of Russian business. The educational offerings of the Moscow School of Management SKOLKOVO include programmes for businesses at any stage of development – from startups to major corporations entering international markets. The Moscow School of Management SKOLKOVO also serves as a hub of expertise drawing those who place bets on Russia and work in markets with fast-changing economies.

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Novaya Ul. 100, Skolkovo Village, Odintsovsky District,
Moscow Region, 143025, Russia

Phone: +7 495 539 3003

Fax: +7 495 994 4668

Email: iems@skolkovo.ru

Website: www.skolkovo.ru