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DIGITIZATION, BIG DATA ANALYTICS, AND ARTIFICIAL INTELLIGENCE TRANSFORMING BUSINESS, SOCIETY, AND RESEARCH

A Short Essay

The processing capacity of a contemporary smartphone considerably outperforms the computers that landed a man on the moon in 1969. Building on that tremendous increase in processing capacity, digitization, big data analytics, and artificial intelligence are about to fundamentally transform business models and management approaches and thereby challenge the functioning of established markets.

Without any doubt digitization, big data analytics, and artificial intelligence empower organizations and change approaches to business, society, and research. At the core of the trajectory to the new information economy are three established economic principles: (1) centralized production together with network effects on many platforms (the 'winner-takes-all' or 'superstar' economy), (2) increased harmonization of demand, and (3) erosion of property rights (the spread of 'The Commons').

Considering the opportunities and risks of digitization, big data analytics, and artificial intelligence, many jobs, institutions, and industries will not survive intact. The more an institution or industry relies on information as its core product, the faster and more radically the change will be.

Digitization, big data analytics, and artificial intelligence challenge established business models; they dramatically reduce transaction costs for collecting information, communication, and controlling activities; they allow for further optimizing existing processes. Overall, they increase the efficiency and the quality of managerial decisions, and products and services. As a result, we see desirable societal effects concerning the employment, productivity, and consumer surplus. However, the disruptive effects will not spare those who underestimate their increasing momentum. Across sectors and nations, we face critical changes which

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cannot be ignored; we have to tackle challenges of value creation in business, society, and research.

For instance, we still do not know whether digitization creates as many new jobs as it eliminates. Neither can we assert any causal relationship between digitization and (un)employment.

Further, increasingly automated decision making will replace certain aspects of human cognitive work. To some, machines or algorithms winning games such as 'Jeopardy' or 'Go', creating movie trailers, composing chart hits, providing just-in-time transcriptions and translations, or autonomously driving a car demonstrate that learning 'intelligent' machines are taking over — at least our jobs, if not our lives. To others, these examples represent nothing but the fusion of human-made algorithms with enormous amounts of structured and unstructured data.

In the context of decision making, distinguishing between decision support systems and automated decision making has become a question of perspective, if not subjective. Decision making — by humans or machines — increasingly gets degraded to rephrasing or implementing data-driven suggestions. It remains to be seen, whether and when intelligent machines will be able to cope with judgments based on tacit knowledge. If the data advocates 'A', even the 'big boss' will find it hard to legitimize deciding in favor of 'B'. Digitization, big data analytics, and artificial intelligence lead to data-driven decision making and thereby undermine organizational power structures — a management revolution? The question remains what we have to expect in the case of 'first time ever' decisions such as pushing the red button in politics, and how we get trained for high-level decision making if machines increasingly take over 'on the way' up — major concerns far beyond this short essay.

I am convinced that digitization, big data analytics, and artificial intelligence cannot be slowed down, let alone stopped or reversed — no matter what individuals or political regimes wish, what insights we gain from accumulated research efforts, or how we regulate business and society. And as digitization, big data analytics, and artificial intelligence become ubiquitous, both, desirable and detrimental consequences will become manifest and ubiquitous, too. We do not know how fast current business models will be re-shaped and jobs will be replaced, nor do we know when major substitution waves will occur.

But neither do we know when digitization, big data analytics, and artificial intelligence will open up avenues for new ways to live and cooperate in our professional and private lives. Hopefully research and education will constructively accompany any transformative strategies — let's lead from a position of informed strength!

Clearly, a lot is at stake and our understanding is still limited — otherwise we would not see so many seemingly contradictory viewpoints, analyses and political recommendations. This gap calls for extensive research and education — across disciplines and political borders.

Here, I would like to conclude by taking the opportunity to thank my hosts *Alexandr Auzan* and *Mikhail Lugachev*, who invited me in the fall of 2018 for seminars to *Moscow State Lomonossov University*, Faculty of Economics, and to the Central Economic-Mathematical Institute of the *Russian Academy of Science*. I can only speak for myself. To me — in the era of digitization, big data analytics, and artificial intelligence — the face-to-face exchanges of ideas made possible during my visit were insightful, marvelous eye-openers. Hopefully, it could be the beginning of a long-lasting fruitful, synergistic academic cooperation for the sake of the advancement of society around the globe in our increasingly digital world.

Literature

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