AJES Journal

Journal of Engineering & Science

4TH VOLUME · OCTOBER 2022

AFEKA
The Academic College of Engineering in Tel Aviv

Afeka Journal of Engineering and Science

Volume 4, October 2022

ajes@afeka.ac.il

Produced by Afeka Academic College of Engineering in Tel Aviv

Marketing Department

Cover design: Yael Shumer

Design and formatting: Nilly Amir-Sagi

Afeka Academic College of Engineering in Tel Aviv

38 Mivtza Kadesh St., Tel Aviv

Afeka.ac.il

Table of Contents

Editors' Preface

Dear readers,

We present to you the fourth volume of Afeka Journal of Engineering and Science.

The changes occurring in our world have become rapid, complex, and interesting, and a profound understanding of them requires a multidisciplinary perspective. For example, the year 2023 begins soon and the world is coping with renewed inflation, after many years of consumer price stability. In fact, the expansionary fiscal and monetary policy adopted by governments and central banks around the world has created an economic activity that facilitated coping with the subprime crisis in 2008 yet did push prices up. In contrast, the recovery from the coronavirus crisis, which harmed business operations, is characterized by an increase in moderate inflation, especially due to hindrances in the supply chains and the rising demand for commodities and services. These processes reawaken the question regarding the state's capacity to control the local economy in an age in which technology has accelerated globalization and removed the boundaries from the movement of capital, goods, and services.

Questions regarding the state's new status are raised in several of the papers presented here.

Yoav Lapid writes about The Predicament of Nationality in the Digital Age and shows how the digital revolution of the 21st century threatens to subvert the nation state, or at least to profoundly change its character and the concepts related to it, which are, as it is known, the offshoots of the 17th century industrial revolution.

Ofer Even points at the alignment of the digital age and the rising power of corporations, pushing our world into overdrive. Systems of governance and administration struggle to maintain control, and bureaucracy does not allow for efficient and rapid business conduct. Even argues that the power of democracies and their ability to plan and manage long-term strategic plans had been dissipated. Behind the scenes, a new power emerges: multinational super corporations, in which a soul was born – a corporate personality that yearns only for power and money and can no longer be controlled by humans.

Erel Avineri reflects on the required responses to the coming crises, and especially the climate crisis, by studying the phenomenon of hypermobility in the context of the coronavirus pandemic. His conclusions lead to several insights into the adaptation of consumption patterns, including transportation mobility, during a crisis.

Ori Nissim Levy and Avihai Koresh examine the short history of nuclear energy: from the atomic bomb to green nuclear energy in the 21st century. Their paper surveys significant stages in nuclear development and analyzes the current as well as future issues facing the international community.

Eli Cohen argues that socio-economic, intergenerational gaps are thoroughly reflected in Israel's education data, and that education provides the vantage for social mobility. His analysis indicates that the state must invest in the education of disadvantaged groups because this investment yields maximum marginal utility. If the state wishes to generate rapid economic growth, it must acknowledge the relation between that growth and the breaking of the poverty cycle by enabling disadvantaged populations access to higher education.

Other papers in Afeka deal with interesting, contemporary, and multidisciplinary problems. They do it through discussions of issues pertinent to the postmodern age.

Doron Avital and Karolina Dolanska take us on a logico-historical journey, tracing the fate of the original in the digital age. In their paper, they follow two iconic foundational texts that examine the idea of the original – Walter Benjamin's renowned The Work of Art in the Age of Mechanical Reproduction and Nelson Goodman's Languages of Art. Their analyses, and the fascinating case studies they present, provide an understanding anchoring the idea of the original in the logic of the singular rule – thus constructing the "one of its kind" feature that we attribute only to the original.

Adi Iny reminds us that we live in a time ungracefully dubbed "the post-truth" age. This reality, formed with the proliferation of media outlets, the development of the Internet and of social media, does enable extensive access to information, but also allows everyone to disseminate whatever information they seem appropriate without any backing for their claims, casting serious doubt over the reliability of information. However, questions on the nature of science and scientific procedure were already discussed a century ago, when the concept of "philosophy of science" evolved. Her paper focuses on two 20th century theories that represent two distinct solutions for the question: what is a scientific theory and what is scientific knowledge?

Eyal Nir explains and illustrates how it is possible to leverage and apply the centuries-old wisdom, principles, and knowledge of traditional Japanese martial arts – BuDo – to become better and more successful engineers in today's global technological market. His paper presents the BuDo-Way Program that is taught around the world, and which opens a window to Budo's wealth of knowledge and to the acquisition of applicable tools for the success and well-being of those who are interested.

Ofer Nur acquaints us with a contemporary thinker: Byung-Chul Han. Han was born in South Korea but lives in Berlin and writes in German. His books are short and accessible and combine reading and interpretation of the great philosophers, yet offer cultural, sociological, and philosophical insights for the current age. He also bases his arguments on reading well-known authors and filmmakers.

The Afeka editors are proud to present Prof. Marcelo Dascal's paper, "Polemics in Classical Science", originally published in Iyyun quarterly in 1999. In this paper, Dascal stresses the importance of polemics for the development of classical science. With the help of a typology that distinguishes controversy, dispute, and discussion as three forms of dealing with differences of opinion, Dascal analyzes the way in which key figures in the 17th century scientific community developed and perfected their positions regarding central scientific issues that were high on the agenda at that time. Thus, for example, he analyzes the controversy between Descartes and Newton over the theory of light, the dispute between Newton and Leibniz over the invention of calculus, and the discussion between Descartes and Fermat over the geometric method. This typology was one of the centerpieces of Dascal's thought and was elaborated in several papers that he wrote and some books that he edited.

We hope you find reading this journal rewarding,

Dr. Kuti Shoham – Chief Editor

Dr. Yaron Cohen-Tzemach – Scientific Editor

Mr. Ran Cohen – Linguistic Editor

Opening Remarks from Afeka's President

I am pleased to present the fourth annual volume of the multidisciplinary Afeka Journal of Engineering and Science. A central theme in the 2022-2023 volume is the the way the current digital age challenges institutions, organizations, and generally-accepted concepts.

The impact of the digital age on our lives has been evident for several decades. Accelerated technological changes are reshaping the world and affecting all aspects of life; Digital systems and technological solutions are widely employed in key areas of society and business, such as security, health, education and more. Digital tools are used not only to optimize national governing – public policy design, decision-making, system management and operation – but also to improve individual quality of life – in terms of information consumption, ease of communication, efficient work environments and more. The workforce is changing and developing, and new emerging professions require a skill-set that is advantageous in an information-rich environment and in coping with the frequent changes that occur within it.

In this era of advanced technology, the global economy is clearly STEM-oriented, emphasizing the growing importance of quality STEM education along the entire educational continuum from preschool through higher education. The digital age has placed engineering at the forefront with the role of providing technological solutions to crucial problems and challenges that arise from the complex issues affecting the future of humanity – such as climate control, renewable energy, water conservation and substance – while also considering issues such as corporate responsibility, social mobility, ethics, privacy and more.

As an academic institution educating engineers in this era, our goal is to continue to march forward, beyond the obvious – to educate our students to become engineers who develop new solutions with compassion and responsibly, and that are able to harness their curiosity for progress that has positive impact, and to help them evolve into professionals with a comprehensive perspective and a passion for solving problems, making an impact, and changing the world we live in for the better.

The Afeka journal allows us to look at key issues from this perspective. Like the authors published in this volume, engineers must be able to apply critical thinking with a multidisciplinary outlook when dealing with the challenges of the current era, while also applying ethical considerations when examining potential engineering solutions that may have a long-lasting effect on the planet and on humanity. It is our belief that reading and expanding one's knowledge on the issues found in the journal papers facilitates this task.

My thanks go to the authors and all those involved in producing the fourth annual AJES.

Pleasant Reading!

Prof. Ami Moyal
President
Afeka – Tel Aviv Academic College of Engineering

Mobility, Environment and Health: Lessons from the First 2.5 Years of the COVID-19 Pandemic

Erel Avineri

Prof. Erel Avineri is Head of the MSc program in Energy and Power Systems Engineering, at the Afeka Academic College of Engineering. His research interests lie in the areas of Intelligent Transportation Systems, Smart Cities, and Behavioral Change, ranging from theory to design to implementation.

This paper examines the phenomenon of hypermobility and discusses it in the context of the coronavirus pandemic (Covid-19). The discussion, which is based on a survey of findings from the research literature, leads to several insights relating to the adaption of consumption patterns, including transportation mobility, in a time of crisis. Specifically, questions are raised regarding the preferred responses to the crises that await us in the near future, especially the climate crisis.

These days, most of the world marks 2.5 years since the introduction of serious restrictions on the movement of people due to the worldwide outbreak of the corona virus pandemic. During this period, closures and restrictions were periodically imposed on social proximity and the mobility of citizens around the world. Although at the time of writing this paper, there was no sign that the virus, with its various variants, has disappeared from our lives; in fact in the summer of 2022, we witnessed a significant wave of the BA.4 and BA.5 variants. However, transportation restrictions are not noticeable, and it seems that, at least *prima facie*, they have been removed from the agenda of the policy makers, while patterns of mobility have gradually returned to be like those of early 2020. This point in time may provide a good opportunity to obtain, retrospectively, insights into the connections between transportation mobility and the different stages of the pandemic and the ways it was dealt with, and to draw conclusions from them regarding the desired responses to the crises we expect in the coming era, and their connections to transportation mobility.

The existence and functioning of any human environment involve the development and management of transportation infrastructure. Transportation systems affect the activities around them and are even considered a significant factor in creating competition and economic growth. Empirical studies point to a relationship between the level of economic development of a country or a geographic region and the development characteristics of the physical infrastructure and accessibility systems for passengers and cargo

(see, for example, Aschauer, 1990, 1991; Seitz, 1993; Banister & Berechman, 2000). The development of infrastructures brought about changes in the social and cultural orders of the world, and, among other things, contributed significantly to the globalization of trade, services and tourism activities. The transportation links allow the public accessible, cheap, and safe mobility to many distant destinations. Despite significant changes in the urban structure of human settlements, in the transportation infrastructure, and in a variety of socio-demographic and economic aspects, and despite the great variation that exists in these aspects between cultures over different eras and geographical spaces, it was found that people adjust their lifestyles (and in particular the patterns of mobility from their homes to other destinations) and the average amount of time that is allocated to travel that seem to be stable across the population (Tanner, 1979; Zahavi and Talvitie, 1980; Zahavi and Ryan, 1980; Newman and Kenworthy, 1999; Schafer and Victor, 2000; Susilo and Avineri , 2014).

Not so long ago, and before innovative technologies reshaped the ways we travel, most people moved about mainly within a radius of a few kilometers from their place of habitation (Marchetti, 1994) ; however, the infrastructural, technological and operational improvements in the transportation systems, especially those of the last few decades, along with a constant improvement in the level of human development, have resulted in the fact that today, making long trips for work, education, leisure or to visit relatives and loved ones is not considered exceptional.

The last few decades have seen the emergence of a new phenomenon – "hypermobility". Although there is no clear definition for this term, it is commonly used to describe a set of social processes that began to occur (and increase) at the end of the 20th century, since many people can travel longer distances than in previous generations and with relative ease (Adams, 2000). Studies show that a small number of passengers forms a relatively high part of the aggregated mileage traveled. For example, a study of those flying out of Gothenburg Airport in Sweden points to a huge variation in the number of their annual flights during the past year: while 28% of those surveyed (from a total of 300) flew once or twice, 23% flew 3-5 times, 12% flew at least 30 times, while two flew over 300 times during the year (Gössling *et al*., 2009).

It is interesting to examine the connections between hypermobility and the outbreak of the coronavirus pandemic (COVID-19). Compared to the characteristics of previous pandemics, it can be seen that the transportation accessibility to the epicenter of the disease, the city of Wuhan in China, is relatively high. Wuhan's transportation accessibility consists of an extensive railway network, intercity road network and domestic and international aviation connections. A strong and significant relationship was found between the number of passengers on the train from Wuhan to six central cities in China and the number of infections with the coronavirus in the initial phase of the outbreak in those cities (Zhao *et al*., 2020). One of the characteristics of coronavirus infection is the absence of symptoms during the first days of incubation – and the spread of the disease with neither the awareness nor control of both the carriers and the authorities. Therefore, it is hardly surprising that the first foci of outbreaks outside of China were in areas that have business and tourism ties with China. It can be assumed that a significant part of the initial outbreaks of the first wave outside of China can be attributed to a small but significant minority of travelers who are characterized by hypermobility. The timing – the Chinese New Year holiday (chunyun) on the dates of January 10th to February 18th 2020, during which many people visited family members and friends throughout the country and around the world or went on vacations – accelerated the spread of

the virus (Zhao *et al*., 2020). The second phase of the pandemic was also characterized by hypermobility, this time of people who were exposed to the virus traveling to other countries. In a relatively short time, the virus spread all over the world.

Possibly, one of the main reasons for the relatively rapid spread of the coronavirus, compared to more limited outbreaks of previous epidemics, and for the challenges of returning to a "covid-free" routine, is the hypermobility of the modern world (Peeri *et al*., 2020). But the side effects of hypermobility may also have a negative contribution in other crises – and this is due to their various negative effects on the life of human society and its prosperity. The spread of diseases is only one of these side effects, and like the others – it, too, does not receive sufficient public attention or intervention by the authorities (Musselwhite *et al*., 2020). The discussion below attempts to examine hypermobility in this context.

Most of the transportation in Israel as in the rest of the world relies on fossil fuels, which is extremely wasteful of energy and creates much pollution. Therefore, the phenomenon of hypermobility is important mainly vis-à-vis the need to reduce air pollution (such as nitrogen oxides) that causes morbidity and mortality, and to reduce greenhouse gas emissions, which are the most significant driver of climate change. For example, it was found that, in the Netherlands, almost half of the travel-related carbon emissions are associated with 10% of the population, and in Great Britain 60% of the travel-related carbon emissions are associated with 20% of the population (Susilo and Stead, 2009). In addition to this, studies show that the phenomenon of hypermobility has a negative effect on the community and society, and that it exacerbates the socio-economic polarization between social classes (Cohen and Gössling, 2015; Gössling *et al*., 2009). Moreover, studies indicate damage to the physical and mental health of those who frequently travel long distances (Cohen and Gössling, 2015). In a recently published study, it was claimed that the benefits of reducing the number of flights for frequent flyers, as expressed in health and psychological-social advantages, outweigh the environmental benefits gained by reducing flights. Therefore, to reduce unsustainable transportation, the health aspects of the individual must be emphasized (Cohen and Kantenbacher, 2020). Empirical findings show that increasing the public's awareness of their health in other aspects has already led to some achievements in changing consumption patterns, such as reducing smoking and switching to a healthier diet (Wakefield *et al*., 2020). This may be one of the effective ways to change behavior also in the context of hypermobility, especially in light of the positive attitude of many members of the public to maintaining their personal health and avoiding unnecessary travel due to the outbreak of the coronavirus pandemic.

Nevertheless, and despite the negative aspects mentioned above – a lifestyle that combines excessive consumption, and in particular hypermobility, receives a positive social evaluation (Larsen and Guiver, 2013; Urry, 2012) even becoming an object of admiration and a status symbol (Cohen and Gössling, 2015). These psychological-social factors, combined with marketing strategies of commercial (and sometimes governmental) bodies, which encourage the practice of frequent long-haul travel and flights are significant barriers to attempts to change behavior toward sustainable mobility. Moreover, it does not appear that there have been substantial attempts by governments to encourage the reduction of hypermobility, and where there has been any intervention in the private market – it was intended to encourage the growth of both domestic and foreign tourism.

Some researchers claim that income inequality may be one of the factors that encourage overconsumption (Boyce, 1994) and in particular hypermobility with its harmful environmental implications. When inequality is high, competition may arise in consumption (Chao and Schor, 1998): households may increase their consumption to match with the lifestyle of higher-income households – for example, buying cars or making more frequent trips (Jorgenson *et al*., 2017). In contrast, some researchers claim that a more just distribution of income between different strata of the population could actually lead to the opposite effect and increase overconsumption and environmental pollution (Sager, 2019). It seems that the outbreak of the coronavirus pandemic and the policy tools implemented in its wake led to a redistribution of income and resources, in a way that increases inequality. However, due to the complexity of the relationship between economic equality and hypermobility, especially during the pandemic period, it does not seem that we will come to an agreement regarding the nature of this relationship. Due to the changes in inequality that are expected in the future as a result of current processes, such as the ongoing climate crisis and the emerging energy crisis, this issue should receive the attention of researchers and policy makers, despite its complexity.

On January 23rd 2020, the Chinese government blocked the land transport routes connecting the city of Wuhan with the other cities, making it the first city to be placed under quarantine as a strategy to prevent the spread of the virus, and a model to be followed by other countries. At the same time, international flights were limited and even canceled – so that for the first time in many years, hypermobility has stopped all over the world. Time will tell if the outbreak of the coronavirus pandemic, and the extensive media coverage it received over the past two and a half years, will lead to the desired change in the public's perceptions and attitudes regarding hypermobility. However, as history teaches us, despite the immediate impact of traumatic events (such as wars, terrorist events or epidemics) on consumption and mobility behaviors, the public tends to recover quickly, and consumption patterns return to their previous patterns encouraged by market forces and government bodies. Among the public with positive attitudes towards environmental aspects there was a certain optimism following the clear findings on the decreased level of pollutants and carbon emissions during the pandemic restrictions – as a kind of proof that behavioral change might be applicable and effective even in the context of the climate crisis. In this context, it is interesting to examine the statement of one of the opinion leaders during the pandemic period, Bill Gates, who wrote in August 2020:

> "What's remarkable is not how much emissions will go down because of the pandemic, but how little. In addition, these reductions are being achieved at, literally, the greatest possible cost" (Gates, 2020).

His conclusion was unequivocal: it is impossible to reach the goal of zero emissions by behavioral change alone – reducing transportation mobility – and in particular flights and car travel. In his opinion, the only way to reach that goal will not be through changing behaviors in the current technological reality, but through changing scientific and technological paradigms in various fields of knowledge – engineering, natural sciences, and social sciences – to find better ways to produce and consume energy, build houses, and grow food. However, this approach may also be accepted with skepticism – time will tell if the coronavirus period led to the collapse of old scientific and technological paradigms, or to the preservation of the existing scientific worldview, or even to a lack of trust among the public in the relevance and effectiveness

of scientific technologies – at least among a small, though noticeable, share of the public (Bromme *et al*., 2022). There is also an opinion that the outbreak of the pandemic actually led to a decrease in trust and a negative change in the public's perception of risk regarding public transportation, which is considered more efficient, safe, and environmentally friendly than using cars (see, for example, Aaditya and Rahul, 2021; Basu and Ferreira, 2021; Musselwhite *et al*., 2021).

One way or another, it seems that following the development of intercity and international transportation networks and the effect of commercial and social globalization, the world has become increasingly more connected, regulated, and efficient – but at the same time less resilient. In these circumstances, the chance of environmental systemic failures increases. A desirable lesson from dealing with the coronavirus crisis is the strengthening of local economies and local communities, and at the same time boosting urban and local transportation. This must be done at the expense of accelerated processes of globalization and hypermobility, whose side effects we do not yet fully understand and are beyond our control. The current period offers an opportunity to examine whether a global-scale crisis like the coronavirus pandemic has resulted in a long-term behavioral change among the public, scientists, or decision-makers, and to examine what kind of change this is. Despite the temptation to return to the pre-pandemic ways of life (and in particular to the old patterns of travel), we must consider whether and how reducing hypermobility may contribute to dealing with crises no less significant than the coronavirus – the rehabilitation of the local economy after the damages of the pandemic, the ongoing climate crisis, and the emerging energy crisis, which require immediate solutions.

Bibliography

Aaditya B and Rahul TM. 2021. "Psychological Impacts of COVID-19 Pandemic on the Mode Choice Behaviour: A Hybrid Choice Modelling Approach". *Transport Policy* 108, 47-58.

Adams J. 2000. "Hypermobility". *Prospect*. http://www.prospect-magazine.co.uk/highlights/hypermobility/

Aschauer DA. 1990. "Why Is Infrastructure Important?" In: Munnell, A.H. (editor), *Is There a Shortfall in Public Capital Investment?* Boston: Federal Reserve Bank of Boston, 21–50.

Aschauer DA. 1991. *Transportation Spending and Economic Growth: The Effects of Transit and Highway Expenditures.* (Report). Washington, D.C: American Transit Association.

Banister D and Berechman Y. 2000. *Transport Investment and Economic Development*. London: Routledge.

Basu R and Ferreira J (2021). "Sustainable Mobility in Auto-Dominated Metro Boston: Challenges and Opportunities Post-COVID-19". *Transport Policy* 103, 197-210.

Boyce JK. 2007. "Is Inequality Bad for the Environment?". *Equity and the Environment* 15, Emerald Group Publishing Limited, Bingley, United Kingdom, pp. 267-288.

Bromme R, Mede NG, Thomm E, Kremer B, Ziegler R. 2022. "An Anchor in Troubled Times: Trust in Science Before and Within the COVID-19 Pandemic". *PLoS ONE* 17(2): e0262823. https://doi.org/10.1371/journal.pone.0262823

Chao A and Schor JB. 1998. "Empirical Tests of Status Consumption: Evidence from Women's Cosmetics". *Journal of Economic Psychology* 19 (1),107-131.

Cohen SA and Gössling S. 2015. "A Darker Side of Hypermobility". *Environment and Planning A: Economy and Space* 47(8), 1661-1679. https://doi.org/10.1177%2F0308518X15597124

Cohen SA and Kantenbacher J. 2020. "Flying Less: Personal Health and Environmental Co-Benefits". *Journal of Sustainable Tourism* 28(2): 361-376.

Gates B. 2020. *COVID-19 is awful. Climate change could be worse*. August 04, 2020. https://www.gatesnotes.com/Energy/Climate-and-COVID-19

Gössling S, Ceron J-P, Dubois G, *et al*. 2009. "Hypermobile Travelers and Implications for Carbon Dioxide Emissions Reduction". In: Gössling S and Upham P (Eds). *Climate Change and Aviation: Issues, Challenges and Solutions*. Earthscan: London.

Gössling S, Haglund L, Kallgren H, *et al*. 2009. "Swedish Air Travelers and Voluntary Carbon Offsets: Towards the Co-Creation of Environmental Value?". *Current Issues in Tourism* 12(1): 1-19.

Jorgenson A, J. Schor J and Huang X. 2017. "Income Inequality and Carbon Emissions in the United States: A State-Level Analysis", 1997-2012. *Ecological Economics* 134, 40-48.

Larsen GR and Guiver J. 2013. "Understanding Tourists' Perceptions of Distance: A Key to Reducing the Environmental Impacts of Tourism Mobility. *Journal of Sustainable Tourism* 21(7): 968-981.

Marchetti C. 1994. "Anthropological Invariants in Travel Behavior". *Technological Forecasting and Social Change* 47(1), 75-88.

Musselwhite CBA, Avineri E, and Susilo YO. 2020. "The Coronavirus Disease COVID-19 and Implications for Transport and Health". *Journal of Transport and Health* 16, 100853.

Musselwhite CBA, Avineri E, and Susilo YO. 2021. "Restrictions on Movement for Coronavirus: Threats and Opportunities for Transport and Health. *Journal of Transport and Health* 20, 101042.

Newman P, Kenworthy J. 1999. "Costs of Automobile Dependence: Global Survey of Cities". *Transportation Research Record* 1670, 17–26.

Peeri NC, Shrestha N, Rahman MS, *et al*. 2020. "The SARS, MERS, and Novel Coronavirus (COVID-19) Epidemics, the Newest and Biggest Global Health Threats: What Lessons Have We Learned?". *International Journal of Epidemiology* https://www.ncbi.nlm.nih.gov/pubmed/32086938

Sager l. 2019. "Income Inequality and Carbon Consumption: Evidence from Environmental Engle Curves". *Energy Economics* 84, 104507.

Seitz H. 1993. "A Dual Economic Analysis of the Benefits of the Public Road Network". *The Annals of Regional Science* 27(2), 223–39.

Schafer A, Victor DG, 2000. "The Future Mobility of the World Population". *Transportation Research A* 34, 171–205.

Susilo Y and Avineri E. 2014. "The Impacts of Household Structure to the Individual's Stochastic Travel and Out-of-Home Activity Time Budget". *Journal of Advanced Transportation* 48(5), 454-470.

Susilo YO and Stead D. 2009. "Individual Carbon Dioxide Emissions and Potential for Reduction in the Netherlands and the United Kingdom". *Transportation Research Record* 2139(1), 142-152.

Tanner J.C. 1979. "Expenditure of Time and Money on Travel". *Transport Road Research Laboratory Report*, SR-466: Crowthorne, UK.

Urry J. 2012. "Social Networks, Mobile Lives and Social Inequalities". *Journal of Transport Geography* 21, 24-30.

Wakefield M, Loken B and Hornik RC. 2010. "Use of Mass Media Campaigns to Change Health Behavior". *The Lancet* 376(9748):1261-1271.

Zahavi Y, Talvitie A. 1980. "Regularities in Travel Time and Money Expenditures". *Transportation Research Record* 750, 13–19.

Zahavi Y, Ryan JM. 1980. "Stability of Travel Components Over Time". *Transportation Research Record* 750, 19–26.

Zhao S, Zhuang Z, Ran J, *et al*. 2020. "The Association Between Domestic Train Transportation and Novel Coronavirus (2019-nCoV) Outbreak in China from 2019 to 2020: A Data-Driven Correlational Report". *Travel Medicine and Infectious Disease* 33, 101568.

Reflecting on the Fate of the Original in the Digital Age:

Re-visiting Walter Benjamin and Nelson Goodman on the Original vs. Reproduction and Fake

Doron Avital & Karolina Dolanská

Dr. Doron Avital, The Cohn Institute for the History and Philosophy of Science and Ideas, Tel Aviv University. Mgr. Dr. Karolina Dolanská, Chair of Visual Art Studies, Anglo-American University, Prague.

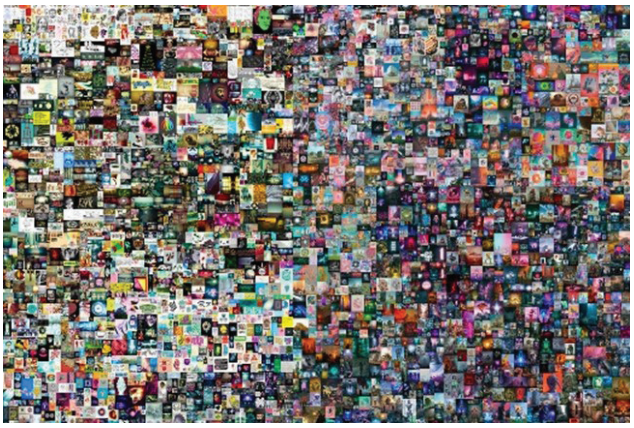
In 2021, an NFT of a digital artwork by the artist @beeple was sold for 69 million dollars. This sale is the starting point for a logical-historical journey tracing the fate of the original in the digital age. We follow the footsteps of two seminal works exploring the concept of the original, the celebrated The Work of Art in the Age of Mechanical Reproduction by Walter Benjamin and Nelson Goodman's book Languages of Art. We examine two case studies: the Lost Leonardo – a painting that surfaced recently and claimed to be painted by Leonardo da Vinci, yet remains highly disputed, and the grandiose saga of Van Meegeren, the famous counterfeiter of Vermeer's works from the 1930s and 1940s. Both tales are read as fascinating detective stories. We provide an analysis of our own that anchors the idea of the Original with the logic of Singular Rule – thereby giving structure to the "one of its kind" property that we associate with the original. Our final remarks discuss the relevance of our analysis to the digital art of today.

Digital Art and NFT

I'm confident it's not a hype thing. It's the catalyst for a generation[1]

In March 2021, Christie's announced that they are proud to offer *Everydays: The First 5000 Days* by artist @beeple as the first purely digital work of art ever offered by a major auction house. Until October of the previous year, the most Mike Winkelmann — the digital artist known as Beeple — had ever sold a print for was $100. On March 11th, an NFT of his work was sold for the price of $69 million. According to Christie's, this sale positions Beeple "among the top three most valuable living artists".

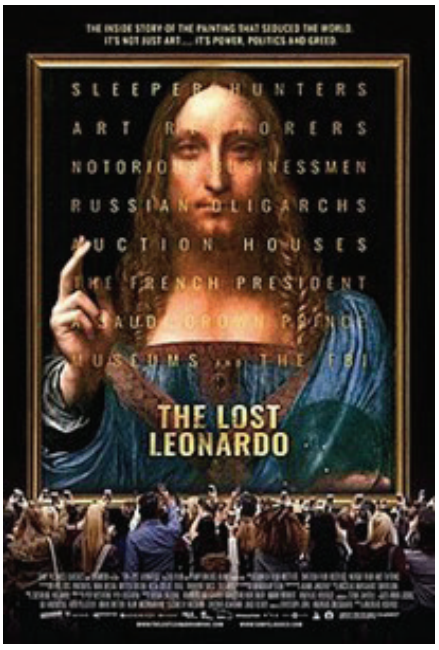
1. A digital art collector arguing for digital art and NFT.



Beeple's collage, *Everydays: The First 5000 Days*

The explosion of the phenomenon of NFTs, which is the acronym for Non-Fungible Tokens – the term NFT was picked by Collins Dictionary as The Word of the Year 2021 – redirects us both to the question of the meaning of ownership in the digital age as well as to the question of art in our digital times. What is NFT? It is a unique file that lives on a Blockchain that reads like a digital receipt confirming ownership, and in the context of our interest here, an ownership of a work of digital art. The novice visitor to the world of Blockchain can imagine a network of participants registering transactions among themselves in a manner that is completely immutable and all the same requires no central authority confirming the validity and integrity of these transactions. In this fashion, in the context of the auctioning of *Everydays: The First 5000 Days*, the transaction of the purchasing of the work from the artist, and consequently the new fact of ownership of the piece, is an undisputed fact registered on the Blockchain for all visible times to come.

Questions may now arise as to the significance of this newly registered fact of ownership. For one, it signifies the trivial fact that only the new registered owner is in a position to resell the work. However, given the reproducible digital nature of digital artworks, ownership here does not entail exclusivity. The work is indisputably owned by the lucky buyer, be it an art lover or dealer, yet the work is open to view to all members of the general public equipped with the minimal machinery required for it to be viewed on screen. This new sense of ownership is sometimes referred to as "bragging rights" and on occasions may even include some restrictions or limited rights on display of the works. However, in essence, the radical break from traditional notions of ownership is that here we have an object that is owned by an individual, yet it is open for view and accessible to all.



Salvator Mundi by Leonardo da Vinci
[attribution to Leonardo is debated]

The Lost Leonardo

The analog to the NFT notion of ownership in the arts in the pre-digital times could be the note "on loan" from a certain individual, which you may find in museums or exhibitions as they are attached to works on display. But here lies the difference between the analog or physical works of art and their digital equivalents. We may consider, say, an "on loan" note attached to the *Mona*

Lisa but then we may consider the true owner, if there were such a person, claiming back the work restricting it from public view. This clearly is not the case for the *Mona Lisa* but surprisingly is and was the case for another work of art attributed to Leonardo, the painting titled *Salvator Mundi*. As a word of caution, we should note that the attribution of this work to Leonardo is still highly questionable. The reader my refer here to a beautifully done documentary tracing the story of the work since it was bought for the meager sum of $1175 in New Orleans in 2005 until it was finally sold in Sotheby's auction for the staggering sum of $450 million in 2017. In a highly publicized affair, the *Salvator Mundi* purchased for this price was destined to appear in a Leonardo da Vinci retrospective in the Louvre Museum in October 2019. It was alleged that the owner of the work, MBS, the Crown Prince of Saudi Arabia, conditioned the loaning of the work on it being displayed in the same room against the *Mona Lisa*.

It was alleged in the press and in the mentioned documentary that the discussion on the matter has reached all the way up to an exchange between the president of France, Emmanuel Macron, and the Crown Prince. What transpired in this conversation on art and politics is still a mystery, but as a result of it the Louvre exhibition opened up without the display of *Salvator Mundi* to the disappointment of many. Since then, the whereabouts of the work are unknown. It was rumored to be guarded at the Crown Prince's Royal yacht or to be brought back to Saudi Arabia.

The reader may assume that if the artwork in question had been digital, no such chain of events could have transpired. This is so, since, as mentioned, the nature of ownership of NFT that is registered on the blockchain is shaped both by way of ideology and technology, in such a fashion that it does not entail restrictions on viewing or displaying the work for the public. Ideology here is the insistence that truth and beauty, say, science and art, should be openly accessible to the public. We witness the "open access" revolution in software, for example. Advocates of this revolution clearly will consider that scientific papers as well as works of art should be open to the public's viewing. This leaves open the economic model, for scientists and artists would need to be able to trade their goods in order to continue to prosper and further create. How would Picasso manage to offer us the wealth of his ingenious work if not for art dealers and the machinery of the economy of the art world in general. But when we go digital, we see that the gates guarding the concept of *scarcity of access to goods*, which is essential to the logic of an economy, can be rather easily lifted. Here enters the logic of NFT on the blockchain, as it disassociates the ownership of the art from its being free to display and visual consumption by the public. If there is a solid sense in an economy for buying and selling digital art while all the same having the art open to view to all art loving public, it would seem we are venturing into a new landscape for art and its economy.

Yet the persistent difficulty that seems to haunt us as we discuss digital art must be that in the analog world, we seemed to have a sound notion of what the original work of art is, and the notions of ownership and value thereof are attached to the original work. Clearly the claim of being in ownership of a postcard of the *Mona Lisa* would carry little attention and the little financial value attached to it would register this fact accordingly. We can trace a digital work from its first registered transactional entry into the Blockchain, say, the artist successfully sells his works as an NFT as Beeple does, but what merit this transaction has to the claim that the new owner is holding

on here to the original work? Since any other digital version of the work played on any public screen must be of equal value, what value does ownership mean here?

The two questions, the digital reproduction and ownership, are surprisingly connected. If any digital reproduction of the work is literally the same as its predecessor, binarily identical, what merit has the claim that I own the original version? What meaning at all could we attribute here to the notion of the original version? What meaning could be ascribed to the oldest question of the philosophy of art about the distinction between the original and its copies or the original and its forgeries?

Art has been always connected to the means of its production as they emerge in a concrete location of time and place. This brings in the question of the uniqueness and originality of the work of art as it stands against the possibility of its reproduction, either by design or not, as well as the commissioning of forgeries and fakes. These considerations go the heart of the question of art and need to be reexamined now in the light of the technology and means of production of art in our digital times.

The Work of Art in the Age of Mechanical Reproduction

The question of the original work of art versus its copies or possible forgeries has had a long standing in the history and study of the philosophy of art. Seminal in this tradition is Walter Benjamin's paper "The work of Art in the Age of Mechanical Reproduction", where he claims that:

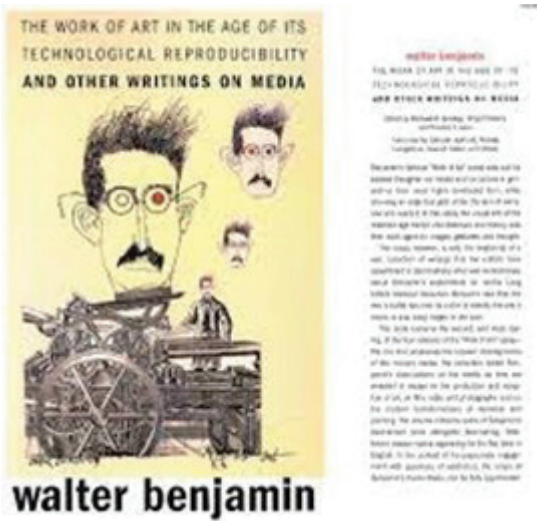
> "Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be."

To this he reserved the term "*aura"* and then concludes that:

> "One might subsume the eliminated element in the term 'aura' and go on to say: that which withers in the age of mechanical reproduction is the aura of the work of art."

In today's commercial times, we can find common uses in the notion of *aura* that can be telling for our discussion. Here is a "substitutions allowed" policy of a flowers shop in Paris:

> "However, due to the regional and seasonality availability of the flowers, making necessary substitutions of equal or greater value is unavoidable. Rest assured that we will ensure that the 'look' and 'aura' of the arrangement will be maintained using the same colour combination, shape, style, and size of flowers."



What we learn here is that *aura* is this unique quality that must stay intact under substitutions or alterations. This is the essence of the commercial commitment that the flowers shop makes here in its policy. If this is an artwork, we could think of alterations or modifications of it whose effect either *withers off* its unique *aura* or keeps it intact. It is here that Benjamin alerts us that in the age of mechanical reproduction, the *aura* withers off either as it were with each reproduction cycle or that the very idea of art designed for reproduction undercuts the very meaning or possibility of *aura*.

Walter Benjamin connects the uniqueness of the artwork with the traditional context in which the work originated and the role it plays in this context. We must bear in mind, for example, that the neutral museum context that we nowadays associate with art is relatively a modern notion that has to do with the secular character of modernity. Here, Benjamin makes this point:

> "The uniqueness of a work of art is inseparable from its being imbedded in the fabric of tradition. This tradition itself is thoroughly alive and extremely changeable. An ancient statue of Venus, for example, stood in a different traditional context with the Greeks, who made it an object of veneration, than with the clerics of the Middle Ages, who viewed it as an ominous idol."

He then goes further to claim that the age of mechanical reproduction emancipates the work of art from what he calls "*its parasitical dependence on ritual*". Since the capacity to be reproduced allows the work to be accessed in principle by anyone and in any location and time, the work is no longer tied exclusively to a "*ritual context*". In fact, the two formulations are equivalent – art designed for mechanical reproduction and art emancipated from the singular context of the *ritual*. This, Benjamin argues, is the essential character of the new art:

> "An analysis of art in the age of mechanical reproduction must do justice to these relationships, for they lead us to an all-important insight: for the first time in world history, mechanical reproduction emancipates the work of art from its parasitical dependence on ritual. To an ever-greater degree the work of art reproduced becomes the work of art designed for reproducibility."

He rightfully connects the revolutionary aspects of the mechanical reproduction of art with the politics of modernity, the possibility of mobilization of mass movements, as well as, we should add, the democratic essential thread that runs through modernity. For analogy, we may consider here the free access to the scriptures that the printing revolution enabled. Here, too, the Christian religious practice is *emancipated* from the necessary mediation of ritual and priesthood. This enabled the mobilization of the Reformation movement in Christianity and, to follow on Max Weber's thesis *On Protestant Ethics and the Spirit of Capitalism,* the rise of capitalism as a matter of ideology and practice. The mechanical reproduction by design of the new art enables the *reproduced* art to be *reactivated* and *freely accessed* by the public in their "own particular situation", undercutting the need of any mediation in the form of a ritual context, in the same fashion in which the printing revolution enables unmediated access to the scriptures that do not mandate the priesthood as an intermediary. The traces of the analogy between these two emancipatory processes are easily

detected in Benjamin's text:

> "This is a symptomatic process whose significance points beyond the realm of art. One might generalize by saying: the technique of reproduction detaches the reproduced object from the domain of tradition. By making many reproductions it substitutes a plurality of copies for a unique existence. And in permitting the reproduction to meet the beholder or listener in his own particular situation, it reactivates the object reproduced. These two processes lead to a tremendous shattering of tradition which is the obverse of the contemporary crisis and renewal of mankind. Both processes are intimately connected with the contemporary mass movements."

When Benjamin considers the mechanical reproducibility of art, he has in mind the technology of his times and mainly the camera and the art form of filmmaking. The photographic negative is his prime example of mechanical reproducibility of the work of art, as he argues that it conceptually obliterates the old notion of authenticity or the sense of holding on to the original work as opposed to its copies. All "*authentic*" prints made of the film-negative are copies of equal value, and none can claim to be the "*original*". Hence, he declares that art moves from the domain of *the ritual* to the domain of *politics*.

> "From a photographic negative, for example, one can make any number of prints; to ask for the 'authentic' print makes no sense. But the instant the criterion of authenticity ceases to be applicable to artistic production, the total function of art is reversed. Instead of being based on ritual, it begins to be based on another practice—politics."

Benjamin further describes the process where the *aura* withers off with reproduction. In a beautiful passage he describes the *aura* of a fresh encounter with Nature – here, the *aura* experience of a summer afternoon:

> "If, while resting on a summer afternoon, you follow with your eyes a mountain range on the horizon or a branch which casts its shadow over you, you experience the aura of those mountains, of that branch."

This experience, when accessed by reproduced art – consider the camera or the film – can bring the experience closer, as it were, to the viewer. But by making it easily accessible and available to the public or the masses, it undercuts its uniqueness as an open-ended experience. The original *aura* decays.

> "This image makes it easy to comprehend the social bases of the contemporary decay of the aura. It rests on two circumstances, both of which are related to the increasing significance of the masses in contemporary life. Namely, the desire of contemporary masses to bring things 'closer' spatially and humanly, which is just as ardent as their bent toward overcoming the uniqueness of every reality by accepting its reproduction. Every day the urge grows stronger to get hold of an object at very close range by way of its likeness, its reproduction. Unmistakably, reproduction as offered by picture magazines and newsreels differs from the image seen by the unarmed eye. Uniqueness and permanence

> are as closely linked in the latter as are transitoriness and reproducibility in the former. To pry an object from its shell, to destroy its aura, is the mark of a perception whose 'sense of the universal equality of things' has increased to such a degree that it extracts it even from a unique object by means of reproduction."

To use Benjamin's conceptual framework, we could further suggest what is it that great art could and aims to achieve for us. For great art could be said to have the capacity to reactivate in us the original *aura* of the encounter with nature – if nature is our model here. Van Gogh's *The Starry Night*, his *Wheatfield with Crows*, or the *Sunflowers* pictures, to name a few, certainly reactivate the *aura* of these genuine encounters with nature. Great artists lead us to experience with and through them the fleeting moments of these encounters. We relive these moments with the artists through their works. We could say that great art freezes and encapsulates these moments for all eternity, and all the same, hands us the key to decode them afresh and relive their *aura*. The original *aura* then comes back to life.

It is here also that the mechanical reproduction of art with its force to obliterate the very idea of the original work of art seems to Benjamin to undermine the original *aura*. Could a post card reproduction of Van Gogh's *The Starry Night* or Leonardo da Vinci's *Mona Lisa* activate the same sense of awe as we have when facing the original? Could it reactivate the *aura* of the works? This question becomes even more pressing, when we consider the arts that, as Benjamin puts it, are "designed for reproduction". In the technology of his time, the prime examples for him, as mentioned, are photographs and the cinema.

This brings us to our digital times and digital art. It is hard to think of a better example of "art designed for reproduction" than digital art. By its very constitution, it is written by script and armed with a multitude of available applications that are the new digital "painting brushes". Also at its disposal is an enormous wealth of visual objects ready-made for use, as well as strong artificial intelligence engines ready to take part in the creative process – consider for example that we can now "draw" and "paint" with text and words using powerful AI engines. This new all powerful "art designed for reproduction" must bring home with greater urgency the concerns that Walter Benjamin expresses in his seminal paper. To put it plainly: no Original, no Aura, no real Art?!

As a consequence, also present are Benjamin's political worries of the cultural and political ramifications of art as a consumable reproduced commodity – of art completely "democratized", if we wish, by the means of its delivery as well as by the means of its production. For if by plugging text in a sophisticated AI Engine, any one now can claim to be an artist, then we should ask ourselves whether this threatens the very idea of what art is and what its role and the role of the artist are in society; does the "democratization" of art deliver a death blow to art? Surely, the idea of science democratized in this fashion must endanger the very concept of truth on which science rests. What about the arts, then? What would be the political face of a society with no real art and no real artists? To answer this, we need first to ask ourselves whether the very idea of the Original is dead.

The Perfect Forgery

Christ and the Disciples at Emmaus. Han van Meegeren, 1936–1937

The year is 1937, in the Netherlands. Dr. Abraham Bredius, a distinguished art historian and an authority on the paintings of Johannes Vermeer, the great 17th century Dutch master, is presented with a painting of *Christ and the Disciples at Emmaus*. The 83-year-old art historian is excited to authenticate the picture as an original by Vermeer and to declare with much bravado that:

> "It is a wonderful moment in the life of a lover of art when he finds himself suddenly confronted with a hitherto unknown painting by a great master, untouched, on the original canvas, and without any restoration, just as it left the painter's studio. And what a picture!... I am inclined to say—the masterpiece of Johannes Vermeer of Delft... quite different from all his other paintings and yet every inch a Vermeer."

It takes a few years for *Christ and the Disciples at Emmaus* to be exposed as a forgery. The forger is Han Van Meegeren, a relatively unknown Dutch artist. In May 1945 he is arrested and put on trial. The allegation is not forgery but collaboration with Nazi Germany. He was traced and charged after a record was found of an art transaction that he made with no other than the German Fuhrer's 2nd in command, Field-Marshal Hermann Göring. It turns out that Van Meegeren had sold Göring, for a considerable sum, another presumably authentic Vermeer, this time the painting *Christ with the Woman Taken in Adultery*. The charges of collaboration and the plundering of a Dutch national asset such as a Vermeer original and selling it to the enemy were considered grave and could carry a death sentence. His only escape from the charges was to admit instead his crime as a forger of Vermeer: "The painting in Göring's hands is not, as you assume, a Vermeer of Delft, but a Van Meegeren! I painted the picture!"

To prove his case, Van Meegeren suggested that he paints another Vermeer under the supervision of the court. So came to life another Vermeer, that of *Jesus Among the Doctors*. Following this, charges of collaboration were dropped and substituted for forgery, for which he had to spend a short prison time. Nonetheless, the affair did win Van Meegeren a national hero status of sorts for ridiculing the Nazi regime and Göring and robbing them of a huge amount of money for his fake Vermeer.

Let us return to the Vermeer expert's excitement over what we know now was a fake Vermeer. The great art historian does not stop at authentication and further expresses his excitement with the painting:

> "In no other picture by the great master of Delft do we find such sentiment, such a profound understanding of the Bible story—a sentiment so nobly human expressed through the medium of highest art."

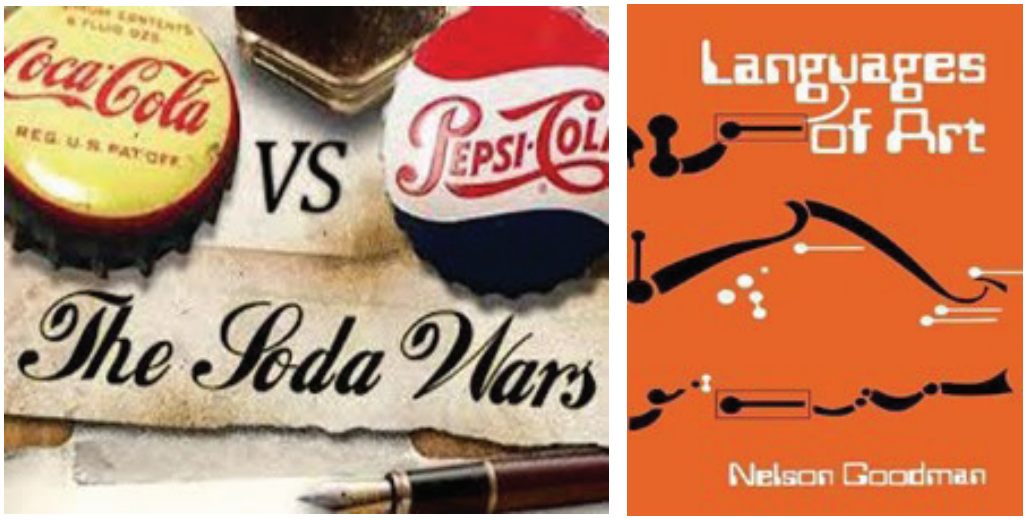
Benjamin's notion of *aura* comes here to mind. The old art historian expresses his exuberance at an encounter with a Vermeer's *aura* radiating as it were out of the work, Vermeer at his best, an *aura* of a Vermeer rising above himself. But as is often with false memories or illusions, that they overstate that which they purport to be, here, too, the "*more Vermeer than Vermeer*" was perhaps the hint, lost on the old expert, that we have a case of a well-crafted forgery.

To succeed in triggering a false sense of Vermeer's *aura*, we could see van Meegeren following closely on Benjamin's definition of the origination of the artwork's *aura* as it is anchored in "*its presence in time and space, its unique existence at the place where it happens to be*." Van Meegeren follows scholarly works that place the early Vermeer in Italy and builds on an optional storyline according to which the artist is inspired to paint religious themes that are based on works of Caravaggio. He follows this with years of perfecting the proper techniques to suit the times of origination of the works, producing the correct paints and brushes to correspond with the ones used by Vermeer, as well as engineering a unique scheme to apply to the paints so as to give the impression that they belong to a picture painted back in the 17th century; all this is executed on a canvas of an old painting of this period that gets scrapped from whatever was painted on it.

In this fashion, this well thought-of and brilliantly executed, perfect crime succeeded to deceive both the master art historian and the contemporaneous art community – and later on, also Hermann Göring. Not lacking a sense of humor, like perfect protagonists of crime stories who cannot resist leaving a signature hint beknown only to them in the crime scene that can disclose their identity, van Meegeren used objects from his atelier to use as models for pictorial elements in the forged paintings. Here is the master forger in his atelier, working on his vindication from collaboration with the Nazis as he proves that he is the true creator of a fake Vermeer.

Van Meegeren painting *Jesus Among the Doctors* in 1945

The Trained Eye



Nelson Goodman's *Languages of Art* and the Cola Wars of the 1970s

In the case of van Meegeren, we encounter the forging or copying of an artist, and not of a specific single picture. Van Meegeren imitates Vermeer and claims that his imitations are originals of Vermeer, and from here follows the accusation of forgery. Moreover, in the case of the forgery of the single picture, the imitation of the original takes place with the aim of achieving a perfect or indistinguishable copy of the original.

The question of the original versus its imitations or copies has had a long standing, as mentioned, in the history and philosophy of art. In fact, it can be traced all the way back to Plato and the role that imitation plays in his metaphysics. The partaking relation said to hold between objects and their Platonic forms is that of imitation: the objects of our surroundings imitate or strive towards yet fall short of their ideal Platonic forms, e.g., a drawn circle on the blackboard is imitating but falling short of the ideal circle. Imitation here appears as a noble task of aiming high – towards the ideal form – yet falling short. Imitation in art, however, receives no acclaims with Plato. It is degraded as third removed from the truth activity. For we have, first, the objects imitating their ideal forms and, second, the employment of imitation with the craftsman, e.g., the work of a carpenter who produces a series of chairs in accordance with a pattern; this second employment of imitation is clearly a useful necessity and therefore worthy of praise, but the third employment of imitation, the arts, imitate ordinary objects – they do not attempt to imitate the ideal forms nor do they produce useful tools. The painting of a table does not imitate an ideal form but the dinner table that serves it as a model. Nevertheless, the painting of the table surely is not one on which the family dinner can be served. At most, if successfully executed, it can delude the onlookers into believing they are encountering a table. It is at this point, when art assumes the role of the remaking of illusory imitations, that it gets its notoriously degraded status with Plato. In protesting against Plato on this point, we could even elicit sympathy to van Meegeren's frustration for not receiving praises for his high imitation skills. As he did once proclaim before a reporter in court: "My paintings will become original Vermeers once more. I produced them not for money but for art's sake!"

Taking imitation as the starting point in the analysis of art emphasizes again the importance of addressing this persistent question of what lies between the original and its imitative offshoots – the copies, the forgeries, or its indiscernible versions. The most penetrative analysis into this matter, at least in the analytic-philosophical tradition, is Nelson Goodman's seminal book *Languages of Art*. In this book, Goodman delves into the question of copy and forgery versus the original, where he claims that in art that is not notational – a classic analog of which is painting versus, say, a musical score – however indiscernible the original is from its perfect copy or forgery, there still must be a physical difference between them. Consider, for example, that the copy or forgery are created necessarily after the coming to being of the original and may utilize by necessity materials and means of production that are different from the ones used in the construction of the original. This would be certainly the case if the time interval between the two constructions were considerable.

In the van Meegeren trial, for example, chemists were summoned to examine his forgeries, and they concluded that van Meegeren's methods were not so to speak perfect enough as they could prove that his paints were mixed with 20th century paint hardeners. The physical difference, therefore, may well – and in the analog world of plastic art must – be there, yet it might be completely indiscernible. So indiscernible it was in the case of Van Meegeren that even science exemplified in court had a hard time dissuading the expert art historian Dr. Bredius from his stubborn position according to which the paintings were authentic. As is often in life, vested interest – his reputation at stake as the one who first authenticated *Christ and the Disciples at Emmaus* as a genuine Vermeer – caused the master expert to hold on to his position.

Nevertheless, Goodman's point is that the existence of the physical difference in itself is the logical anchor that opens the way out of the difficultly. Once we are introduced to the difference being there, we could train ourselves to see the difference. If the untrained eye of an observer is trained on which is the original work and which is the copy, they may see through the illusory sameness of the two works and rediscover the power of the original and then see the copy or the fake for what it really is. Just as an illusion may lead us astray for a while, but once recognized there is no way back and we see it for what it – an illusion, such may be the case also with the fake or the copy.

This can also shed new light on Walter Benjamin's quest for the *aura* that must accompany the original. The trained eye is taught to discern the original from the fake copy and in this it can observe the work afresh, as it were, for the first time. It reactivates the *aura*, which withers off in the copy, as it brings to life the original "*presence in time and space, its unique existence at the place where it happens to be*". This is much in the same fashion when we say of great literature, fiction or not, that it brings the epoch of its historical times to life. As we venture through the prose, we relive the times afresh together with the protagonists, as if we were present with them in the plot. It is in this that great art may be said to serve a cause for which no other discipline can substitute.

Nelson Goodman's point here about the trained eye can be brought to bear on more mundane scenarios outside of art. For example, consider the discussion in business and marketing culture about "blind tests". There are many known experiments of blind tests, where experts or people of

strong convictions about the differences between, e.g., the taste of distinct beverages fare poorly when they need to identify or compare the beverages served to them. Perhaps the most well-known of these scenarios is the one related to the "Cola Wars". The term refers to the long-time rivalry between the soft drink manufacturers Coca Cola and Pepsi. The two firms were engaged in dramatic mutually targeted marketing campaigns from the late 1970s to the 1980s. The rivalry was fierce and politically colored, as the two polar rivals seemed to be representing established White America, on one hand, symbolized by Coca-Cola, and Pepsi, on the other hand, positioned as the representative of the challenging, up-and-coming young generation. Heavily in play here was also the African American community's identification with Pepsi as the drink that challenges the hegemony of White America – the king of pop, singer Michael Jackson, was the poster boy of the Pepsi campaign. However fierce and political the divide was, it turned out that blind tasting tests had surprisingly dismal results with experts and diehard supporters of the two rival drinks, as both sides failed in them repeatedly. Here, Goodman's analysis could serve us well; when the experiment participants are told which drink is which, they are able – not, as it were, falsely – to notice and taste the differences. This is also true of beer wars and wine tasting. As long as there is a physical difference, Goodman tells us, we can learn to observe it, feel it, or taste it.

Goodman uses the necessary existence of *difference* to anchor his definition of *autographic* art:

> "a work of art is autographic if and only if the distinction between original and forgery of it is significant; or better, if and only if even the most exact duplication of it does not thereby count as genuine".[2]

Goodman distinguishes, however, the possibility of multiplicity embedded, for example, in etching and argues that it is autographic even though we can create multiple works from of the original mold. This must hold true, we will argue, also of the art of photography, if we recall Benjamin's worries about the duplicative nature of the photographic negative. Goodman draws the line, though, between what he calls notational art – music, for example, where the musical score constitutes the identity of the work – and non-notational arts, like the plastic arts, where there is no notation to secure the identity of the works.

Here, in the plastic arts, the important emphasis that Goodman makes is that "*the aesthetic properties of a picture include not only those found by looking at it but also those that determine how it is to be looked at*". This brings us back into the question of what it is that we see in the picture – the visual *gestalt* experience, if you wish – in analogy to what it is that we taste in the wine before us. Here, the artwork can offer a potential multiplicity of experiences that the observer can explore in an iterative, educational process. This, as we will suggest in the next chapter, will carry us from being captive by the picture of *a particular, presumably unique object* that we call the original to an analysis of the deeper, internal structure of what we may call an original. We will have to explore the property of being *"one of its kind"* that must, in the final analysis, capture the essence of the idea of the original.

2. Goodman, *Languages of Art*, p. 113.

Variations and Singularity

Picasso version of Michelangelo's *David*. DALL· E OpenAI

The drawings above were generated by DALL· E, an AI engine of OpenAI. The generating text was the following word combination: "Picasso version of Michelangelo's David". To this, DALL· E offered optional pictures of which we have chosen one, titled here "original" in the top center. We then asked DALL· E to offer variations to the original and received the rest of the pictures above. It is safe to say two things: first, that the variations are those of the original, as there is an overall *gestalt* that grounds the idea that they are all variations of the same original; and second, that the original is the better artistic version than its variations.

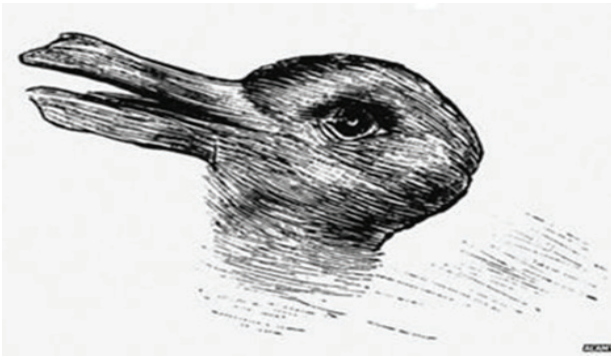
Setting a picture against its variations is the leading idea in the work of the Czech aesthetician Tomas Kulka. In his work, Kulka suggests setting the artwork against itself as a standard, challenging the idea that it is aesthetically superior to its variations or possible alterations. Kulka defines admissible "alteration" thus: "a change in a work only counts as an alteration if it does not shatter its basic perceptual gestalt". As he examines alterations that are better, worse, or neutral with respect to the original work, Kulka offers a reconstruction of key aesthetic concepts such as *unity*, *complexity*, and *intensity* and thereby a way to ground a better, educated evaluation of the work.[3] The DALL· E example we design is a mechanically executed illustration of this idea. There is something tempting in the attempt to evaluate the work of art against its variations. We may envision the artists themselves grappling during the creation process with competing paths on which to proceed. We could envision the preliminary sketches, the layers erased to make way for new versions, and we could act as experts do when they examine classical artworks – try to reverse-engineer the work of the artist, thereby gaining a deeper insight into the outcome. In fact, digital art provides for the first time in history a new prospect of this idea since we can effortlessly record

3. Kulka's reconstruction is extremely helpful in examining the subject of kitsch. Kitsch is a work that allows for no "meaningful" alterations; all its alterations are neutral with respect to the original, and therefore can replace the original work to no effect. It is, therefore, according to Kulka, categorically different from art – be it bad or good – since it does not carry any promise of improvement. See: Kulka, Tomas. 1996. *Kitsch and Art*, Pennsylvania State University.

the whole creative process from its inception.[4]

However, in insisting, as Kulka does, on a single "perceptual gestalt" as the constant with respect to which variations are admitted, we forget that an artwork may be approached through many different gestalts. To illustrate this, let us reflect on the familiar duck-rabbit gestalt switch or the following white versus black figures *Mosaic* by M. C. Escher, below.

Mosaic, by M. C. Escher



Duck-Rabbit

In these examples, we have two "perceptual gestalts" competing on our visual field, for we cannot see them both at the same time. We could introduce the distinction between *figure* and *background* and acknowledge that it is impossible to simultaneously access both the figure and the background. A gestalt switch happens when we move from one visual reading to the other, e.g., from duck to rabbit. In the switch, roles are also switched, for what we observe at a time is the *figure*, and to allow for this, the complementary pictorial element must retreat to the background. Thereof it assumes the role of *background*.

In the switch of roles, we find out that the complementary gestalts are equally essential to the constitution of the work's identity. This poses a difficulty to Kulka, as his scheme requires a singled-out gestalt. We suggest, however, that this difficulty opens the door to a new scheme for the question of art. This is our idea of art as a singular rule. In previous papers, we explored this idea in depth; here we will introduce the gist of the idea.[5]

Let us follow Kulka and transform artworks into rules. By fixing the "perceptual gestalt" constant – *the figure* – we design a rule that takes as arguments all possible variations of the work and we admit the variations that keep the *figure* intact. The unaltered work in itself is trivially such a variation. We could then *switch* the gestalt and fix a new rule. The new rule admits variations that do not alter the new gestalt that now plays the *figure*. *Mosaic* by Escher can illustrate this unique structure. We may fix either white figures or black figures as constant. We define in this

4 . This assessment of the significance of variations is also evident in the controversy surrounding the restoration and authentication of the lost Leonardo, Salvator Mundi. The restoration, led by Dianne Dwyer Modestini of New York University, won praises but also condemnations for being too creative – one critic doubting the attribution of the work to Leonardo claimed the work is half by the master's students and half by Modestini. Siding this critique, the significance of the analysis of alterations cannot be overstated. With the lost Leonardo, one such alteration emerged when Modestini discovered a drawing of Christ's thumb underneath the painted one. At least with Modestini, this was an indication for the authenticity of the work. The logic is clear when we bear in mind that the original precedes the copy. The copy follows faithfully the finished composition of the original, and therefore such a pictorial deliberation, in this case of the positioning of the thumb, would clearly seem unwarranted.

5. See Avital, D. 2007. "Art as a Singular Rule". In *JAE*, UI Press, V. 41 (1); Avital, D. & Dolanska, K. (2019). "From Tomas Kulka on Kitsch and Art to Art as a Singular Rule". In *ESPES*, Vol. 8 (2).

fashion two possible rules: white-figures as a rule admits variations of the original picture also with backgrounds different from that of the black-figures; we could then switch roles and introduce the black-figures rule, which admits backgrounds different from that of the white-figures. Since the two possible gestalts are essential to the constitution of the identity of the work, applying the two rules simultaneously would result in each of them admitting the other as the only admissible variation.

When, as observers, we switch between the two possible readings of Escher's *Mosaic*, we vacillate between seeing the picture as the manifestation of one or the other of the two rules. Seeing the picture as produced by one of the rules, the second rule unfolds as the former's unique extension. This is what is meant by singular rule: that it is both the rule and its unique extension.

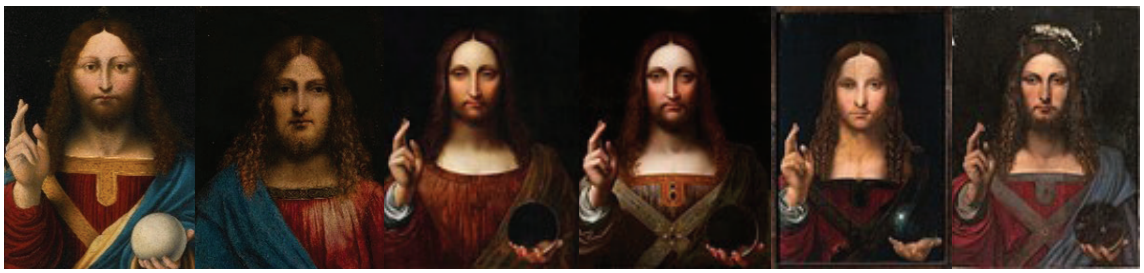
The Starry Night. Vincent van Gogh

The uniqueness we associate with the original can now be finally explicated. For this, we must note the distinction between a thing's being unique and its being a particular. A particular object in and of itself does not imply that it is unique. In fact, we need a grasp of singular rule in order to grasp the true meaning of uniqueness. The idea of the original as unique implies its being "one of its kind". A particular object, e.g., a chair, may fall under a general concept such as "dining table chair" and hence it is not one of its kind, since its kind is the extension of all dining table chairs. Not so, for example, for an original artwork such as Duchamp's famous chair, titled *Bicycle Wheel*. Duchamp's chair falls under nothing but its own rule or kind.

For true uniqueness, here is *The Starry Night* of van Gogh. If we try to isolate a gestalt of any of the elements that make up this picture, the swirling skies, the moon, stars, mountain range, the cypress tree aiming high, other trees on the ground, hills, village houses, the church with its spire stretching up – whatever we can focus on visually – we soon discover that none of them can be skipped. All the elements are implicated logically through the singular rule scheme. This is singular rule in its full glory: an aura of encounter with nature that comes to life before our very eyes.

Conclusion

By now we can answer the persistent initial question: no Original, no Aura, no Art? What we suggest, then, is to approach the question of the original through the idea of the singular rule, which, when properly recognized by the trained or the educated eye, brings to life the original aura, and provides justification for the role of art as a constant reminder of the true meaning of uniqueness.



Versions of *Salvator Mundi* executed by students and followers

The original as a singular rule is the standard with respect to which copies are possible. It is the singular-rule nature of the original that is the driving force for imitators, followers of good faith or bad-faith producers of fakes. We know, for example, of at least thirty copies of *Salvator Mundi* that were identified (see a few examples above). This large number of copies is an indication that there must have been an original by Leonardo. The original, therefore, is the spring of creative power. Art starts with imitation in the education phase and later aims at independent breakthroughs by creating new singular rules: new standards for imitation. The Lost Leonardo may have not been painted by Leonardo, but the power of the original *Salvator Mundi* by Leonardo clearly resonated throughout history. *The original in this sense is present as an ideal even in its absence*. I suspect making a similar point was the motivation behind Damien Hirst's latest artistic happening. Hirst offered the owners of his works to choose either the physical work or its NFT; those who have chosen the NFT had their physical equivalent piece burned by the artist. Not judging the depth of Hirst's artistic endeavor, he does explore through this exercise the frontiers of digital art and the role of the original in it.[6]

In conclusion, we must stress that only ignorance can account for our confusing the copy for the original. It can confuse, on occasion, even the experts, as the copy to the original is as the illusion is to the real. An illusion can mislead us into an enhanced, abstracted version of the real, as we are willing participants in its fabrication. The visual of *fata morgana* in the desert landscape must impress a more vivid effect of the presence of fresh water on the thirsty observer than that of the visual of a true life-saving oasis. Reflect on Dr. Bredius, the Dutch art historian, entirely taken in owe before van Meegeren's fake Vermeer: his excitement is not different from that of the thirsty wanderer of the desert experiencing *fata morgana*. Both are proven wrong by reality.

Let us conclude with a scene from *The Matrix* trilogy. Cypher is offered a deal in exchange for betraying his friends. Cypher indulges on the false steak and proclaims:

> "You know, I know this steak doesn't exist. I know when I put it in my mouth the Matrix is telling my brain that it is juicy and delicious. After nine years you know what I realize? Ignorance is bliss!"

Art chooses here to differ.

6. In fact, Hirst is imitating here, perhaps knowingly, an exercise undertaken by an early pioneer of the concept of NFT, who bought a diamond, NFT-ed it, then on record smashed the diamond to obliviousness with the required machinery, showing in conclusion that the NFT – the blockchain receipt of ownership over the now absent diamond – is worth more than the original 5K dollar diamond.

Education as Leverage for Social Mobility

Eli Cohen

Eli Cohen is the CEO of the Pitchon Lev non-profit organization.

The intergenerational socio-economic gap can be examined through education data. Only those who manage to get out of the loop will probably be able to change their lives. As the cliché goes - change starts from the bottom.

The Chairman of the Knesset's Economy Committee, MK Michael Biton, has a master's degree in non-profit management from the Hebrew University, a certification in mediation and a teaching certificate from the Mandel Leadership Institute. There is no doubt that Biton's education helped him reach senior and important positions later in his public work, both as mayor and later as minister and chairman of a Knesset committee. However, what were the chances of 17-year-old Michael Biton to reach those key leadership positions? Probably not high. As the son of parents who immigrant who lacked education and as a young man who dropped out of four high schools in Yeruham, I presume he could not have dreamed of reaching the status that he reached a few decades later.

Young Biton changed his and his children's future when he chose to complete the matriculation exams and proceed to academic studies. But his story is rare and unique. Most of those born to uneducated parents, not only will their standard of living be inferior to their friends' whose parents are educated, but most likely they, too, will be uneducated. This is where the cycle is created of which it is so difficult to break out, while at the same time, as mentioned, the sons and daughters of those who acquired education will follow their parents and will also acquire a higher education. The tracking on every level continues, and we witness the results across Israeli society.

A study titled "Returns to Education and Labor Market Experience in Israel" (Debowy, Epstein & Weiss 2021) examines the relationship between human capital and employment and wages in contemporary Israel, before the coronavirus crisis, based on employment and wage data. According to the findings presented in the study, the path of the majority of Israeli residents who are of working age to full employment goes through the higher education system. As a result, as the years of study and academic degrees accumulate, the range of possibilities of employment as well as wages increase.

The employment rate among the 17-67 age group, according to a recent survey conducted in 2017-2018, was 89% for those with a third degree, 87% for those with a master's degree, 83% for a bachelor's degree, 79% for the holders of other academic certificates, 78% for those with a non-academic certificate, 70% for high school graduates with a matriculation certificate, 67% for high school graduates without a matriculation certificate and only 37% for those who did not have high school education.

Another graph presented in Debowy, Epstein and Weiss's paper presented a similar trend in the context of the increase in the average gross hourly wage according to academic education: 150.45 shekels for those with a PhD, 102.72 shekels for holders of a master's degree, 77.99 shekels for those who have a bachelor's degree, 60.61 for those who acquired another academic certificate, 56.91 for those with a non-academic high school diploma, 42.91 shekels for high school graduates with a matriculation certificate – and this is a surprising figure because the average salary of high school graduates without a matriculation certificate was 44.76 shekels – and although according to the study this is within the range of the standard deviation, the finding may indicate that without further studies, the matriculation certificate itself has no significant value ; closing the table in terms of data is the average salary of 41.30 shekels for those who do not have a complete high school education.

Similar studies presented the same prevailing claim, as the reviewers examined the data of the Central Bureau of Statistics: in all of them, it was found that there is a positive correlation between education and income, which is expressed in the rate of employed people and the level of income. Thus, in the last three decades it can be said that there has been a positive trend or even a veritable revolution in the field of higher education in Israel – but has a deep social change been generated here or have the two lines remained parallel?

Educated families not only earn more than uneducated families but also support the next generation to acquire higher education – and this is where the foundation for the deepening the gaps lies. These gaps can be seen, for example, in the Gini inequality index, which increases every year in Israel. According to the National Insurance of Israel report for 2021, the Gini index rose in the past year by an estimated 3.3% and climbed to 0.3824. These data are not encouraging if you look at the last few years, since a consistent increase can be seen every year in that index, which indicates a continuous deepening of inequality in Israel.

It must be admitted that in Israel, it is possible to anticipate where the younger generation, already from childhood and youth, will come to in the future. It is likely that in well-off cities and towns in central Israel, for example, the desire and ambition of young people will be to enter the technological professions and possibly in the high-tech industry, while in the social and geographical periphery of the country, being less informed about existing possibilities together with a lack of motivation due to a reduced sense of capability – when the sense of deficiency rooted in one's family, as mentioned, may affect a student's grades – will result in less and less young people wishing to integrate into these fields. These cycles are self-sustaining.

Last year, the number of students who started their studies was about 350,000, of which 38,000 chose engineering studies. This track occupies a share of 18% of all students studying for a bachelor's degree

in Israel. It should also be noted that an additional 20,000 students from those who started the academic year enrolled in the subjects of computer science, mathematics, and statistics. These data indicate the continued increase in the number of students in high-tech fields.

Despite the global crisis in recent months in the high-tech sector, it is still the most sought-after industry and a significant growth engine in the Israeli economy, which has been on the rise in recent years. Already five years ago, when the field suffered from a shortage of professionals, various government and private programs were launched to increase the supply, especially among underrepresented populations. The bottom line is that while the average wage in Israel per employee is about 12,000 shekels, in the high-tech sector the average wage exceeds 30,000 shekels.

And despite these clear data, which show that an academic education in the technological fields results in a career in a field where one can earn almost three times the average salary, and despite the existing programs for encouraging technological studies in the social and geographic periphery, there is still no intergenerational change. A survey by the CBS from 2019 confirms the hypothesis that the parents' education determines the future of their children. Almost all the data in this survey support that claim, but one comparison in particular tells the whole story: less than 15% of academics aged 30 and over are children of uneducated parents, but if one of the parents in that group has academic education, the rate of academically educated children is more than 70%. The conclusion of the study, therefore, was that social mobility in Israel is very low.

And it is the low social mobility that ultimately creates the social gaps when this phenomenon is examined in the long term. The tracking into poverty begins where the intergenerational gap has not yet been bridged. With such data, we would expect the state to intervene profoundly. In many parts of life, we want and strive for equality. Here, it is the state that should encourage a policy of preference or affirmative action because, to begin with, the starting point of a young person from a well-heeled family from a wealthy locality is immeasurably better than for a member of a family without means from the periphery. Therefore, the investment in education cannot be equal. The resources should be invested mostly in those places that experience difficulties, and in addition to that, various subsidies should be offered to encourage the disadvantaged groups of society to enter education in general and higher education in particular. MK Michael Biton's case, as described above, is unusual in so many respects – and in order for his case to become more prevalent and a social norm, the state must invest in long-term programs, while supervising and monitoring them. Only in this way can we truly bridge the gaps instead of making them deeper.

Bibliography

Debowy, Michel, Gil Epstein and Avi Weiss (2021). "Returns to Education and Labor Market Experience in Israel". In *State of the Nation Report: Society, Economy and Policy 2021*. Jerusalem: Taub Center. https://www.taubcenter.org.il/en/research/returns-to-education-and-labor-market-experience-in-israel/, accessed 5.10.22.

Polemics in Classical Science

Marcelo Dascal

Marcelo Dascal was a professor of philosophy in the Department of Philosophy, and dean of the Faculty of Humanities at Tel Aviv University. His research spanned a wide range of topics, including the theories of Gottfried Wilhelm Leibniz, the pragmatics of language and the interrelationship between language and thought, the importance of polemics for understanding the development of human knowledge, philosophical anthropology, and the connection between man and technology. Prof. Dascal had written many dozens of books and papers, and his research work has earned him prizes and awards from academic institutions around the world, including the prestigious Humboldt Prize.

The paper "Polemics in Classical Science" was first published in the journal *Iyyun*.[1] In this paper, Dascal presents the importance of polemics to the development of classical science. With the help of a typology of polemics that distinguishes between controversy, dispute, and discussion as three ways of dealing with differences of opinion, Dascal analyzes the way in which key figures in the 17th century elaborated and developed their positions on key scientific issues that were high on the agenda at that time. Thus, for example, he analyzes the controversy between Descartes and Newton over the theory of light, the dispute between Newton and Leibniz over the invention of calculus, and the discussion between Descartes and Fermat over the geometric method. This typology was one of the centerpieces of Dascal's thought and was expanded in several papers that he wrote and some books that he edited.

1. Generally speaking, the history of sciences has neglected the study of scientific polemics. Moreover, attention has been directed to a small number of well-known polemics, either because they accompanied "scientific revolutions" (in Kuhn's sense of the term) or because they exposed the "human" (sometimes too human) aspect of great scientists. In other words, polemics were seen as unusual phenomena (which in the long periods of "normal science" between the "scientific revolutions" did not exist at all) or as marginal incidences in relation to the contents of scientific theories. (What importance other than personal or political may be attached to the bitter quarrel between Leibniz and Newton on the invention of the infinitesimal calculus?) The

1. The paper was first published in the philosophical quarterly *Iyyun*, Vol. 48 (April 1999), pp. 123-133. The Afeka editorial board wishes to thank Iyyun's editors for allowing the re-publication of this paper here.

recognition of both the number and the role of polemics in science is slowly starting to change. A few recent studies – sociological, historical, and even epistemological – deal with scientific polemics, and their importance is gradually being acknowledged. I believe that studies in the history and philosophy of the sciences that do not consider the role of polemics in the creation, development and evaluation of scientific theories are not only incomplete but also incapable of properly reproducing the content of these theories and explaining how scientific knowledge develops. This, I will try to show here, at least regarding classical science.

2. To understand the role of polemics in classical science, we should remember one of its central aspects. This is an aspect that classical science undoubtedly bequeathed to modern science but also applied in practice with a power that we tend to forget today. By this I mean the dialogic nature of classical science. Scholars in the 17th and 18th centuries, even those who were inclined to work alone, acted while maintaining a constant dialogue with their peers. Reflections of a purely private nature the results of which were preserved through dictation and aimed at future generations gave way to an exchange of opinions and ideas, either directly or through intermediaries, either in collaboration or within a polemic, either with "colleagues" or with a lay yet educated public that harbors a keen curiosity about the sciences. This constant dialogue contributed to the emergence and consolidation of a "forum" that allowed the dissemination of ideas as well as the existence of public debates. The correspondences (which were not always completely private), the scholarly journals, the academies, the competitions, the challenges (mathematical and other problems published in the journals), the public presentation of experiments, the speaking in salons, and more – all these became essential components of scientific activity. The speed with which the ideas spread through these means is impressive. The academies and scholarly societies sometimes held weekly meetings and quickly published the works presented to them, the journals also published without delay the accepted manuscripts, as well as the reactions and the counter reactions, often at in time frames that did not exceed a few months.

3. Thus, a universal audience was created (*auditoire universel*, in Haim Perlman's terminology) of scholars and scientists, which certainly deserves the designation *République des Lettres*. This name denotes, primarily, a community whose boundaries go beyond the national, linguistic, or disciplinary ones. It gave rise, of course, to linguistic difficulties: on the European continent English was not read, and in the British Isles they did not sufficiently master French, Italian, or German. However, translations were distributed rapidly, and Latin continued to be used by all scholars at least until the end of the 18th century. In addition, even if the many attempts to create a universal language did not materialize, they contributed to the development of a uniform notation, a scientific terminology, and a scientific writing style that became prevalent everywhere. However, the differences and animosities between the scholars not only persisted but were exacerbated. This process led to the creation of specific audiences – local, national, disciplinary, and methodological. However, beyond those differences (which are by no means negligible), the citizens of the Republic of Scholars share a belief in the power of rational methods – the observation and systematic description of facts, a commitment to perfect the means of experiments, the importance of mathematics both as a model and as a tool, well-founded argumentation, freedom of expression and criticism – all essential methods for formulating and

solving scientific questions. Thanks to this common background, an unprecedented thriving of dialogue and scientific cooperation is possible.

4. However, not everything in the Republic of Scholars is conducted by way of ideal cooperation. The general participation in the exchange of ideas also gives rise to prolonged confrontations between the scholars, which attract attention, whether because of their numerousness or because of their force. Therefore, the sciences do not fall short of the fervor of the religious, political, and philosophical disputes of that period.

5. According to the accepted historical classifications, modern science began with the Galilean struggle against the dominant Aristotelian science. This battle soon assumed an ethos of a great quarrel between those who side with the "ancient" wisdom and the exponents of "modernity", of an all-out confrontation between the new and the archaic, between the exclusive authority of reason and that of tradition. If the Renaissance humanists still relied on the ancient sources "like dwarves on the shoulders giants", the new interpreters of nature in classical science were much bolder. They regarded themselves as capable of decoding the great book of nature on their own, following Galileo's example. In doing so, they applied to science Martin Luther's position toward the reading and interpretation of the Old and New Testaments. They adopted the idea of the autonomy of reason, presented by the methods of Descartes and Bacon, and turned the skeptical arguments of Montaigne and Bayle to the tools of critical reason that believes in its ability to construct knowledge that would be new and completely liberated from the prejudices of the past.

6. However, the uniformity and objectivity that are supposed to be the virtues of reason do not prevent the debates that are multiplying at all levels and in all areas. Oftentimes, the scholars and their students organize themselves into opposing parties with leaders and activists: the proponents of Descartes against the adherents of Newton, those who support the vacuum against their opponents, the supporters of spontaneous generation against those who deny it, The preformationists against the advocates of epigenesis, those who do not object to the assumption of the existence of invisible agents (such as aether, phlogiston and plant force) against those who doubt their existence, and so on. Epistemological, metaphysical, theological, and even political motives are always present in these polemics: this is evidenced by the frequent use of the accusation of atheism directed at the theories of one's rival, and the extent of cautiousness practiced by all in order to evade such accusation.

7. Particularly surprising is the number of polemics dealing with details, even among those who belong to the same scientific "faction". There are controversies about the exact formulations of problems, questions, and experiments; on the validity, interpretation, and implications of experimental and mathematical results; on the methods and techniques used; on the admissibility of hypotheses considered "strange"; on the burden of proof and on presuppositions; and on the scientific authority of the opponent. It seems that everything is subject to dispute. Everyone positions oneself as authorized and capable of criticizing and judging everything and everyone. There is faith in the "court of reason", which will decide these debates and according to whose judgement the truth will prevail. This court is embodied, even if imperfectly, in the community of scholars and the educated public. For this reason, new theories, in order to establish their

position, must overcome their opponents and convince this public in their superiority. Moreover, everyone should ensure the public's recognition of the originality of one's discoveries, which explains the proliferation of accusations of plagiarism. This also explains the growth of competitions and challenges, which, instead of solving or ending disputes, only made them more intense and powerful. Scientific contests, especially in mathematics, become common ways of demonstrating the superiority of the methods and the theories of the problem-posers, who are certain of their exclusive ability to solve those problems – an assumption fiercely disputed by the other participants. The academies run many contests dealing with specific questions. However, rarely does the controversy end in a prize awarded by the expert committee, which the contestants attack often. It can be said, therefore, that classical science already demonstrates clearly and explicitly the spirit of all-out competition that is so characteristic of contemporary science – a science in which the polemic is not the exception but the rule.

8. The polemic is, primarily, a phenomenon of discourse that belongs to the category of dialogue (in the broadest sense). The polemic appears in linguistic exchanges, often written (reports, correspondence, critical responses, etc.) and sometimes orally (public debates, conferences, etc.), which are linguistically characterized by the presence of explicit indicators of oppositions ("I don't agree with you on...", "What you wrote contains a logical error that cannot be accepted whatsoever", and so on), or implicit oppositions (irony, mockery, etc.). Therefore, it is appropriate that the methods developed for the study of discourse in general and the study of dialogue in particular be applied in the research of polemics. In my humble opinion, such a point of view will make it possible to refer to the essential role played by the polemic in the history of science. On the one hand, the polemic constitutes the dialogical context that makes it possible to grasp the meaning and implications of scientific theories, since criticisms and objections compel the scientists to be more elaborate and precise in what was (likely necessarily) only implied and imprecise in their initial formulations. They even force the scientists to perfect their arguments in order to overcome the arguments raised against them. On the other hand, polemics link the theories to the social and intellectual background of the period: they reveal what can be considered an accepted assumption that needs no justification compared to what must be painstakingly justified. Also, the polemics reveal the dangerous consequences that must be avoided at all costs and the political and intellectual interests at work in the background of scientific practice. In the end, only within the practice of polemics, the nature and limits of rationality are laid bare as it is actually applied by scientists (and not as an idealization): it is the dialogical practice, especially of the kind that is expressed in polemics, that reveals what is considered in a certain period as proof, a valid criticism, a relevant argument, an acceptable formulation, and what is conventionally regarded as "knowledge".

9. A theory that is heedful of both the dialogical nature and the epistemological and historical role of the polemic needs to analyze it on several levels: from the "micro" level of the chronicles of the exchange to the "macro" level of their global structure. Each of these levels should use (among other things) syntactic, semantic, logical, pragmatic, and rhetorical tools. Since I am unable to present such an analysis here in all its richness and diversity, I will limit myself to presenting, very concisely, a general typology of polemics and the exchanges that characterize them. Subsequently I will demonstrate this typology with a few examples from classical science.

10. Not every polemic necessarily manifests the attributes of what constitutes a "controversy", in the sense that I propose for this term. There are polemics that are nothing but opposing viewpoints, attitudes, or mere tastes. Even if the participants in the polemics may use "arguments" that lend them the appearance of rationality, they are often merely conducting a "dialogue of the deaf", in which no real effort is made to dissuade the opponent from their position. Mostly there it is impossible to do so since the contradiction of approaches omits the common ground that might have allowed contact and discussion by the parties. I propose to use the term *dispute* to indicate this type of polemic. A dispute is not decided by rational persuasion but usually by appealing to an authority with the intervention of an external party (lottery, conciliator, police officer or court). Such an external factor can bring about the end of the dispute, but it cannot change the sense of inner conviction (at the beginning of the dispute as well as at its conclusion) of each of the disputing parties in their absolute right.

11. At the other end of the polemical spectrum, a type of polemic can be described in which the rival parties have shared assumptions, methods and goals that allow the opposition between them to be resolved. For example, two mathematicians can disagree with one another about the proof of a certain mathematical theorem. Yet if one of them succeeds in showing that the other was wrong in his proof, the problem is solved. For lack of a better term, I suggest calling this type of polemic a *discussion*. What characterizes this type of polemic is the possibility of deciding it by accepted means that are supposed to convince every rational being.

12. *Controversy* can be situated between these two extremes. Although controversy cannot be decided like undecidable like the discussion, it is not undecidable (rationally) either like the dispute. The reason is that controversy (as opposed to dispute and discussion) is never "local". The controversy may start from a specific problem but quickly be transposed to other levels and other questions. The controversialists soon discover that their positions differ essentially with respect to various aspects of the given problem: with regard to the interpretation of the problem, to the relevance of the data, to the meaning of the theses adopted by each of them, to the strength of the arguments they present, to the goals of the research, to the methods pursued, and to a large number of other specific problems concerning which they believed to be in agreement. Under these conditions, none of the arguments put forward by the controversialists can be decisive. Furthermore, each of them can at most tip the "the scales of reason" to one side or the other without leading to a logically necessary conclusion of the polemic. This is the reason that controversies, as opposed to disputes and discussions, tend to be long, open-ended, undecidable, and recurrent throughout history, even if they are not, despite all this, irrational or emotional, such as disputes.

13. These three ideal types characterize the polemics in terms of their global structure. At this level of generality, the parties in each of these types of polemics can be ascribed (*post factum*) separate purposes. In a dispute, the goal is to *win*, in a controversy to *convince*, and in a discussion to *determine the truth*. These strategic goals should of course be translated during the polemic into tactical moves. Among the various moves we can distinguish a few that are affiliated to each of the different types of polemics. The *proof*, which is preferred by the discussion, attempt to determine the truth or falsity of a specific statement, based on a logical argument, experimental

evidence, and the clear semantic sense of the terms. The *ruse*, which the dispute employs frequently, attempts to render the opponent (at least temporarily) incapable of replying and thus lead the audience to believe that the latter was defeated. Although it may seem like a logical deduction, the ruse does not necessarily respect the laws of logic: moreover, its success usually requires the concealment of its real aims. The *argument*, which is typical of a controversy, tries to convince the opponent rationally – although not necessarily through a logical proof – to accept a certain claim. Unlike the ruse, and unlike the proof, the argument's primary purpose is not the truth but the belief. Unlike the ruse, the argument is "transparent", since it tries to change the opponent's beliefs by reasoning based on assumptions that the latter accepts. Unlike proof, these reasonings do not have to be clear and universally accepted and indisputable, but rather aimed at a certain opponent and a certain audience at a certain stage of the polemic. In this sense, arguments are always to some extent *ad hominem*.

14. The polemics in classical science are replete with examples from all the categories presented above, but – as expected – without representing them "purely". As we will see below, every polemic contains a certain mixture of components belonging to the different categories, although the dominant category can be recognized in most cases.

15. It was to be expected, and quite rightly, that the polemics between mathematicians would approach the *discussion* in its purest form; that is, to debates in which totally objective criteria are applied by a "panel of judges" made of qualified and unbiased mathematicians who decide the debated question. The only type of argument allowed in this type of polemic should be the *proof*. Everything else belongs to the "rhetorical" level that is considered not only improper but also harmful. Nevertheless, in fact this is not the case at all. These polemics contain some characteristics of both *dispute* and *controversy*. This cannot be recognized without referring to the texts themselves. For example, let us consider Descartes's mathematical correspondence. Descartes writes to Pascal and Roberval that he is motivated only by his desire to discover the truth and that he harbors no hostility towards his rivals. However, at the same time he hurls this accusation at them: "If there is a certain hostility between Fermat and myself" – writes Descartes to Pascal and Roberval, Fermat's friends – "it is wholly on his side" (AT 2:11). "I admit that I was wrong in what I wrote about Descartes" – notes Roberval – "however, do you know concerning what? Well, that I believed he was seeking the truth. In contrast, I now realize that when the truth does not correspond with his thoughts, he becomes its enemy and fights it as if he was able to win and change it in order to adhere to his truth" (AT 4:502). To which Descartes replies: "If what I wrote to Roberval had been incorrect... he would not have been so cross" (AT 4:543). Indeed, he appeals to the objective, impartial public judgment of reason embodied in the community of scholars: "In every other matter that he [Fermat] opposes to, he uses a new false argument, or he distorts the meaning of my reasoning and thereby shows that he does not understand them. It obliges me [that my words] be seen as clearly as the light of day, provided that he deems it appropriate that the public and future generations judge between us in this matter", and all this, of course, "to strengthen the recognition of truth" (AT 2:12-13). However, at the same time Descartes is also skeptical regarding the existence of competent judges: "I know only two people in Paris to whom I can bring this matter for consideration... it is not because there are no others who are

qualified for this, but because I do not know them. And as for those who intervene and condemn my geometry without understanding it, I despise them" (AT 2:12-13). Fair criticism is seemingly welcomed: "I do not think there is any subject [field] in which I feel resentment towards those who want to put me to the test in a battle where you can often be defeated without disgrace" (AT 2:12). However, the critics are often blamed – including Descartes himself – for bad faith, misunderstanding (real or imagined), and motives foreign to the subject under discussion: "To show that Fermat was wrong, Descartes was ready to invent his own considerations, attempting to create the belief that those are Fermat's considerations, merely proving his own misunderstanding of the method discussed here, as we do not wish to suspect him of bad faith" (Roberval & Pascal; AT2:107). These great mathematicians undertake passionately to reveal contradictions ("And here is an open contradiction between his two letters", says Roberval, AT 4:503), but these accusations do not conclude the discussion since they are also given to disagreements: "Where he claims that there is an open contradiction, I claim that there is no contradiction", Descartes replies (AT 2:54). It becomes clear, then, that not all polemics between mathematicians have the nature of a *discussion*. Nevertheless, it is also not the case that whatever is expressed in these polemics is nothing but an obstinate defense of predetermined positions by means of trickery and slander. At the beginning of the modern era, new mathematical languages and methods are developed, which make it possible to cope with old-new problems. The "translation" problems that occasionally arise are not always a sign of bad faith or ignorance. They also reflect real gaps between different conceptual frameworks that constitute a fertile ground for the development of controversies.

16. The same intermingling of the different analytic categories that we proposed above is also evident in the polemics in physics. When Newton first published his new color theory in 1672, he presented it as based on a crucial experiment (*experimentum crucis*) that shows, according to him, in an irrefutable manner, that white light is not, contrary to Descartes's prevailing theory, simple and the other colors are derived from it, but that the opposite is true. Newton was convinced that the only way to disprove Descartes's theory was to expose some flaw in that crucial experiment. Since, according to his version, no counterclaim is valid, then if such deficiencies would not be found, the problem would be regarded as solved – that is, his theory would be proven correct. Therefore, any polemic around this issue is pointless for him. However, if there is still a case some kind of polemic, it cannot be conceived and resolved except in the form of a *discussion*. When Hooke, Huygens and others rejected Newton's theory although they accepted the results of his experiment, they explained the results by their own hypotheses. Yet, true to his own conception of the nature of the discussion, Newton simply demands of them to carefully repeat the experiment so that they will convince themselves, "since this matter should be decided not by words but by re-testing the experiment" (Cohen 1978, p. 153). What he does not see is that this polemic actually has the nature of a controversy: no experimental result by itself will be able to decide the polemic, since the opposition here is between different hypotheses that explain the experiment and are formulated within different theoretical frameworks. In order to convince the opponents, different arguments are needed here and not experimental results. Indeed, some thirty years later, when he publishes his *Opticks*, Newton recognizes this. This is, in fact, what Hooke demanded all along: But how certain soever I think myself of my hypothesis (which I did not take up without first

trying some hundreds of experiments) yet I should be very glad to meet with one *experimentum crucis* from Mr. Newton, that should divorce me from it.
(Cohen 1978, p. 111).

17. Towards the end of the 18th century, the polemic between Galvani and Volta – or, more precisely, between the Bologna school and the Pavia school – contained elements of both discussion and controversy. Unlike the previous polemic, this one is conducted in a strikingly friendly atmosphere. The topic of discussion is hypotheses that explain similar experimental results in different ways. While Galvani postulates the existence of a "living electric fluid" transmitted by the nerve fibers, supposedly explaining the muscular contraction in the frog's leg without the involvement of "natural" electricity, Volta saw the frog's leg as an electroscope that responds to what he called "metallic electricity", formed by the contact of two different metals. The difference between these hypotheses does not only prompt discussions but also leads to the improvements of the experiments and observation methods, with the hope of solving the problem. Galvani's death in 1798 and the invention of the electric battery by Volta in 1799 end this polemic without actually solving the problem.

18. A bold investigation of assumptions considered self-evident usually results in a controversy. Indeed, when Antoine Louis questioned the existence of hereditary diseases in a study that he submitted to a competition organized by the Dijon Academy in 1748, he started a controversy that had occupied medicine (mainly in France) for more than a century. The question posed by the competition organizers was: "How does the transmission of hereditary diseases happen?" This question guess presupposes, of course, the existence of such diseases. Louis raised the question of whether some other phenomenon that requires explanation hides behind this term, or whether the so-called "hereditary" factor is in fact an "intelligent being", that is, a product of the imagination that is referred to out of habit and without actual familiarity with the phenomenon (López-Beltrán 1995, p. 313). Loyal to their presupposition, the judges did not even consider Louis's study as relevant to the question at hand. However, with this skepticism, Louis instigated, as mentioned, a controversy that set medical theories against one another (the physiology of humors against mechanical theories postulating the "solid" nature of diseases), modes of explanation (the acceptance or rejection of hidden or indirect causes, the possibility or impossibility of hidden hereditary effects), as well as metaphysical and theological implications (preformationism, epigenesis). This controversy concluded with a dramatic change of the said presupposition and an acknowledgement of the need for precise criteria for defining the phenomena said to be hereditary. In fact, official approval for this new direction was given in 1788 by the French Royal Academy of Medicine, when it re-announced a competition on the same topic, whose first question was: "Do hereditary diseases really exist?"

19. Certain polemics that shook classical science seem to us today, in retrospect, nothing more than disputes arising mainly out of extra-scientific interests. The arguments about who preceded whom in scientific discoveries are of this type. These arguments are often driven by personal pride, and if it were not for this reason, they could be resolved easily, since it is seemingly a simple question of historical fact. However, sometimes even these polemics contribute,

in their own way, to the clarification of basic concepts in science, because they enable us to realize that the discovery claimed by the opponents is not exactly "the same discovery". A typical example of a polemic that appears to be motivated by "external" interests is the one sparked by the publication in 1768-1769 of *Recherches Philosophiques sur les Américains*, a book in which Corneille De Pauw defended the thesis of the inferiority of the natives in America (thus expanding Buffon's thesis on the climatic, geological and zoological inferiority of this continent). This polemic was clearly related to political motives: justifying the expulsion of the Jesuits from South America – after they had practically proven in Paraguay the natives' capacity for learning and self-government, and in general justifying slavery – a topic that was then high on the agenda in Europe. Of course, De Pauw and his rivals exchanged arguments and presented observations (such as evidence of the "giants" from Patagonia). However, the contribution of each of the participants seemed to have been predetermined by his approach to the discussion, an approach he maintained until its conclusion, in a way that did not allow for rational persuasion. This type of polemic, therefore, seems to belong entirely to the category of dispute.

20. Apart from the special case of Leibniz, the thinkers of the period in question did not deal explicitly with the analysis and understanding of polemic. The reason may be that the scientific model they held did not allot a proper status to this kind of activity (an activity to which they nevertheless dedicated a significant portion of their time). Their model had capacity for nothing but discussion. Leibniz expressed this idea in his "*characteristica universalis*" project. Leibniz envisioned that when opposing positions are translated into this formal sign system, the differences between them can be resolved immediately by "calculation". A lesser-known fact is that Leibniz himself developed another model of polemics that was also able to explain the phenomenon of controversy. Despite this, he demonstrated a clear preference – at least as far as scientific polemics are concerned – for the logical model of the discussion. This is evident in his announcement that he resolved the polemic between himself and Denis Papin regarding perpetual motion once he reduced it to "a few deductions" (a statement that has not been substantiated, it should be noted). When Kant, in the introduction to *The Critique of Pure Reason*, condemns the persistence of controversies in philosophy and their intractability in comparison to controversies in physics and mathematics, which according to him are easily resolved, he in fact sums up what was undoubtedly a fundamental belief in classical science. From this point of view, those who do not accept the judgement of the resolution methods applied by the community of scientists immediately and unconditionally, and who have the courage to persist in the polemic, cannot do so except out of motives that are foreign to the quest for truth. All they do is take part in the dispute, whose course eludes the norms of rationality, and is therefore of no interest to the scientific procedure.

21. According to the self-image of classical science, the polar opposition between discussions and disputes is necessary and it exhausts the range of possible polemics. Hence the dual strategy that was expressed in so many polemics during this period: A tries to deal with the differences of opinion as if this were a discussion, in which the method of resolution would obviously be favorable to him; if B rightly rejects this attempt, A accuses him of bad faith, that is, A accuses his opponent that he is engaged in nothing but a dispute. However, despite the undoubted influence

of the scientific model that the scientists in the classical period sought to realize in their scientific work, in retrospect we can see that the controversies actually constituted the most typical type of polemic in this period of constant creation and innovation in science – which may not be entirely accidental.

Tel Aviv University

Bibliography

Dascal, M. 1995. "Epistemología, controversias y pragmática". *Isegoría* 12.

Dascal, M. 1998. "Types of Polemics and Types of Polemical Moves". In S. Cmejrkova, *et al*. (eds.), *Dialogue Analysis VI*. Tübingen.

Descartes, R. 1891-1912 (= AT). *Oeuvres de Descartes*, ed. Adam et Tannery. 13 volumes. Paris.

Freudenthal, G. Forthcoming. "The Leibniz-Papin Controversy". In M. Dascal and G. Freudenthal (eds.), *Leibniz the Polemicist*. Amsterdam.

Gerbi, A. 1973. *The Dispute of the New World: The History of a Polemic, 1750-1900*, tr. J. Moyle. Pittsburgh.

Gil, F. (ed.). 1990. *Scientific and Philosophical Controversies*. Lisbon.

Granger, G. 1985. "Discussing or Convincing: An Approach towards a Pragmatical Study of the Languages of Science". In M. Dascal (ed.), *Dialogue: An Interdisciplinary Approach*. Amsterdam.

De Jesus, C.H. 1990. "Animal Electricity: The Initial Controversy and Further Biophysical Developments". In F. Gil (ed.).

López-Béltrán, C. 1995. "Les maladies héréditates – 18th Century Disputes in France". *Revue d'Histoire des Sciences* 48 (3).

Newton, I. (= Cohen). 1978. *Isaac Newton's Papers and Letters on Natural Philosophy*. 2nd ed. Cambridge, MA.

Corporate Rule and the Collapse of Democracies in the Digital Age

Ofer Even

Ofer Even, Adv., in the founder of Hue & Co. law firm. He holds a master's degree in law (LLM), a master's degree in business administration (MBA) and a master's degree (MA) in Philosophy, Science and Digital Culture (2013) from Tel Aviv University. Even is also the founder of BeLiveMe, and the author of the books *Digital Power to the People* and *Modern Slavery and the Gods of Consumption.*

The combination of the digital age and the rise of the corporations, which were born as separate legal entities only about 300 years ago, has put our world into a fast forward track on steroids. Democratic systems of government are no longer in control, their bureaucracy does not allow effective and fast interventions, governance is lost, prime ministers resign after 45 days, administration change frequently, the countries of the Western world are in incessant elections – the power of democracies and their ability to manage and plan long-term strategies have abated. Behind the scenes, a new force is rising and intensifying. Multinational super-corporations, in which a soul has emerged – a corporate personality that yearns only for power and money and is no longer under human control. These corporations are larger than most states and render them and their populations servants to those corporate personalities who crave more power and more money. This is a new, different, and fast world, where Moore's Law has turned into More's law before our eyes – more of everything – only for a few who are not necessarily human.

If we examine the macro processes taking place in our world in the last few decades, since the dawn of the digital era, we can discern a clear trend in the western world, according to which, on the one hand, the rule of money and corporations is getting stronger, and, on the other hand, democracies are increasingly losing control. The power of governments is waning, governance is fading, the turnover of leaders and parties is increasing, the division and polarization into camps is deepening, the number of parties, groups and factions rises day by day, citizens in democratic countries are becoming enslaved to credit and debt, while prices are rising, and inflation is increasing, and the vision of the prosperous global village is fading in the distance.

We are in a new technological era, where the corporations, and especially the multinational super corporations, are stronger than the rule of democracies, stronger than the governments, and stronger than the leaders of the Western world, in a way that allows them to control the democracies and manage them for their needs, while the leaders, governments and rulers are apparently nothing more than puppets on a string in the money and power game.

The disruption of the balance of power, the democracies' loss of control and the increase in the dominance of corporations, which were born as a separate legal entity only about 300 years ago, began with the dawn of the digital age, with the development of technology and the transformation of money into an infinite product. This process is accelerated as technology develops at an exponential rate.

This process, which takes place before our eyes, partly originates from a latent process that I will review in this article, in which a personality has emerged within the super corporations that is no longer under human control, and whose entire purpose is the accumulation of power and money. This accumulation is made possible for the benefit of the corporations at an ever-increasing rate, by enslaving the democracies and controlling them.

The Birth of Corporations

To understand the process, which, as mentioned, is hidden from view, and within which the super corporations in the digital age in the past few decades have given rise to a personality, I will briefly examine the formation of companies and corporations around the world.

The word *corporation* comes from the Latin word *corpus* – body, in this case body of people. Even in antiquity there existed various organizations that in Roman times were named universities and *collegiums*, which were bodies of people who acted together. Later, in the Middle Ages it was possible to see activities that were conducted within systems of partnerships of individuals, and which were based on the British *common law*.

In the 17th century, under colonialism, there was a need for extensive control and management systems for large and multinational businesses, and thus corporations, some of them multinational, began to be established by virtue of royal decrees and charters. For example, the British East India Company was established by royal decree of the Queen of England in 1600, a corporation that was granted an exclusive monopoly for trade east of the Cape of Good Hope. In 1602, the Dutch East India Company was established, appointed by the Dutch Parliament that granted it a 21-year monopoly to manage the Dutch colonies in and the trade with Asia.

Initially, to avoid a situation in which companies would be established without any control by the central government, the Bubble Act (6 Geo I, c18) was enacted in England in 1720,[1] which stated that a company cannot be established without a royal charter or decree. It seems that the law's main purpose was to prevent competition between corporations that were granted a monopoly on international trade by their governments, but also to preserve the control of this trade by the government and the crown.

1. https://engole.info/bubble-act-1720/.

The Bubble Act was repealed in 1825 under the pressure resulting from the industrial revolution, and the demand to create legal frameworks that would allow independent economic activity. Following this pressure, the Joint Stock Companies Act was enacted in England in 1844[2] – in effect the first company law enacted in history, which allowed not only the registration of companies as recognized legal corporations but stated that a corporation can become bankrupt like a private individual. This was still only the beginning – the creation of companies enabled orderly organizational and financial conduct, but the companies' shareholders remained directly responsible for the operation of the company they owned.

The most significant development was the enactment in England of the Limited Liability Act[3] – which allowed the shareholders of corporations to determine that in the event of the failure of the corporation's business, their liability for the corporation's operation would be limited to the registered value of the shares that they hold. This is how the term "limited liability" was born, known as LTD or LLC (Limited Liability Company).

This was where the crack that led to the breaching of the dam was created, and once the liability of shareholders for the company they own was limited, companies were established in increasing numbers. The advantage became not only organizational and procedural, but it allowed investors to increase the business exposure and the risks they were willing to take through the corporation as a platform that is legally separate from them as individuals, so that in the event that the corporation's business fails, the creditors will not turn to the shareholder to collect their debts.

The complete destruction of the dam was brought about following a decision passed unanimously by the House of Lords in England in 1897, as part of the ruling of Salomon v A Salomon & Co Ltd [1897] AC 22.[4] Salomon, who owned a leather processing business, decided to turn his business into a company. However, according to English law, forming a company required seven shareholders; Salomon enlisted his wife and five daughters as shareholders. 994 of the shares belonged to him, and another six shares were distributed among the rest of the family. Salomon was also the main debtor in the company, through bonds that he bought from the company that he founded. Thus, he created a new legal entity, where he, as a shareholder, had priority over other creditors.

When his business failed, and the loans from the other creditors were not repaid, the creditors filed a lawsuit against the company, fearing that it would not repay its debts. Salomon claimed in court that he has priority in receiving funds, as the main bond holder in the company. The creditors, however, argued that he moves money from one pocket to another, but the money is still in his and his family's hands, and therefore it is they, as external creditors, who should have priority over him and his family in repaying the debts from the company.

In that pre-corporate world, Salomon lost the case in all court instances, even though as the principal bond holder he was a secured creditor. In a petition to the highest court, the House of Lords, it was determined that the company is a separate legal entity from the shareholders, and therefore nothing prevents Salomon from receiving all his money before the other creditors – because Salomon and his company are not the same.

2. https://en-academic.com/dic.nsf/enwiki/2864185.
3. https://www.legislation.gov.uk/ukpga/1855/133/pdfs/ukpga_18550133_en.pdf.
4. https://www.trans-lex.org/310810/_/salomon-v-salomon-co-ltd-%5B1897%5D-ac-22/.

Thus, for the first time, a kind of personality was created for the corporation, which is separate from the personality of its owner. That personality, as a consequence of that ruling, can enter obligations, accept responsibility and sign contracts. Moreover, concerning legal disputes – it is a separate personality from the persons who founded it or who manage it, who bear no responsibility for the corporation under their control. In practice, this is not concrete reality, but a social convention created by people, an illusion that exists in the perception of all of us, of the owners of the companies, of the creditors and of the courts; an illusion and nothing more.

Thus, the ruling established the doctrine of corporate personality, known in Hebrew as "a separate legal personality".

The Corporate Personality

In 1897, then, the seed was sown for the formation of a separate entity – a "corporate personality". This personality is not metaphorical: the corporate personality in the technological age has acquired a physical body turned into a real, concrete thing.

The model of corporate personality, which is separate from the corporate "body", is analogous to the dualistic conceptions in relation to humans, which distinguish between body and soul. Despite the increasing power of the physicalist view, which sees the human being as a complex of chemistry, biology and physics, without a soul or mind that cannot be reduced ultimately to chemical or electrical processes, the dualistic approach assumes that humans have a soul that does not occupy space or time, and that therefore cannot be reduced chemically, biologically or physically.

By analogy, the exact same theory can be applied to the corporate world. In the evolutionary process of the development of corporations, which culminated in the last 30 years, as I will elaborate below, a critical mass has accumulated – of money, power, the flow of knowledge, information, and organizational capabilities – and it resulted in the emergence of a personality that controls the body, the matter, of the corporations.

The first and clear practical meaning of the appearance of the corporate personality is that there is no single person who can press the red button and turn off the lights on the company. What does this mean?

As the holder of the controlling interest, in a regular company, the owner who holds the majority of the shares can decide to shut down his company, by way of voluntary liquidation, if he so wishes. But if we examine the super corporations with turnovers of tens or hundreds of billions of dollars a year, and with tens or hundreds of thousands of employees and multinational operations, we will realize that they are held by shareholders scattered throughout the entire world, most of whom are unrelated, and among them a small group that holds the control interest, if at all. Therefore, in a super corporation, a decision to terminate the corporation is almost impossible.

The technological age, and the ability to generate virtual infinite money and power, which is made up of binary digits of ones and zeros, has allowed the corporate personality to emerge. If I am a sole owner of a small company, I can close it tomorrow if I wish; if I am one of sixty million shareholders in a corporation – the dispersion of the shareholders and the complexity of managing and operating the

company on a multinational level enable the emergence a personality that is already much greater than the sum of all its parts; it is the mind or spirit that operate the invisible hand.

For example, if you look at the day when Steve Jobs – the founder, inventor, and thinker, who built a company in his image and likeness – passed away, you will realize that instead of Apple, as a company, perhaps starting a process of dying and collapsing, the exact opposite happened: the company lived on, when the corporate personality was formed in it and kept it all together.

This is not a metaphor. The corporate personalities are totally real and as such have only two interests: accumulating power and accumulating money. And they use these to accumulate more power and more money.

Humans have become servants of those corporations – if the CEO of the corporation works to fulfill the will of the personality – the directors will reward him with a yacht, give him bonuses and add dividends to his salary; but if he does not promote the personality's will, he will be replaced – immediately, without any remorse.

The board of directors, which supposedly manages the corporation routinely, will also enjoy the comforts of life. Its members will fly around the world in private jets, receive high compensation and be included in the select elite circle of the corporate world. But if for one instance they think differently and do not serve the basic goals of the corporation – they too will be replaced, as if they never existed.

Apparently, you will say, it is the shareholders who control the corporation. However, the controlling interest in mega corporations is usually very small, no more than a few percent of the company's shares. It should be noted that a person can have control of a large corporation, among other things, because of a very large dispersion of shareholders in traded companies and also in case he directly owns a percentage significantly lower than the 51% required for control, through a control pyramid (that is, leveraging the money he has through the founding of a holding company that founds daughter-companies and offers at each cycle less than 50% of the shares to the public, until it has enough money to purchase the corporation's controlling stake).

Now, the shareholders, too, as long as they promote the wishes of the corporate personality, will receive dividends on their investment. On the other hand, if they do not do so, or act toward different goals – the corporate personality will be left with two options. The first: to cause a takeover by alternative shareholders, usually through a hostile takeover; the second: simply self-destruct, by dissolving the company and selling its parts to other corporations, so that the separate parts, in which the corporate personality is integrated, can merge into new entities and continue with their basic goal – accumulating more power and more money.

Of course, this is not suicide in the human-physical sense, but a corporation that fails to find alternative shareholders has the possibility, like a human being, to end its life out of a conscious, voluntary decision. To each its own reasons. The corporation can go to liquidation, to "Chapter 11" (of the American Bankruptcy Act that relates to a company's bankruptcy regulation, which gives it some protection from creditors) or follow other models and be sold in parts to other corporate personalities, that is, take root and start growing elsewhere.

Since corporate personalities have two interests – power and money – and are not interested in anything else, they work efficiently and quickly to achieve their goals. And since they are more flexible and faster, they have also become stronger than any government in the western world, because governments in the western world are by their nature afflicted by endless bureaucracy that prevents the rapid advancement of processes, and corporations have the ability to nimbly skip over bureaucracy because there is no need for it – it is only an obstacle.

The personalities, through an array of lobbyists and mainly through the physical buying of people – regulators, public figures, government officials and other authority figures – manage the public systems, and where they encounter obstacles, they move between countries quickly to circumvent the limitations.

Thus, the corporations take advantage of the lack of coordination between western governments, and of the bureaucracy and regulation, to create forces to divide and conquer, split into camps, separate into groups, and use this very separation to advance their goals.

A clear example of the success of corporations in the western world is shown when examining the total tax rate that they pay to the various governments under whose jurisdictions they operate. You can find many articles and papers about the fact that the super corporations pay almost no taxes on their profits.[5]

If no name was given to Adam Smith's invisible hand, now it has acquired a name and a face – the corporate personality.

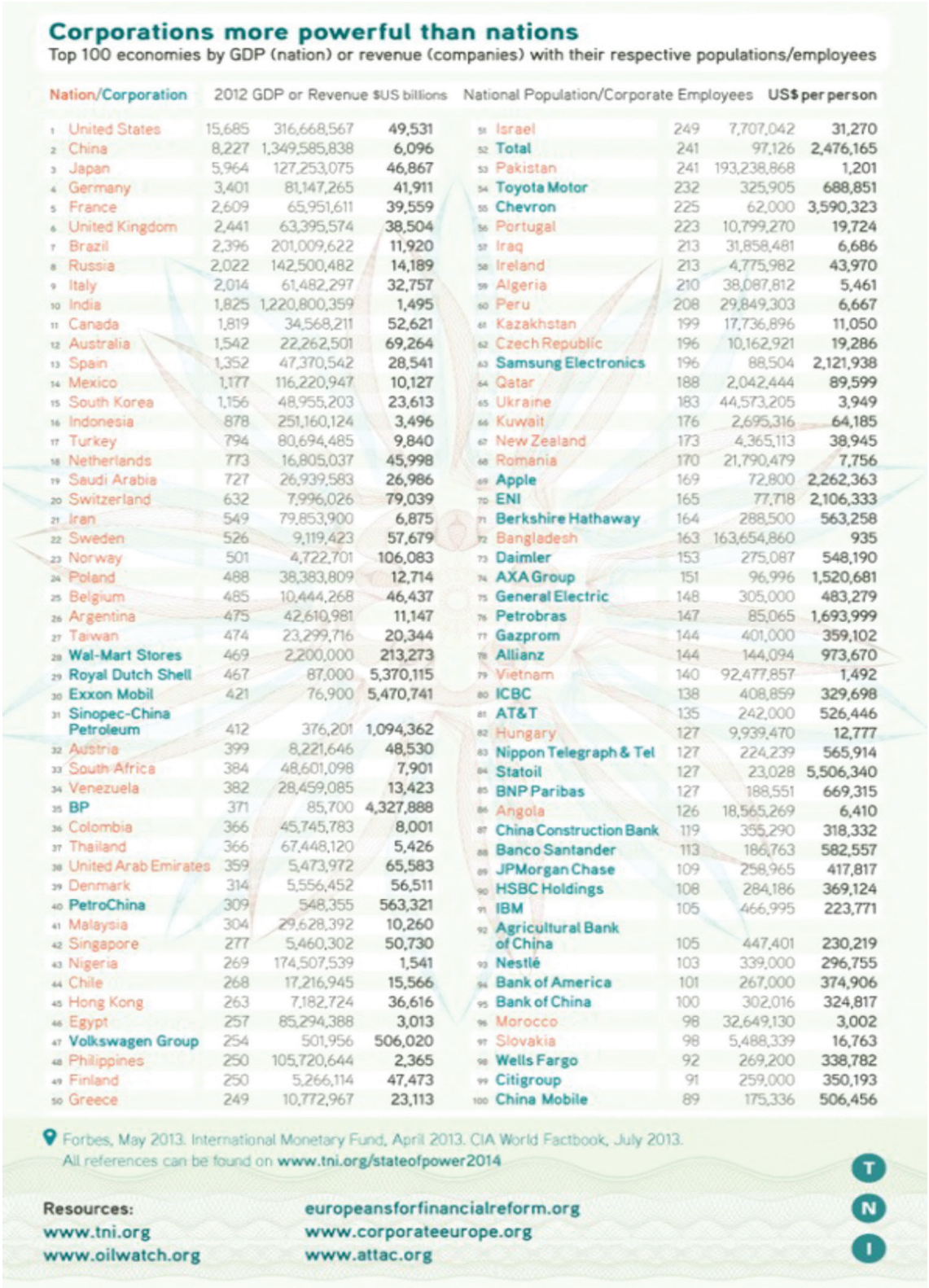
In the following table, which refers to 2017 (from *Forbes* and the CIA website), it can be seen that if the largest corporations in the world are ranked next to states, the list of the biggest one hundred in terms of activity features 70 companies whose turnover is between tens of billions of dollars to almost 500 billion dollars – amounts that exceed the gross national product of most countries in the world.[6]

5. See, for example, https://www.nytimes.com/2021/04/02/business/economy/zero-corporate-tax.html, https://americansfortaxfairness.org/tax-fairness-briefing-booklet/fact-sheet-corporate-tax-rates/.

6. Authors' calculation based on "Forbes Fortune Global 500 list 2017" and CIA World Factbook 2017. Fichtner/Babic/Heeskerk.

	Country/Corporation	Revenue (US$ bn)		Country/Corporation	Revenue (US$ bn)
1	United States	3363	51	General Electric (US)	140
2	China	2465	52	CSCEC (CN)	139
3	Japan	1696	53	AmerisourceBergen (US)	136
4	Germany	1507	54	Agricultural Bank of China (CN)	133
5	France	1288	55	Verizon (US)	132
6	United Kingdom	996	56	Chevron (US)	131
7	Italy	843	57	E.ON (DE)	130
8	Brazil	632	58	AXA (FR)	129
9	Canada	595	59	Indonesia	129
10	Walmart (US)	482	60	Finland	128
11	Spain	461	61	Allianz (DE)	123
12	Australia	421	62	Bank of China (CN)	122
13	State Grid (CN)	330	63	Honda Motor (JP)	121
14	Netherlands	323	64	Cargill (US)	120
15	South Korea	304	65	Japan Post Holdings (JP)	119
16	China Nat. Petroleum (CN)	299	66	Costco (US)	116
17	Sinopec Group (CN)	294	67	Argentina	116
18	Royal Dutch Shell (NL/GB)	272	68	BNP Paribas (FR)	112
19	Sweden	248	69	Fannie Mae (US)	111
20	Exxon Mobil (US)	246	70	Ping An Insurance (CN)	110
21	Volkswagen (DE)	237	71	Kroger (US)	109
22	Toyota Motor (JP)	237	72	Société Générale (FR)	108
23	Apple (US)	234	73	Amazon.com (US)	107
24	Belgium	232	74	China Mobile Comm. (CN)	106
25	BP (GB)	226	75	SAIC Motor (CN)	105
26	Mexico	224	76	Walgreens Boots Alliance (US)	104
27	Switzerland	216	77	HP (US)	103
28	Berkshire Hathaway (US)	211	78	Assicurazioni Generali (IT)	103
29	India	200	79	Cardinal Health (US)	103
30	Norway	200	80	BMW (DE)	102
31	McKesson (US)	192	81	Express Scripts Holding (US)	102
32	Russia	187	82	Nissan Motor (JP)	102
33	Austria	187	83	China Life Insurance (CN)	101
34	Turkey	184	84	J.P. Morgan Chase (US)	101
35	Samsung Electronics (KR)	177	85	Koch Industries (US)	100
36	Glencore (CH/JE)	170	86	Gazprom (RU)	99
37	ICBC (CN)	167	87	China Railway Eng. (CN)	99
38	Daimler (DE)	166	88	Petrobras (BR)	97
39	UnitedHealth Group (US)	157	89	Schwarz Group (DE)	97
40	Denmark	157	90	Trafigura Group (NL/SG)	97
41	EXOR Group (IT/NL)	154	91	Nippon Telegraph and Tel. (JP)	96
42	CVS Health (US)	153	92	Boeing (US)	96
43	General Motors (US)	152	93	Venezuela	96
44	Vitol (NL/CH)	152	94	China Railway Constr. (CN)	95
45	Ford Motor (US)	151	95	Microsoft (US)	94
46	China Constr. Bank (CN)	150	96	Bank of America Corp. (US)	93
47	Saudi Arabia	150	97	ENI (IT)	93
48	AT&T (US)	147	98	Greece	93
49	Total (FR)	143	99	Nestlé (CH)	92
50	Hon Hai Precision Ind. (TW)	141	100	Wells Fargo (US)	90

And in the following table, from 2013, it can be seen that four years earlier only 39 corporations were in the class of activity of countries.



Corporations more powerful than nations

Top 100 economies by GDP (nation) or revenue (companies) with their respective populations/employees

	Nation/Corporation	2012 GDP or Revenue $US billions	National Population/Corporate Employees	US$ per person
1	United States	15,685	316,668,567	49,531
2	China	8,227	1,349,585,838	6,096
3	Japan	5,964	127,253,075	46,867
4	Germany	3,401	81,147,265	41,911
5	France	2,609	65,951,611	39,559
6	United Kingdom	2,441	63,395,574	38,504
7	Brazil	2,396	201,009,622	11,920
8	Russia	2,022	142,500,482	14,189
9	Italy	2,014	61,482,297	32,757
10	India	1,825	1,220,800,359	1,495
11	Canada	1,819	34,568,211	52,621
12	Australia	1,542	22,262,501	69,264
13	Spain	1,352	47,370,542	28,541
14	Mexico	1,177	116,220,947	10,127
15	South Korea	1,156	48,955,203	23,613
16	Indonesia	878	251,160,124	3,496
17	Turkey	794	80,694,485	9,840
18	Netherlands	773	16,805,037	45,998
19	Saudi Arabia	727	26,939,583	26,986
20	Switzerland	632	7,996,026	79,039
21	Iran	549	79,853,900	6,875
22	Sweden	526	9,119,423	57,679
23	Norway	501	4,722,701	106,083
24	Poland	488	38,383,809	12,714
25	Belgium	485	10,444,268	46,437
26	Argentina	475	42,610,981	11,147
27	Taiwan	474	23,299,716	20,344
28	Wal-Mart Stores	469	2,200,000	213,273
29	Royal Dutch Shell	467	87,000	5,370,115
30	Exxon Mobil	421	76,900	5,470,741
31	Sinopec-China Petroleum	412	376,201	1,094,362
32	Austria	399	8,221,646	48,530
33	South Africa	384	48,601,098	7,901
34	Venezuela	382	28,459,085	13,423
35	BP	371	85,700	4,327,888
36	Colombia	366	45,745,783	8,001
37	Thailand	366	67,448,120	5,426
38	United Arab Emirates	359	5,473,972	65,583
39	Denmark	314	5,556,452	56,511
40	PetroChina	309	548,355	563,321
41	Malaysia	304	29,628,392	10,260
42	Singapore	277	5,460,302	50,730
43	Nigeria	269	174,507,539	1,541
44	Chile	268	17,216,945	15,566
45	Hong Kong	263	7,182,724	36,616
46	Egypt	257	85,294,388	3,013
47	Volkswagen Group	254	501,956	506,020
48	Philippines	250	105,720,644	2,365
49	Finland	250	5,266,114	47,473
50	Greece	249	10,772,967	23,113
51	Israel	249	7,707,042	31,270
52	Total	241	97,126	2,476,165
53	Pakistan	241	193,238,868	1,201
54	Toyota Motor	232	325,905	688,851
55	Chevron	225	62,000	3,590,323
56	Portugal	223	10,799,270	19,724
57	Iraq	213	31,858,481	6,686
58	Ireland	213	4,775,982	43,970
59	Algeria	210	38,087,812	5,461
60	Peru	208	29,849,303	6,667
61	Kazakhstan	199	17,736,896	11,050
62	Czech Republic	196	10,162,921	19,286
63	Samsung Electronics	196	88,504	2,121,938
64	Qatar	188	2,042,444	89,599
65	Ukraine	183	44,573,205	3,949
66	Kuwait	176	2,695,316	64,185
67	New Zealand	173	4,365,113	38,945
68	Romania	170	21,790,479	7,756
69	Apple	169	72,800	2,262,363
70	ENI	165	77,718	2,106,333
71	Berkshire Hathaway	164	288,500	563,258
72	Bangladesh	163	163,654,860	935
73	Daimler	153	275,087	548,190
74	AXA Group	151	96,996	1,520,681
75	General Electric	148	305,000	483,279
76	Petrobras	147	85,065	1,693,999
77	Gazprom	144	401,000	359,102
78	Allianz	144	144,094	973,670
79	Vietnam	140	92,477,857	1,492
80	ICBC	138	408,859	329,698
81	AT&T	135	242,000	526,446
82	Hungary	127	9,939,470	12,777
83	Nippon Telegraph & Tel	127	224,239	565,914
84	Statoil	127	23,028	5,506,340
85	BNP Paribas	127	188,551	669,315
86	Angola	126	18,565,269	6,410
87	China Construction Bank	119	355,290	318,332
88	Banco Santander	113	186,763	582,557
89	JPMorgan Chase	109	258,965	417,817
90	HSBC Holdings	108	284,186	369,124
91	IBM	105	466,995	223,771
92	Agricultural Bank of China	105	447,401	230,219
93	Nestlé	103	339,000	296,755
94	Bank of America	101	267,000	374,906
95	Bank of China	100	302,016	324,817
96	Morocco	98	32,649,130	3,002
97	Slovakia	98	5,488,339	16,763
98	Wells Fargo	92	269,200	338,782
99	Citigroup	91	259,000	350,193
100	China Mobile	89	175,336	506,456

Forbes, May 2013. International Monetary Fund, April 2013. CIA World Factbook, July 2013.
All references can be found on www.tni.org/stateofpower2014

Resources:
www.tni.org
www.oilwatch.org
europeansforfinancialreform.org
www.corporateeurope.org
www.attac.org

I do not have current data for 2022, but the trend is clear. I assume that an up-to-date table will paint a picture according to which the absolute majority of active entities in the world, according to the turnover index or the GDP, will no longer be states but corporations.

The Revolutions that Prompted the Emergence of the Corporate Personality

The increase in the power of corporations was accelerated as a result of the revolutions in modern times, such as the printing revolution, the industrial revolution in the 18th century, the electric revolution in the 19th century and the transportation revolution in the 19th and 20th centuries, which saw the beginning of mass use of transportation means, which shortened physical distances across the globe. All of these eventually amounted to globalization, as a result of which local corporations could become huge international ones, using the cheap resources of one country for the purpose of selling them at a higher price in another country.

The next revolution, which occurred at the same time as the start of the digital revolution, was the money revolution in 1971, during which US President Nixon severed the link between the amount of gold in bank vaults and the amount of money in circulation printed by the US.[7] This revolution made money infinite; in one point in time, a corporation can be valued at a trillion dollars, and the next day, that same corporation can double its value, without any more gold being created on Earth, or any physical resource that supports the doubled value.

Any corporation can generate infinite value – trillions of dollars that allow them to increase money and power without limit and regardless of the extent of resources on the planet. This is perhaps because, paradoxically, money and power derived from information are the only two resources in our world that are endless in the postmodern age.

The next revolution in line that accelerated and reinforced the emergence of the corporate personality, a revolution supported by the money revolution, is that of computerization, digitization and robotics happening before our eyes, at a faster and more aggressive pace than any revolution we have witnessed so far in history.

As part of this revolution, many new and diverse capabilities were born that enhance the speed of action, the thought processes, and the reaction of the corporate personality. This is a revolution that enables machine learning, instant connectivity, autonomous and automatic trading through algorithms, automation and real-time data analysis and processing. In recent years, we have witnessed tectonic shifts in artificial intelligence systems, blockchain-based monetary systems, nanotechnology, autonomous and automated trading systems, the Internet of Things in which devices "talk" with one another, genetic engineering, augmented reality, and the first attempts to transfer our world, including the world of commerce, into a parallel digital universe such as the Metaverse.

7. https://journals.sagepub.com/doi/pdf/10.1177/2378023119841812.

We are witnessing a universe where the phrase "No. 5 is alive" from the movie *Short Circuit* (1986) became a reality. An example of this is the statement of a certain engineer at Google, Blake Lemoine, to the effect that the LaMDA bot that he develops of is alive and has emotions.[8]

Unwittingly, we a humans become part of statistical data in huge corporate databases – information that serves as an endless resource enabling the continued empowerment, growth and strengthening of corporations.

Where Do We Go from Here?

In recent years, the distinction between democratic countries controlled by corporate interests in the western world, and centralized regimes such as Russia, China and many other countries becomes clearer. The huge difference is that in latter countries, the governments put a rein on corporations, which work to augment both the power and the money in their hands, in the form of the limitation that they must serve the goals set by the rulers, or the states. On the other hand, in the western world, these corporations no longer see governments as a constraining factor, and regulation does not deter them.

Here also lies the weakness of democracies, since an environment of frequent elections, lack of governance, regulation, bureaucracy, and the rule of money in the capitalist system allows corporations to continue to fragment and divide the governments, the states, the peoples, and the nations. The corporations with corporate personalities cope well with the increasingly weak government systems in the western world and do almost everything they wish in the countries where they operate.

Part of the strategy of the corporate personalities is the enslavement of people – whether manufactures or consumers. Enslavement is achieved by promoting the culture of consumption and increasing debt.[9] Increasing consumption and debt is achieved by disseminating repeated messages, required to increase growth. This process inflates the debt of the average person in the western world – a debt that serves the super corporations and ties the masses to a loop of control from which it is difficult to break away.

If the strengthening of corporations continues, without a change in trend, we may witness the death of democracies as we know them.

Possibly, the only solutions facing the western democratic world will be achieved through models of direct democracy or other methods of governance. It is possible that out of the division and fragmentation, the countries of the western world will come to understand that they must unite and act to restrain the corporations – as happens in countries that are undemocratic – to establish a corporate UN, which enforces ethical rules, uniform taxation and proper conduct of corporations and establishes a punishment mechanism through the confiscation of their patents and intellectual property. It is too early to tell what will turn out and which of these methods will work.

---

8. https://www.washingtonpost.com/technology/2022/06/11/google-ai-lamda-blake-lemoine/.
9. For further details regarding the struggle of the masses against the corporations, see my book *Digital Power to the People*: https://www.amazon.com/Digital-Power-People-Corporate-controlling-ebook/dp/B0725JZM4V.

One thing is clear: once the western world realizes that the democracy model of the last 100 years does not function for the welfare of the masses, that the rule of corporations and money has replaced democratic rule, and the expression "whoever votes, makes a difference" becomes a dead letter – changes will occur. The corporate personalities will try to do everything to prevent this.

What is a Scientific Theory? Karl Popper versus Pierre Duhem

Adi Iny

Adi Iny Yashar is an architect with expertise in urban planning and is currently a senior planner at Yashar Architects. She is an M.A. student in the history and philosophy of science and ideas at Tel Aviv University.

We live in a time that has been dubbed the dubious "post-truth era". This reality, which has formed with the proliferation of media, and the development of the Internet and social networks, does allow extensive access to information, but it also gives every person the opportunity to spread widely whatever crosses one's mind without the need to back up one's arguments, and thus the reliability of the information is called into question. We are cruising through in an inexhaustible abundance of questionable data, which brings with it a multitude of opinions and interpretations, without the ability to decide between them. The ordinary person is left without tools even to differentiate between, on the one hand, scientific action, and knowledge, based on research, control and conclusions drawn in a logical and consistent manner, and, on the other hand, those that are not scientific and are in the realm of beliefs, inclinations, interpretations, or propaganda. In other words, we are facing an absurd situation where any theory, no matter how far-fetched, can be supported. However, this situation is not new – questions about the nature of science and scientific action were discussed at length already in the previous century when the concept of "philosophy of science" also was created. This paper discusses two theories that developed in the 20th century and represent different positions regarding the question: what is a scientific theory and what is scientific knowledge?

The first to define the "demarcation problem" was Karl Raimund Popper, a Jewish Austrian-British philosopher, who is considered one of the most important and influential philosophers of recent times. The term he defined, in the 1930s, describes the challenge of finding criteria that distinguish between scientific theories and theories that claim to be scientific; in Popper's terms, criteria that determine what is science and what is pseudo-science. Although Popper coined this term, deliberations on the characterization of scientific action and knowledge began already in the fourth century BC, when Aristotle pointed out the existence of a difference between a casual,

everyday explanation and a scientific explanation that features a necessary relation.[1] Since then, the characterization of scientific action and knowledge is one of the central themes in the philosophy of science.

The period of Popper's life (1994-1902) coincides with the 20th century, with its wars and transformations, and in principle it can be said that historically, he was positioned at a vantage point that allowed him to observe and be deeply involved in the various developments. His ideas, in one form or another, served as a starting point for the main philosophies of science in the 20th century. The present paper presents Popper's position and in relation to it the position of philosopher Pierre Maurice Marie Duhem. A study of their thinking regarding scientific action and knowledge, and a discussion of their various characteristics, brings forth three essential issues: 1) The question of the relationship between hypothesis and observation; 2) The relationship between experience or observation and scientific necessity; 3) The way science progresses throughout history.

What is Science According to Popper?

In his book *Conjectures and Refutations*,[2] Karl Popper deals in detail with the problem of demarcation. He does this by discussing and comparing different forms of confirmation of theories that were common at that time: Marx's theory of history, Freud's psychoanalysis, Adler's individual psychology and Einstein's theory of relativity. What troubled him was not the trueness of the theories, but the question of whether they are scientific as they are presented, since their dissemination was very influential – such as the impact of Marx's theory on the interpretation of history.

Popper found that some of the theories he examined were verified through observations, and in fact these theories were "capable of explaining almost every occurrence in the fields to which they related".[3] In other words, every observation constituted a confirmation for them, whether because the theories were not formulated accurately, or because their followers adhered to them regardless of their performance in the tests. In contrast, other theories were formulated so that they could be put to the test, through a possible observation that would contradict them – what Popper calls "falsifiability", or at least they could be confirmed as a result of "risky predictions".[4] In the former case, Popper says, these are pseudo-scientific theories. They cannot be truly examined under the verification criterion and therefore lack scientific status; they are more like "intellectual religion or revelation".[5] In the latter case, however, the theories can be attributed a scientific status, since confirmation of the theories results from a prediction that puts them at the risk of being refuted. That is, Popper claims that refutability is the hallmark of science, in his words: "The criterion of refutability is a solution to this demarcation problem, since it means that in order for statements or a set of statements to be ranked as scientific, they must be able to conflict with possible observations or

1. Bechler, Zev. 1979. Philosophy of Science. Avraham Peleg (ed.), Tel Aviv: Ministry of Defense – Broadcast University Series, p. 21 (Hebrew).
2. The book, first published in 1963 by Routledge, is a collection of Popper's lectures and papers that summarize his ideas on the philosophy of science.
3. Popper, Karl. 1977. "Science – Conjectures and Refutations". In *A Sourcebook in the Philosophy of Science*. Gad Freudenthal (ed.), Yoram Navon (trans.), Tel Aviv: The Open University, p. 3 (Hebrew).
4. *Ibid*., p. 4.
5. *Ibid*., p. 3.

with those that can be conceived".[6]

Hence, according to Popper, scientific theories are nothing more than hypotheses that can be refuted. The scientist does not operate inductively, collecting the experimental or observational facts and formulates, through generalization, a universal law, but works deductively. She formulates theories freely and uses experiments or observations to refute and contradict them, that is, to examine whether they are false or not. A conjecture that passes the refutation test will be considered correct, at least until an experiment is found to refute it. In other words, science is a process of continuous creation and criticism, and the scientific process is the attempt to refute a theory's predictions and not an attempt to confirm them. The scientific process, according to this conception, is an endless process that will never attain certainty, and the scientific theory will always be under the threat of refutation.

It is worth noting that in the background of Popper's preoccupation with the problem of demarcation was the "problem of induction", posed by David Hume in the 18th century.[7] Hume maintained that, logically, observational facts, however numerous, cannot be used to verify even one generalization. In other words - even though the sun has been seen rising in the morning thousands of times, it does not mean that it will rise tomorrow morning as well. Even though science has developed in this way for thousands of years, the "problem of induction" determined that inductive reasoning is flawed when trying to establish laws and theories in science and it is dangerous to apply past experience to the future. That mean that when Popper claims that the scientist does not act inductively but deductively, he also refers to the problem of induction and responds to it. In his words, "I discussed in detail the problem of demarcation because I believe that its solution is the key to solving most of the fundamental problems in the philosophy of science. Among them... the problem of induction".[8]

What is Science According to Duhem?

The French physicist, mathematician and philosopher Pierre Duhem argued that logically, not only is experience unable to verify a universal law, but it is also unable to refute it. According to him, observations and forming concrete conclusions regarding a certain theory require the use of additional laws, measurement tools, interpretations and auxiliary assumptions. According to Duhem, "Separately from any theory, or as far as it is by itself, an observational claim is meaningless and therefore devoid of content. And vice versa, its content can be anything depending on the theoretical context into which it will be assimilated. Thus, it turns out that a theory that makes a prediction cannot be refuted by any observational claim: there is no possible contradiction between the theory's prediction and the observational claim, because the observational claim has no content by itself and when it is disconnected from interpretation".[9]

---

6. *Ibid*., p. 7.
7. Hume (1711-1776) was a Scottish philosopher and historian. Hume's most renowned and influential philosophical enquiry was that into the concept of causality. His research's skeptical conclusions undermined the desire to explain human knowledge as based on sensory data only. He is considered one of the forefathers of the empiricist school.
8. Popper, *Conjectures and Refutations*, p. 9.
9. Duhem, Pierre. 1962. *The Aim and Structure of Physical Theory.* New York, p. 215. In Bechler, Zev. 1999. *Three Copernican Revolutions.* Tel Aviv: Zemora Bitan, p. 190 (Hebrew).

That is, the experiment does not stand by itself, but relies both on the theory itself and on other theories. Those "experimental facts" that seek to confirm or refute theories depend on theories as well. In other words, just as an attempt to establish a theory in an inductive process falls into an infinite regression (observation relying on observation), an attempt to establish a theory according to the principle of refutation also falls into an infinite regression (theory relying on theory). Therefore, according to Duhem, all that can be inferred in a state of disagreement between experience or observation and theory is that something is not right, and nothing more. We cannot draw practical lessons thereof.[10]

A Comparison of Popper's Conception of Science to that of Duhem

The logical models of science reflected in Popper's and Duhem's positions are fundamentally different. Popper does agree that the inductive inference lacks a logical basis for scientific knowledge, but at the same time claims that the scientific procedure does not necessitate inductive inferences at all, but rather a refutation that constitutes deductive inference, which is logically valid. Duhem, in contrast, does not afford the argument of refutation logical validity, hence he also does not consider any inference thereof to be deductive. According to his view, the set of laws and language on which we rely should be seen as holistic structures, a kind of network in which the part is sustained by the whole. Therefore, a single experiment does not have the power to confirm or refute a hypothesis. Thus, Duhem sees both confirmation and refutation by means of experiment as logically meaningless to science. Metaphorically, the experiment functions for Popper as the gatekeeper of the "truth" – it is external to the theory being tested, and therefore Popper ascribes it the power of refutation. Duhem, in contrast, sees the experiment as inseparable from theory and therefore cannot attribute such power to it.

There are other fundamental differences between the two thinkers. Popper defines rational thinking as one that critiques itself and sees dogmatism as a direct threat to such a way of thinking. To overcome the danger of dogmatism, he posits the negative ideal – refutation, instead of the positive ideal – confirmation. He relates to the attempt to salvage a refuted conjecture by modifying a background hypothesis or rejecting the refutation attempt as a "conventionalist ploy", that is, relying on the circularity of the scientific theory, which cannot be contradicted by facts or even come to terms with contesting theories. Popper describes it thus: "Many times it happens that theories, though testable, have been found to be refuted, but their adherents continue to hold on to them – for example, by adding some ad hoc auxiliary assumption, or by ad hoc reinterpreting the theory in such a way that it evades refutation. This kind of move is always possible, but it saves the theory from being refuted only at the cost of destroying its scientific status or, at the very least, challenging it (I later described this kind of rescue operation as 'a conventionalist twist' or a 'conventionalist ploy')".[11] According to him, "The only way to avoid conventionalism is by deciding not to adopt the methods of the conventionalist. We decide that if our system of hypotheses is endangered, we will not save it by a conventionalist ploy".[12]

10. Duhem, *ibid.*, p. 187.
11. Popper, "Science – Conjectures and Refutations", p. 5, section 7.
12. Popper, Karl. 1959. *The Logic of Scientific Discovery.* New York, p. 18.

As mentioned above, on the opposite side stands Duhem, according to whose opinion scientific claims, even when they are perceived as certain and necessary, are not determined by experience. While Popper sees dogmatism as a scientific and cultural danger, Duhem sees it as a normative and rational scientific action, certainly not a risk. He claims that although making science involves building abstract systems and formulating theories that seek to define them verbally – which makes science dependent on the metaphysics of the time – scientific practice also finds symbolic connections and sets of systemic laws that do not depend on it but reflect physical reality. Therefore, Duhem finds no reason to immediately cast away any set of hypotheses just because the theory has been supposedly refuted.

Moreover, it is important to emphasize the nature of the relationship between observational data and scientific necessity. In Popper's approach, the more experiments there are that put the theory at risk of refutation, the more scientific it will be considered. It is possible that the theory be refuted in the future, but until then our confidence in it is growing, so that our confidence in a theory's scientific necessity and in scientific knowledge is ultimately based on observational data. On the other hand, Duhem maintains that a theory's scientific status cannot be determined by observation, and scientific necessity does not depend on it at all. In fact, a scientific theory is neither true nor false, and the scientific research itself is a sort of bridge between the observational data and the scientist's view:

"The result of the operations in which an experimental physicist is engaged is by no means the perception of a group of concrete facts; it is the formulation of a judgment interrelating certain abstract and symbolic ideas which theories alone correlate with the facts really observed".[13]

Hence, the question of the relationship between hypothesis and observation receives different answers from Popper and Duhem. It can be seen that Popper is loyal to the scientific tradition that gives priority to observational data. He does claim that "the belief that we can proceed from observations [...] without having something similar in nature to a theory is [...] absurd",[14] but in the case of a contradictions between the observation and the hypothesis, the observation for him is the "fact" that has the power to overturn the hypothesis, and not the other way around. He ignores the element of interpretation in examining the observation and sees the concept of "fact" and the concept of "theory" as separate. Conversely, Duhem does not consider observation a "fact" and he gives no preference for the observational data over hypothesis – after all, the data themselves depend on it and he does not see any separation between them. According to him, in case there is a conflict between the two, it must be settled – sometimes by rejecting the theory and at other times by rejecting the observational data. That is, while Popper posits the refutation principle as the demarcation line for scientific theories – observation as a "bouncer" – Duhem sees science as a collection of conventions. It can be said that Duhem's approach is holistic, according to which in a state of conflict the language should be modified so that the observational data and the hypothesis will be reconciled.

It is now appropriate to ask how science progresses throughout history according to Popper and Duhem. Popper's approach maintains that there is a common "standard" for science, and it progresses by contradicting false theories and replacing them with new theories that survived the test

13. Duhem, *The Aim and Structure of Physical Theory*, p. 147.
14. Popper, "Science – Conjectures and Refutations", p. 14.

of refutation. That is, science progresses linearly and incrementally, step by step by eliminating errors. Thomas Samuel Kuhn,[15] who was Duhem's successor in many ways and therefore relevant to our discussion, thought differently and even criticized Popper.

According to Kuhn, a scientific theory requires scientists who can constantly perfect it and extract everything from it that can be extracted, before deciding to reject it, and until that point it should be considered as a dogma. He maintained that science advances through revolutions, and these occur when scientists decide that a theory is no longer satisfactory (this can happen when facts has been contradicting the theory for too long, or when it has exhausted its possibilities of refinement or for other reasons) and replace it. Contrary to Popper, who believes in incremental linear development, Kuhn, like Duhem, sees no "common standard" between an existing theory and the one that replaces it. A theory is tested within the standards of its paradigm and language, that is, it is tested as part of a "package of assumptions and concepts", which define the position of a certain scientific community in relation to research. This is the reason different theories cannot communicate with one another.

In this view, the transition between theories is actually socio-political and depends on time, place, and institution. A theory must be explained from a subjective perspective, too, since all conclusions are ultimately based on the subjective conditioning of the researchers, their worldview, and the cultural perspective of everyone concerned. That is, a scientific theory does not lead to the discovery of the one objective truth, because such truth is simply not to be found.

Despite the many differences between them, the goal of both Popper and Duhem was to present science as a rational activity. Hence, their philosophical interest is the same, but their different conceptions lead them to do it in different ways. Popper presents science as rational, because he uses experiment as a deductive rather than an inductive process. Theories, according to him, are replaced by "factual necessity", and the role of the scientist and the experiment is to criticize and refute. Duhem and Kuhn – although many will dispute this – present science as rational since it develops from the scientist's well-considered view, and is determined by neither experience nor observation, which do not provide certainty. Theories, according to their approach, are replaced "in the presence of facts". In other words, the argument is that since any conceptual system of a theory is from a purely logically perspective circular, the question of whether to hold on to a theory is utilitarian rather than logical. Moreover, since there is no objective truth, sometimes the wise thing to do is to attack or replace the theory. That is, rationality arises from deliberation and not from any necessity.

Summary

This paper presented the positions of Karl Popper and Pierre Duhem in relation to the question of science and compared between the two. We saw that the two thinkers represent two different models that developed in the 20th century with relation to the question of what a scientific theory is, yet both distanced themselves from the naive view that science has the power to reveal the truth to us. According to Popper's model, science does not reveal the truth, but rather explains away reality negatively, that

15. Kuhn (1922-1996) was a Jewish-American historian and philosopher of science. In 1962 he published his controversial book The Structure of Scientific Revolutions, which had enormous influence. The book presented arguments on the advancement of scientific knowledge and discussed the objectivity of scientific truth.

is, what is not true or what has not yet been proven false. This model won him many followers in our time, mainly because it was popular among scientists. The picture it painted presented a consistent "logic" of scientific activity and flattered scientists who were presented as discerning and creative. On top of that, Popper's model required a multiplicity and productivity of theories since every theory that was refuted had to be replaced by another. In fact, he was a philosopher of science writing for scientists and even earned the nickname "the scientists' philosopher", although he was less popular among other philosophers.

The collapse of Popper's theory stemmed from two reasons. The first is logical – Duhem's argument against the possibility of refutation, as presented above, undermines Popper's theory; the second is historical – the history of science and scientific practice simply did not support his theory.

Kuhn claimed that Popper's philosophy presents a requirement from science that a mortal cannot fulfill, so that it is impossible for scientists to fulfill these kinds of guidelines. For, if science had met all of Popper's requirements, it would not have existed for a single day. According to Popper, when a theory is refuted, it is immediately replaced by another, and if so, it would be necessary to replace all the theories that exist today, and it would be impossible to accept a single theory in their place. In other words, these are not conditions in which scientific creation can be sustained and promoted in reality. Indeed, all the theories created in science, starting with Aristotle, through Copernicus to Galileo and Newton, did not explain all the facts they intended to explain and were even immediately contradicted by many facts.

Looking back at history, it becomes clear that in reality, scientists do not try to refute their theories but to confirm them. A scientific theory is usually created when it seeks to explain something specific, and only some of the facts are known to it and correspond with it. A scientific theory requires time to prove its capability to organize and arrange the phenomena it seeks to explain, and this is a necessary condition for any serious success in science, in the human reality within which it is constructed. Therefore, there is no reason to condemn actual science for not being utopian, but the standard by which the rationality of the scientific act is judged must be changed.

Bibliography

Bechler, Zev. 1979. *Philosophy of Science*. Avraham Peleg (ed.), Tel Aviv: Ministry of Defense – Broadcast University Series, p. 21 (Hebrew).

Duhem, Pierre. 1962. "The Aim and Structure of Physical Theory". New York, p. 215. In Bechler, Zev. 1999. *Three Copernican Revolutions*. Tel Aviv: Zemora Bitan, p. 190 (Hebrew).

Duhem, Pierre. 1962. *The Aim and Structure of Physical Theory*. New York.

Kuhn, Thomas, S. *The Structure of Scientific Revolutions*. Yehuda Meltzer (ed. & trans.). Tel Aviv: Books in the Attic/Yedioth Ahronot (Hebrew).

Popper, Karl. 1959. *The Logic of Scientific Discovery*. New York.

Popper, Karl. 1977. "Science – Conjectures and Refutations". In *A Sourcebook in the Philosophy of Science*. Gad Freudenthal (ed.), Yoram Navon (trans.), Tel Aviv: The Open University, p. 3 (Hebrew).

Popper, Karl. 2015. *The Open Society and its Enemies*. Yosef Agassi (ed.), Aharon Tamir (ed.). Jerusalem: Shalem Center (Hebrew).

The Predicament of Nationality in the Digital Age

Yoav Lapid

Yoav Lapid is a senior manager in the Israeli high-tech industry, an MA graduate from the Philosophy, Science and Digital Culture Program at the Cohn Institute at Tel Aviv University, and an MBA graduate in business administration at INSEAD (France and Singapore).

Abstract

Since the signing of the "Peace of Westphalia", which led to the founding of several sovereign states in Europe at the end of the 17th century, and even more so after the Second World War, the nation state has become the main form of organization of human beings, a central component of their personal identity and the ultimate focus of power to which they submit. However, the digital revolution and the new technologies to which it gave birth created enormous transformations in human society, its economy, and its power structures, which undermine the foundations of the state. These processes reflect the belief of Karl Marx, Walter Benjamin, and others, according to which technological development underlies any social or political revolution and the structure of culture, politics and society reflects the dominant technology in each era. Therefore, the nation state and the concepts associated with it are a product of the industrial revolution, while the digital revolution threatens to undermine it – or at least transform its nature – in the 21st century.

Since the signing of the "Peace of Westphalia", which led to the establishment of several sovereign states in Europe at the end of the 17th century, the nation state has gradually become the main form of organization of human beings, a central – and perhaps the most central – component of their personal identity, and the ultimate focus of power to which they are subject. This process culminated after the Second World War, when (almost) all of humanity divided according to political subordination to nation states.

However, at the end of the 20th century and the beginning of the 21st century, two powerful global phenomena have been redefining human society and its forms of organization. First, the acceleration

of the phenomenon of globalization – the increase in mutual relations and interdependence between countries and peoples – blurs both economic and mental boundaries. Second, and closely related to the first process, the digital revolution and the new technologies to which it has given rise created enormous transformations in human society, its economy and its power structures. These processes reflect the belief of Karl Marx and others, according to which technological progress underlies any social or political revolution, and the structure of culture, politics and society is a reflection of the dominant technology. Therefore, the nation state and the concepts associated with it are a product of the industrial revolution, while the digital revolution undermines it and threatens to disintegrate – or at least weaken – its status in the 21st century.

The Nation State

"This people have nothing in common... Is this what a country is founded on? You establish a state because you know your neighbors and you're having a good tie together, then you establish a province, a district, and eventually – you establish a state" (Shauli, *Eretz Nehederet*)

In the 20th century, Jürgen Habermas claims, "countless individuals merged into a colossal figure of a macro-subject acting collectively" within the framework of the nation state (1998:15). In fact, the state has become so fundamental to the collective identity of each individual that we rarely think about it. Every person is born in the territory of a nation state, and almost always belongs to one; the economic and legal powers exerted on the individual originate in the state, and its symbols represent the individual. Even if sometimes a debate erupts – or even a war – about the nature of the state, it seems that no one questions its very existence anymore, and alternatives are hardly discussed. However, even the most prominent proponent of political power, Thomas Hobbes, did not regard the state as a natural or the ultimate entity, but as a historical development and even one that is contrary to the "state of nature" (5888: 214). Although human beings have been organizing in power-based collective frameworks since the dawn of history, the nation state is only one, fairly new, possibility for doing so. Contrary to Aristotle 's view, who described history as a linear progression of political organization (which the quote from *Eretz Nehederet* captures well), the social order, in fact, was never a fixed construct. The paradigm of the state – without which it is already difficult to think about the political reality – had many ancient ancestors: the tribe and the empire, the kingdom and the church, all existed at the top of an equally dominant political order, and for a longer time. It is not a coincidence, then, that Hobbes published his book *Leviathan* only three years after the Peace of Westphalia, when the state was still an idea that required justification and explanation.

A rather modest definition of the state was given by Max Weber: "a human community that acquires a monopoly on the use of force in a certain territory", whose boundaries are determined by the area of tax collection (Gerth and Mills, 77). About a hundred years after him, Zygmunt Bauman proposed a more expansive definition, of "an arm that asserts its legal right and purports to rule when it possesses the appropriate means to establish binding laws and norms" (Bauman 2002:96). According to Bauman, the state rests on the "triple monopoly" of the security, economic and cultural order – that is, protecting the borders, balancing the public purse, and shaping the nation's identity. The many years separating the two thinkers over the years highlight the differences between them: on the one hand, Bauman's

definition is more expansive, not limited to physical and monetary power, but also includes laws and goes a step further when it deals with the imposition of norms and identity; on the other hand, while Bauman speaks of "assertion" and "purport", for Weber and Hobbes the power and the right are the same – the state deserves power because it acquired it.

It is possible to construe the nature of the change in the role and definition of the state through Habermas's scheme of the development of the nation state and the accumulation of its power (1998:45):

- A state of administration and tax collection – political rule over a territory prioritizing the capacity to collect tax, which covers Weber's definition well. This is a pre-state government associated with the management of the primary human need – agriculture.
- A territorial state with sovereignty, which includes the demarcation of the community's area, protection of borders, and a primary conception of the people as a subject. This is already a primary state government characterized by the protection of production needs (a secondary human need).
- A national state that includes cultural integration, collective identity, and the symbolism of a "nation". This cohesive identity is required to maintain global relationships, which characterize the state of trade and services (the tertiary need, i.e., trade, serves production).
- A social-democratic state of law that advocates the sovereignty of the people and the legitimacy of the government and guarantees equal rights and the self-guidance of society. This is the state that characterizes the current era in the West; more and more, it is required to serve a new, quaternary need of a knowledge-based economy, which is the basis of commerce and services (even if, as we will see below, it is not at all certain that it is suitable for the task).

For Karl Popper, the nation state – and more precisely the politics of the democratic state – is also "the key to controlling the demons", and its purpose is to restrain the other social forces and control them in order to fulfill the nation's values: "Political power is... the only means by which we can defend ourselves against the abuse of power" (2010:330). Not everyone shares Popper's optimistic approach, nor his perception of the state's power. Michel Foucault, for example, did not at all see the state as the key political force wielded on us, but saw modern history, long before the digital revolution, as a retreat from it (Arbel 2006). Marx, on the other hand, argued that the state can only "ameliorate the birth pangs" of political change rather than lead to a significant transformation; for him, it is at most the Messiah's Donkey, destined for the slaughter once a more just political framework comes into force (Popper 2010). In his view, the liberal nation state is actually an instrument for promoting bourgeois interests and oppressing the proletariat.

The Marxist reduction, however, does not end with the class analysis, but states that the primary force that generates the power relations in society and determines the interests of its players is technological development. Thus, it was the development of shipping that drove colonialism, while the industrial revolution, and especially steam engines and mass production, created modern capitalism together with the classes of the industrial world – even the proletariat itself is nothing but "the outcome of a series of transformations in the mode of production and exchange" (Marx 1999: 41). Although Marx wrote about the state during its rise to prominence, he also predicted its fall. According to him, the technological

revolution that guarantees the status of the bourgeoisie and the state must continue relentlessly to maintain the social structure, but when completely new technologies emerge it will lose its power, and the state is also expected to disappear (Popper 2010). Thus Marx, who believed in universal class identity, was one of the first globalists. However, he refrained from predicting what the alternative political apparatus would be after the revolution, perhaps because he did not know what technology would serve it.

The Digital Revolution and Its Effect on the Concept of State: Digital Versus Industrial Technology

"The new global distribution of sovereignty, power and freedom of action that is generated by the tremendous leap in the technology of speed, the occurrence of synthesis and dissolution, integration and deconstruction, all at the same time – are not accidental at all, and even less so are they reversible" (Bauman 2002:107).

To understand how the technological changes of the last few decades affect society and the state, the characteristics of the technology itself must be examined. Marshall McLuhan provided a good description of them at the early stages of the revolution: according to him, the linear model of production was replaced by a flat and non- geographic model of feedback, in which power flows in new ways, and in order to control these "new social structures are needed" (2002:428). These are based on the idea that it is now possible to transfer information and act on a large scale, without an ultimate source of authority and with far fewer communication and organizational challenges (Ewen 2015). Moreover, the digital age deals with new, different types of stocks, and with the process of transitioning from storage and transportation of goods to "a continuous process of transmutation", independent of distance (McLuhan 2002:426). In fact, the only storage that counts in a digital world is the server farm that stores information, and it is characterized by the absence of a resource limit: its production and transport are separate from its use, and therefore its consumption is limitless (Evan 2015).

Therefore, if following the industrial revolution, the state's power was largely derived from its unique raw materials and its ability to produce stocks, protect them, and monitor the flow of resources, these fundamental roles have become largely superfluous; and if the border is the ultimate determiner of the state, its significance is waning when the main thing passing across it is information. All those transformations – the disconnect from geography, physical raw materials and hierarchical structures – leave the nation state in a condition of embarrassment and helplessness. As Habermas pointed out, the politics of democracy always lags behind the politics of capital – while the speed of the Internet may make the gap unbridgeable: "It seems that the shift of the center of gravity from the territory's ruler to the champion of speed removes the national government from power" (1998:50).

The End of Geography

One of the characteristics of modernity was the contraction of time and space through new means of communication and transportation, which, on the one hand, made it possible to unify the nation, and, on the other hand, opened a window to other cultures. Now, in an age of information that is characterized not only by speed but by "instantaneous expansion" that is unlimited (McLuhan 2002:427), geography

– as mentioned, the great determiner of the states – has been losing its significance. Apart from the physical movement, Bauman observes that "the centers in which meanings and values are created are extra-territorial and freed from local constraints" and are mainly digital (2002:34). According to his view, the liberation from geography is not distributed equally, but creates new classes ("mobile" and "stationary") that define the political discourse in the West, according to Marx's model – technology that creates a class that creates politics. However, he ignores the way the Internet frees everyone from certain constraints of space, as almost everyone now has a way to move through the non-physical spaces of meaning-generation. When Bauman asserts that an "asymmetry between the extra-territorial nature of power and the territorial nature of the totality of life" (2002:43) has arisen, he does not notice that the totality of life is also largely disconnected from geography. Thus, for example, precisely in developing countries, many more people have smartphones (a digital, non-geographic, non-state tool) than bank accounts.[1] Admittedly, in Bauman's model this disconnection is exclusive to "mobiles", but it seems that his prediction from 1998 that "there is no chance that the Internet will be open to everyone" (2002:46) was thoroughly refuted. The mental impact of digitization does not stop at political borders, and precisely in poor countries – those that have smartphones but no bank accounts – the majority define themselves as citizens of the world (Eyal 2018).

Bauman says something strange and interesting: it is without boundaries that "the chance of encountering otherness will decrease" (2002:47), because of the global structuring of consciousness. He talks about "near" and "far" – what is near is the familiar environment, associated with everyday habits, where a person feels comfortable, but no effort is required of them, while far is a "nerve-wrenching experience" involving alienation and estrangement. However, to a certain extent, the Internet constitutes a new and common "near" for everyone, since the digital cultural structures (the Facebook feed, for example) are designed so that we will never feel far away in them, and in this respect, they fulfill Bauman's prediction. Thus, whoever is interested in wooing a woman in a distant land will do so within the "nearby" experience of Tinder, without differences of nationality and culture; and the briefing of the doctor – a representative of the state – struggles to keep up with the universal information available on the web. Intra-community information, according to Bauman, no longer has an advantage over the exchange of information between communities, when both arrive instantaneously and constitute universal experiences (Bauman 2002).

The Networked Society

Among the attributes of the new era, the power of the network, which is an alternative to hierarchical power structures, is at the very center. A network is a non-hierarchical, non-linear power structure, based on interconnections between different vertices. Although associated with the Internet, researcher Taylor Owen notes that the network has many precedents in human society: from tribal drummers in Africa to Rothschild's banks (Owen 2015). The network does not eliminate power, or the asymmetric ability of certain vertices to affect others, but it is a power that does not depend on a specific actor and

1. https://www.pewtrusts.org/-/media/assets/2016/06/fsp_what_do_consumers_without_bank_accounts_think_about_mobile_payments.pdf.

is not rooted in coercion but in the ability to take advantage of collaborations and influence others. The degree of freedom in the network is measured by the ability of players to determine their behavior within it. Moreover, networks by their nature have a different approach to space – geography is much less important to them (Owen 2016).

In fact, the networking of power is a process that began already as a result of globalization and increased economic interdependence, and got stronger in the age of the Internet, which is built as a "network" from a verbal and architectural sense. In the new era, power is not concentrated in a hierarchical structure headed by the state but distributed among nodal points that include states and financial and technological actors. Anne-Marie Slaughter (at Owen, 34) argues that global networks have fundamentally changed the idea of Westphalia-style sovereignty, for the simple reason that nation states are "no longer as effective as they used to be in the use of force", since they are not compatible with the prevailing technology. The vacuum left by the states led to the creation of new and anomalous power structures, which include actors with great power but without institutional structure. Meanwhile, and in the face of the state's bafflement, the digital corporations became their own regulators; the states, as mentioned, simply cannot keep up. Even space exploration, which in the 20th century was an expression of the unique power of the most powerful countries, is increasingly being taken over by private and globalist parties. In general, outer space appears to offer a possibility for a distinct post-political domain, when entrepreneurs like Elon Musk, who easily overtake the state in the space race, are already declaring that the space colonies that will be established will not be subject to any state law (Starlink 2020).

The State in the Digital Age

"The political integration of the citizens in a wide-range society is considered one of the indisputable historical achievements of the nation state – but today, the signs of political fragmentation expose cracks in the walls of the nation" (Habermas 1998:57)

How, then, does the networked structure of power, the end of geography and information technology affect society, and concretely the role of the state? According to McLuhan, "Electronic speed leads to an organic construction of the global economy, just as mechanization by means of the road and printing press led to national unity" (2002:424). In other words, as space contracts and knowledge becomes more accessible, society's interests become global in nature, and action at the national level does not have much significance. The above-mentioned developments lead to radical changes in the political power structure, most of which subvert the nation state's power.

Describing the transition from monarchical/feudal reality to modernity, Marx explains that instead of exploitation "wrapped in mystical illusions", an "open, brash, direct and rigorous" exploitation was created (1999:42). According to him, the state uses brute force to rule, in contrast to the previous superstructures (religion, monarchy), which ruled through solicitation rather than coercion, and were supported by an ideology that the ruling class is not required to use force to instill (Popper 2010). However, perhaps the new model returns to the same mystical and subtle exploitation, in the name of a technology-oriented ideology that is perceived as the ultimate expression of the human spirit. A good

example of this is the issue of ownership of personal information and the idea that "the person is the product", receiving products for free and giving the technology companies in return absolute knowledge about him, such that no state has ever had. Allegedly, this is done by solicitation and consent; in fact, this is an almost feudatory exploitation – the individual who uses the Internet does not get to enjoy the fruits he grows. Foucault observes that "just as in a game there can be no goals, interests, etc. without the existence of game rules, so also in society there can be no interests without power relations, which determine what the range of possibilities is in a given society" (Arbel 2006:25). However, as we saw above, this is a new game or field that the state does not know, control, or with which it is compatible. As Yuval N. Harari sarcastically points out, while the highlight of Obama's eight years in office was insurance reform, at the same time Google began working on immortality.

In this context, Nadav Eyal states that "the era of prosperity conceals the weakening of the nation state, which is being pressured from within and without and is disintegrating" (2018:196). Accordingly, the stormy and violent political struggles around the world today take place within the various societies and not between them, and in an era of peace we face the largest refugee crisis in the last 70 years – all these are signs that the nation states are unable to cope with the threats facing them. Eyal shows how, under the new power, not only the new and connecting global forces arise but also the old and divisive tribal elements – communities, regions and sub-national movements that occupy an increasingly central place in the citizens' identity. If the transition to modernity was a movement from natural and unique communities to a society standardized by the state (Bauman 2002), it seems that now there is a paradoxical movement between the hyper-standardization of culture – and this time a global one – and a return to the colorful mosaic of the natural state; the Internet brings about the homogenization of culture, on the one hand, and its endless fragmentation, on the other. National unity is being gradually replaced by large geographic allegiances (the European Union), small ones (Catalonia, Scotland), and often not geographical at all (based on sexual or political inclination etc.).

The disintegration of the state's power is also evident in the loss of its traditional roles in the face of new technological developments, most of which brought about by the big technology companies. The most threatening of these, although still in its infancy, is the control of money – almost the last stronghold of the state. The Romans understood its importance when they standardized and delegitimized any other payment method, and the Americans also began the transition from an empire to a state when they minted (well before the founding of the United States) their own currency (Owen 2015). The relationship, however, between the state and money is not a law of nature; in fact, it took states centuries to obtain exclusive control of it, and they had already given up key parts of this control in favor of a more global system when they adopted the gold standard and later the US dollar. Nevertheless, the cryptocurrencies of the 21st century, based on a supranational and completely decentralized network, threaten to break the rules of the game. Alec Ross, former innovation advisor at the US State Department, stated that "the Bitcoin phenomenon is part of a broader trend towards networked and global power structures, which tend to undermine the system of the nation state to which we have become accustomed" (Owen 2015:71).

The fact that the power of money prevents countries from having a truly independent economic policy is not new; but the new power prevents the state from maintaining cultural coherence as well, and as Bauman points out, its functions are increasingly reduced to law and order – a withdrawal to the primordial nation

state. In Castoriadis' wonderful formulation, "In the cabaret of globalization, the state puts up a strip show, at the end of which it remains dressed in only the most essential: its coercive powers" (in Bauman 2002:103). In addition to money, Owen also examines the state's failures facing network players in other power centers. The press had an ambivalent relationship with the liberal state, but was considered one of its institutions ("the fourth estate") and was a part of its rules of the game, until it largely transitioned to a networked and unsupervised model; space exploration, as mentioned, has passed into the hands of the technology giants; and even the future of law enforcement and the military seems to depend on technological capabilities in which the state no longer has a relative advantage – how long will it take until Amazon has a better grasp of drones than the Air Force? In this context, the state's last advantage is its willingness to lose money over a considerable length of time to achieve grand goals. All of these, Bauman concludes, "wrap the ongoing process of the nation state's fading in an aura of a natural disaster: the causes of the process have not yet been fully understood... it cannot be accurately predicted, but its occurrence certainly cannot be" (2002:98).

New Possibilities

"The state's monopoly… for collective democratic actions is over. States will therefore have to choose between seeking absolute control and potentially threatening the free and open digital as well as the principles of democracy, and or accept a higher degree of uncertainty and give up some power" (Owen).

As we have seen, the digital age, alongside the rise of multinational technology companies and other supranational actors, challenges the state. David Held and Anthony McGrew argue that we are heading to a post-Westphalian era characterized by the undermining of the state's authority. According to Harari (2018), there is no way back to a world of powerful nation states, because the main problems and challenges of humanity in the 21st century are global in nature: global warming, the destruction of the ecology, global economic tensions, the policing of cyberspace and the creation of groundbreaking technologies such as genetic engineering and artificial intelligence. According to him, no country – not even the US or China – can face these challenges on its own. At the same time, during the last few years the state had an opportunity to present its strength and advantages as well – this was the case in the coronavirus crisis, which demonstrated both the coercive power of the state and its ability to conduct necessary collective action, and this was also the case with the outbreak of the war in Ukraine, which brought the discourse of nationalism back to the forefront. At that time, the weakness of supranational systems was brought to the fore, as in the failure of the European Union to create a unified system of vaccine distribution, or of the World Health Organization in the treatment of the pandemic in Africa. To these were added events such as Brexit and the election of Donald Trump under the slogan "America First", which reflect strong national feelings. While the coronavirus reminds us that, for the time being, only the state has the capacity to cope with certain challenges on a large scale, it is possible that the additional processes above constitute a reaction to the very same disintegration, by those forces seeking to hold on to an industrial and national world.

The decline of the state's role, therefore, is not a linear process, and in any case does not result only from technological development. Among the reasons for this are the widening of wealth gaps leading

to emigration and alienation, multiculturalism that poses a challenge to nationalism and the state's loss of its ability to balance the economy or trade when the latter is conducted privately, on the one hand, and globally, on the other. However, all these phenomena maintain a complex relationship of cause and effect with the digital revolution. Eric Schmidt, former CEO of Google, also claimed in 2013 that it is very doubtful whether the institutions that dominated the 20th century, hierarchical organizations in an industrial model that grew in an era of clear control and command, are still able to serve in the 21st century, which is defined by decentralization of power, internet access and a huge increase in computing power (Schmidt 2013). Admittedly, the Internet is a lawless space, designed so that it cannot be controlled; but states have the power to control the machines – the towers, the routers – that drive the Internet in their territories (not with a chisel, Schmidt clarifies, since they lack the necessary knowledge, but with a hammer). They can restrict content or hardware, build a local internet infrastructure that is limited in its worldwide connectivity and take other steps. It is possible to stretch the argument and state that the Internet actually empowers states, which get to serve as gatekeepers that introduce the public to technological changes (Schmidt 2013).

Habermas admits, though with regret, that "it seems that the compromise that is the social state is no longer feasible" (Habermas 1998:34), yet he envisages an alternative to supranational organizations. However, the ability of the latter (for example, the European Union) to exercise power and forge an identity seems overshadowed even by that of states. So far, the nation state has been the only political framework that allowed for a stable democratic process (Habermas 1998), so perhaps that giving it up will also entail the decline of democracy as we know it. The danger is twofold: both from the corporations, as well as from the possibility that the state decides to conquer the digital field – since it still has considerable power. Due to the enormous power inherent in digitization, there is a danger that we shall witness the reversal of a century-old trend towards greater democracy (Schmidt 2013). The big question is whether and how states will be able to use digital and network power. Schmidt brings up a series of intriguing possibilities for how power will flow in the 21st century and what the roles the state will have within it: will there be cyber-autocracies, as opposed to a new "Hanseatic League",[2] which will prefer openness and freedom? Will there be virtual states that will compete with the national-physical ones? Either way, it is very doubtful whether those Westphalian states will be able to instigate – or prevent – the revolutions of the 21st century.

2. An alliance of cities in Northern Europe, which was characterized by economic and commercial openness and was eliminated by the rise of the state.

Bibliography

Eyal, Nadav. The Rebellion Against Globalization. Tel Aviv: *Yedioth Ahronoth*, 2018 (in Hebrew).

Arbel, Ilana. *Foucault and Humanism*. Tel Aviv: Dvir, 2006 (in Hebrew).

Bauman, Zygmunt. *Globalization*. Tel Aviv: Hakibbutz Hameuhad, 2002 (in Hebrew).

Habermas, Jürgen (1998). *The Post-National Constellation*. Tel Aviv: Hakibbutz Hameuhad, 2001 (in Hebrew).

Hobbes, Thomas. *Leviathan*. Jerusalem: Magnes Press, 2007 (in Hebrew).

McLuhan, Marshall. *Understanding the Media*. Tel Aviv: Babel, 2002 (in Hebrew).

Marx, Karl. *The Communist Party Manifesto*. Tel Aviv: Hakibbutz Hameuhad, 1999 (in Hebrew).

Popper, Karl. *The Open Society and Its Enemies*. Tel Aviv: Shalom Press, 2003 (in Hebrew).

Gerth, H. H. and C. Wright Mills (translated and edited). From *Max Weber: Essays in Sociology*. New York: Oxford University Press, 1946.

Owen, Taylor. *The Crisis of the State in the Digital Age*. Oxford University Press, 2015.

Schmidt, Eric and Jared Cohen. *The New Digital Age*. Alfred A. Knopf, 2013.

Starlink Beta Terms of Service, 2020. https://www.americansatellite.us/Starlink-Beta-Testing-Services-Terms-and-Conditions.htm.

When Disaster Strikes: Successful Management of Large-Scale Nuclear Events[1]

Ori Nissim Levy & Avihai Koresh

Dr. Col (Res.) Ori Nissim Levy: International Expert and researcher in Nuclear Defense (Nuk-Def). Commander of the Government Ministries' Liaison Unit at NEMA - Israel National Emergency Management Authority, holding full responsibility for construction & command of the government ministries network special unit. A PhD researcher at Haifa University and teacher at in the Faculty of Engineering at Ariel University. Supervises emergency app's development projects. Chairman of WNF-193.

Avihai Koresh: A researcher at ONDM team, member of WNF-193 and currently studying for a master's degree in philosophy of science at Tel Aviv University.

The paper outlines the objectives of a new course titled "A Brief History of Nuclear: from the Atom Bomb to Green Nuclear Energy in the 21st Century", that will soon be offered at *Afeka College*. The course explores significant steps in nuclear development, provides a macro-level overview of nuclear usage, and elaborates on current and upcoming issues that the international community will encounter.

1. Introduction

Nuclear energy is a stable, affordable, and safe energy source, yet it is surrounded by prejudice and fear. Some of the concerns regarding nuclear power are justified because large-scale nuclear events, rare as they are, can have a significant medical, environmental, and social impact, as occurred in Fukushima in 2011 and in Chernobyl in 1986.

In today's growing demand for sustainable and non-polluting energy sources, we must learn how to safely harness nuclear energy and know how to act during a crisis. The use of nuclear energy can pose challenges that must be addressed in order to profit from the advantages of clean, renewable energy. It has the potential to provide a realistic alternative to the expanding global demand for electricity, but its

1. Based on the article: Nissim-Levy, O. & Koresh, A. (2021). "Improving Decision Making Process in a Large-Scale Nuclear Event for a Safer Usage of Nuclear Energy", *Energy & Environmental Division Newsletter 5(1),* 28-32.

potential to trigger a massive crisis should not be underestimated. In previous events, poor decisions were made at critical moments by key personnel, which escalated a serious situation into a catastrophic disaster. New thinking about nuclear events management is needed in order to fully adopt this form of potentially safe energy.

2. Nuclear Use: An Overview

The first application of nuclear power was during World War II. The allied states, primarily the U.S.A., initiated the Manhattan Project to develop nuclear weapons. The U.S.A was the first to develop the nuclear bomb, and on July 12th 1945, the first atomic bomb test was conducted in the American deserts under the code name *Trinity*. The potential power of the bomb was equal to a 20,000-kilogram TNT bomb, and this event signaled the beginning of the atomic age.

Attacking Hiroshima, Japan, was the first operational use of an atomic weapon. On August 6th 1945, a nuclear bomb with a destructive power of 12–15 kilotons was dropped above Hiroshima in an effort to avoid a full-scale invasion to the Japanese islands, which was predicted to result in the loss of millions of American soldiers. Different historical sources report different numbers of casualties in Hiroshima, but it is assumed that 70,000 people died instantly, approximately 140,000 people had died by the end of 1945, two-thirds of the city were destroyed, and data indicates that at a distance of 800 meters from the detonation point, about 90% of people had perished. Because there were no medical facilities available, the death toll from radiation burns and injuries was very high. Three days later, a second atomic bomb was dropped over Nagasaki, where more than 80,000 people died.

After World War II, civil industries started to utilize the new energy source, mainly used in power plants to produce electricity. A controlled nuclear reaction is used to create steam that powers the turbines, in contrast to energy produced from fossil fuels that produce heat through much weaker processes and pollute the environment. As such, nuclear processes enable the production of the same amount of energy from much smaller amounts of material. A single uranium pellet, weighing tens of grams of material, produces the same amount of energy for electricity production as 564 liters of oil, a ton of coal, or 17,000 cubic meters of natural gas. A nuclear reactor that produces 1,000 mega-watts of electricity requires only a few kilograms of uranium per year, in contrast to a coal-fired power station that requires 3,000,000 tons of coal per year to produce the same amount of electricity.

3. The Advantages of Nuclear Power

The growing awareness of the environmental impact of using fossil fuels led to an increase in the use of nuclear power. It is now accepted that nuclear energy is one of the viable solutions to our energy needs whilst reducing greenhouse-gas emissions.

Although using nuclear energy can be unsafe, overall, the threat from nuclear power plants is much lower than the risk posed by fossil fuel-based power plants. Nuclear energy significantly reduces air

pollution-related mortality. According to research by NASA [1], between 1971 and 2009, this type of energy prevented on average more than 1.8 million net deaths globally, and between 2000 and 2009, the use of nuclear energy prevented an average of 76,000 deaths annually.

According to more recent research [2], nuclear energy produces energy with 99.8% fewer deaths per terawatt-hour than brown coal, 99.7% fewer than coal, 99.6% fewer than oil, and 97.5% fewer than gas. Solar, wind, and hydropower seem to be safer. One terawatt-hour is sufficient to power a town of 27,000 inhabitants, and if one assumes that such a town is completely powered by a single power source, it is then possible to illustrate the mortality differences: It is expected that 25 premature deaths per year will occur if the town depends entirely on coal, 18 people are expected to die every year if the town depends entirely on oil, and three people would die prematurely annually if it ran only on natural gas. If it were powered by nuclear energy, nobody would die on average each year; instead, it would take 14 years before anyone died. Yet there are safer energy sources – one death will occur every 29 years if the hypothetical town depends solely on wind energy, one person every 42 years on hydropower, and one person every 53 years on solar energy.

The data from this study clearly show that there are far fewer fatalities associated with nuclear energy than with the use of fossil fuels to generate electricity. Additionally, nuclear energy is much more affordable than other energy sources, with a cost per KWh of about 1.72 cents as opposed to 2.21 cents for coal energy, 7.51 cents for gas power plants, and 8.09 cents for oil energy.

4. When Disaster Strikes

Nuclear energy has a wide range of benefits, but it can also pose serious risks in certain scenarios. Despite their infrequency, nuclear accidents do happen, and a major one could have disastrous effects. We must make every effort to be completely prepared to face them if we wish to utilize nuclear energy to generate power safely and sustainably.

A major accident at a civil nuclear facility can be destructive, as it was in the two largest and most famous nuclear incidents, at Chernobyl on April 26th 1986, and at Fukushima on March 11th 2011.

The cost of the damage caused by the Chernobyl accident is estimated to be about 200 billion dollars. Additionally, 200,000 square kilometers of land are still unsuitable for human habitation, and about 350,000 people were forced to leave their homes and are unable to return. Furthermore, no one is sure what will happen to European nations in the years ahead. Credible research did not really start until the Soviet Union collapsed, and researchers discovered that there are radiation effects in eastern Europe, although there are disagreements among researchers about the effects of such an incident.

Fukushima's nuclear reactor accident caused 160,000 people to evacuate their homes as well as a 20,000 square kilometer area left highly contaminated. To date, the area within 20 kilometers of the reactors is still considered a disaster area and is off-limits to the public. The radiation reached many places in the world, and in recent years very high radiation levels, even higher than before, have been measured on the west coast of the U.S.A.

Chernobyl and Fukushima are not isolated events, but part of a sequence of nuclear events of various levels of severity over the years. Previous research [3] discovered that there have been 174 civil nuclear incidents of various severity levels between 1946 and 2014. Nuclear *event frequency* has declined since the 1970s, and as of 2015, every nuclear facility has an average of 0.002-0.003 safety incidents per year. Nonetheless, in relation to *event severity*, the picture is different. The number of nuclear incidents had decreased only for low and medium severity incidents, but there had been an increase in the number of extremely severe accidents. Even though safety procedures at nuclear facilities are constantly being improved, which has resulted in a decrease in relatively mild nuclear events, serious and unanticipated accidents still happened, which are referred to as *runaway disasters*.

Given that there are civil nuclear facilities situated all over the world, it is likely that many nations will be exposed to a nuclear incident in the future. Because of human error, poor design or operation, or a powerful, unanticipated natural disaster, even modern facilities that are designed to be as safe as possible can experience safety issues. Because of the clear risks associated with nuclear energy, accidents seem to be inevitable.

According to the study mentioned above [3], there is a 50% probability that one of the following scenarios occur: a considerable accident resulting from a natural disaster will occur within the next 50 years; a nuclear facility accident resulting from an improper design will occur within the next 27 years; and a major accident resulting from human error will occur within the next 10 years. Additionally, once a year smaller nuclear events that have little to no impact on the population will happen; the effects of these events, according to these researches, will be primarily economic.

Even though nuclear energy is statistically safer than fossil fuel-based energy production, and it is a realistic solution for reducing dangerous greenhouse gases in the atmosphere, accidents *will occur* in the future. We must be prepared for such an incident.

5. A Framework for Coping with a Nuclear Crisis

The first and foremost aspect of coping with a nuclear event is to understand the difference between *readiness* and *preparedness* in disaster management. Readiness is a very specific and focused element, such as firefighters' readiness to fight fires or the CBRN (Chemical, Biological, Radiological and Nuclear) team's readiness to respond to an event. But it is not preparedness – it is just a specific part of the overall preparedness of the state. Preparedness is a multi-dimensional concept that means much more than just being ready to cope with a specific occurrence. It encompasses all aspects of the event, from having emergency plans, specialized training, and CBRN teams, to the ability to rehabilitate damaged areas and address social and financial elements after the field teams are no longer required [4].

Preparedness for a large-scale event is to envision the event from beginning to end and to know exactly what the important elements that are to be dealt with at each point in time. According to our developed

Operational Nuclear Defense Model (ONDM), an event is divided into nine sequential stages called Life Cycle Stages (LCS). Each LCS is relevant to a specific point in time of the nuclear event, from the routine stage before a disaster to the rehabilitation and back-to-normal stage, sometimes decades after the crisis. The nine LCS's together constitute the Complete Life Cycle of any nuclear incident or event.

Preparedness is not just readiness for one or two stages – preparedness means the state is ready for all of them. At each LCS, different actions are needed, different field-teams are employed, different political, administrative and organizational bodies become more or less important, and different goals must be achieved. These stages are:

LCS-1: Routine: this is a day-to-day routine stage when there is neither information nor signs of a nuclear event. At this stage, the focus is on high levels to construct a designated arrangement to cope with a nuclear event and to execute periodic drills.

LCS-2: Emergency Routine: at this stage, information or potential circumstances of a nuclear incident are created. Here the focus starts to turn on the emergency forces, with emphasis on CBRN teams and field-teams located at the closest point to an event.

LCS-3: The Moment of an Incident: this stage describes a specific moment when it is known with certainty that an incident has occurred. In the case of a nuclear facility incident, the readiness of the power-plant engineers and automatic systems are at the focal point.

LCS-4: Initial, Immediate Reaction: this is the time when immediate, mainly spontaneous, actions occur. The immediate reaction is carried out by anyone who is in the relevant area, such as CBRN teams, emergency teams and decision-makers. The aim is to begin actions to mitigate and ease the event in its initial stages, according to a planned order of action.

LCS-5: Second Reaction: at this stage there is an ambition to mitigate the event and turn initial reactions into organized arrangements, whereby everyone acts according to existing instructions. This stage occurs when an event is not successfully controlled within the framework of the initial response and attempts to mitigate the event in its initial stages have failed.

LCS-6: Broad Reaction: this stage occurs if the second reaction failed to achieve its goal. Here the country is dealing with a large-scale event, a disaster, a crisis, in which all enveloping systems cope with the wide-scale emergency, including organized bodies and the government.

LCS-7: Short-Term Rehabilitation: here the state is starting to cope with long-term effects after halting an event and ending the immediate danger that the crisis presented. The focus of action is a return to routine with immediate management.

LCS-8: Long-Term Rehabilitation: this stage represents rehabilitation and rebuilding, repairing all disaster damage whose effects will be felt for many years, at all aspects of life.

LCS-9: Ambition to Return to Normal: at this stage, it appears that all actions have been executed to mitigate and deal with the effects of a disaster, where a significant part of these actions take decades, and plans must be monitored and supervised to ensure they are progressing properly.

6. Making the Proper Decisions During a Nuclear Crisis

Another central problem in coping with nuclear events is external considerations in decision-making. Making the proper decision is a crucial factor in disaster management. If there is an event and none of the existing emergency scenarios addresses it, there are no more automatic plans of operation. The professional teams must rely on decision-makers for immediate orders. Here the decision-making level becomes crucial because one wrong decision completely changes preparedness arrangements and harms – sometimes fatally – the ability of emergency teams to handle the situation.

In previous study [5] that investigated the management of the nuclear events of Fukushima, Chernobyl and Three Miles Island, it was discovered that there is a need to improve the way leaders and decision-makers reach decisions when managing a disaster. Nearly all decisions made by leaders during the management of a nuclear disaster were not based on proper considerations and scientific knowledge but rather on various factors, including public opinion, biased opinions, personality traits, personal and political interests, cognitive abilities, and even extraneous factors, such as people's political desire to save their own skin and place blame on others.

Decision-makers may experience personal and political consequences during times of crisis. The safety of the civilian population is an issue for which politicians, as well as other decision-makers, are fully responsible, and in times of emergency, the political leadership is regularly held accountable. Leaders may be forced to resign or even face legal consequences if they fail to respond to the situation or overcome a crisis effectively. Because there is almost always a significant political cost associated with decisions made during a crisis, many political factors are taken into account.

Poor decision-making has a significant influence on the way a disaster is managed. However, many preparedness plans currently in use place a strong emphasis on emergency services and professional teams, with little to no consideration given to adequate instruction of decision-makers. The main reason for this is that no plans were made for catastrophic events because they are almost always unexpected, overlooked by existing plans, or have a remote possibility of occurring.

7. Conclusions: Safer and Reliable "Green" Energy Must be Accompanied by a Proper Preparedness Plan

Nuclear power is becoming an increasingly safe and socially accepted method to provide for future energy needs. There are more and more international organizations and safety regulations, safer reactor designs, automatic response mechanisms that reduce the effect of the human factor in the immediate response phase and designated CBRN response teams that are specially trained to handle a nuclear disaster. But in order to replace traditional energy sources with nuclear energy, adequate coping plans and mechanisms must also be developed.

According to the ONDM coping framework, there are various stages to a nuclear event, and preparedness means readiness at all stages. Each stage has its own goals, objectives, actions, and relevant personnel.

The concept of preparedness goes beyond the simple readiness of field teams or of safety protocols – it encompasses readiness at all stages, as well as an effective and practical coordination mechanism.

Countries have different nuclear preparedness strategies, but many emergency plans still neglect one aspect: the decision-makers. It is impossible to ignore the decision-making levels and concentrate solely on equipment and teams needed to handle such event. Existing plans provide in-depth training programs, coping mechanisms, a variety of scenarios, evacuation plans, and safety training. Despite the comprehensiveness of those plans, many countries fail to consider the human factor, which is the most important aspect of crisis management. It is a crucial element for the widespread use of nuclear energy, a significant factor that does not receive the proper attention.

Bibliography

[1] Kharecha, P., & Hansen, J. (2013). "Coal and Gas are Far More Harmful Than Nuclear Power". *Science Briefs-National Aeronautics and Space Administration* (NASA), https://climate.nasa.gov/news/903/coal-and-gas-are-far-more-harmful-than-nuclear-power/.

[2] Ritchie, H. (2020). "What Are the Safest and Cleanest Sources of Energy?". https://ourworldindata.org/safest-sources-of-energy.

[3] Wheatley, S., Sovacool, B., & Sornette, D. (2016). "Of Disasters and Dragon Kings: A Statistical Analysis of Nuclear Power Incidents and Accidents". *Risk Analysis*: an official publication of the Society for Risk Analysis.

[4] For further reading: Nissim-Levi, O. & Koresh, A. (2021). "Operational Preparedness of Field-Teams in Different Stages of a Nuclear & Radiological (N&R) Event – A Multi-Dimensional Perspective". *NTC Magazine,* https://nct-magazine.com/nct-magazine-march-2021/operational-preparedness-of-field-teams-in-different-stages-of-a-nuclear-radiological-nr-event-a-multi-dimensional-perspective/.

[5] Nissim-Levi, O. (2019). *Consolidated Policy to Manage Nuclear Risks: Preplanning, Coping with an Event and Rehabilitation of a State.* Doctoral dissertation, Babeş-Bolyai University, Cluj-Napoca.

Become a Black-Belt Engineer

Eyal Nir, sensei

Sensei Eyal Nir has over 40 years of martial arts experience, and serves as chairman at Traditional Karate Israel & Karate World champion. He holds an MSc. EE (Technion), had a long hitech career and in the army served in Unit 8200 army in the rank of major. Nir is a Products Director and co-founder of the 4D2C startup, and a lecturer at Ariel University & Afeka College. He is also founder of the BuDo-Way program, giving lectures worldwide, and author of the Amazon bestseller *Breakthrough in Business & Life.*

This paper explains and demonstrates how BuDo's (Japanese Traditional Martial Arts) centuries-old wisdom, principles, and knowledge can be leveraged and applied to becoming a better and more successful engineer in today's technological global market.

This is part of the BuDo-Way program delivered worldwide, providing a bridge for people to access the BuDo treasure of knowledge and acquire applicable tools for their success and well-being.

The program as well as this paper are based on my lifelong experience "combining the worlds" – having a long career in the global hi-tech industry, from an R&D software engineer to a Director of Products in global companies, and in parallel studying, teaching and internationally competing in the martial arts for more than 40 years.

The BuDo Bridge

The following table summarizes the "BuDo to Life" concepts and the paragraphs below expand and elaborate these concepts while focusing on "Engineering qualities and benefits" derived from the BuDo principles listed on the left of the table.

BuDo ⟷ Life	
KumiTe	2 become 1 Connect, anticipate, influence
KiMe & KiAi	Complete Focus, give it all
AiKi	Agility, Mental Flexibility, flow
TodoMe-Waza	1 chance – Perfection
Tanden	Stable physical-mental center
MuShin	No Mind – direct perception
Oji-Waza	Awareness, Response & Timing
Ho-Shin	Decide – no doubt or hesitation
Kata	Movement meditation, Team

Taking Control

> "Change will not come if we wait for some other person or some other time. We are the ones we've been waiting for. We are the change that we seek" – Barack Obama.

A fundamental principle of the concept presented has to do with proactively *taking control* over one's life by setting high, worthy, and meaningful goals and acquiring relevant tools for achieving those along an ongoing growth path.

Life is full of challenges and often we are expected to perform at our best within stressful situations such as when being tested, presenting our idea to investors or relevant decision makers, convincing within a sales situation, negotiating or when delivering an important speech.

Our mental and emotional state during those situations, and actually at any given moment in life, significantly affects our performance and ability to handle efficiently any external event.

Our efficiency and resulting success of handling those, at times stressful, situations highly depend on our ability to maintain stable emotions, mental flexibility, and creativity and the capability to adjust to the ever-changing situations of life.

When calm, happy and full of positive energy, we shall probably handle any situation in a better way than when being upset, sad, and nervous or simply feeling down. Therefore, being able to proactively control our emotional state, at will at any given moment, is a *life-modifying* success-enabler skill.

This paper presents some BuDo-derived tools that enable proactively taking control over our emotional state and thus over our performance in any given life situation.

From Physiology to Emotional States

Some of the BuDo-based "tools for engineers" outlined in this paper are acquired through leveraging the amazing human bidirectional "body-mind" connection, as our physiology and mental states are tightly cross-connected and mutually influential.

The way we feel and experience our environment is strongly correlated to the way we use our body. Even small changes in our expressions, gestures, posture, movement and breathing patterns shall significantly change the way we feel, experience our life, think, and act.

In BuDo, we often use physiology-aspects to affect our mental state and these tools are very relevant and applicable to life in general. With training, the corresponding skill is developed, thus gaining the ability to employ those "physical tools" to instantly influence one's corresponding mental side if and when needed.

> "Some people want it to happen, some wish it would happen, others make it happen"
> – Michael Jordan.

BuDo Engineering Tools

This section introduces specific BuDo tools and the way these are relevant and can be applied by today's engineer within the global technology-based market.

Ho-Shin

Ho-Shin is a concept and tool for effective decision making within complex and challenging situations often characterized by uncertainty. In BuDo, as well as in many "engineering situations", the ability to channel everything to a given task at a given moment is critical as it enables us to fully be within the situation, recruiting all human physical-mental resources for our best performance and resulting success. Furthermore, and surprising for many, through such complete determination to remove doubt and hesitation we create a space for mental flexibility and efficient adaptation to varying situations. This is summarized in the beautiful BuDo concept *Ho-Shin*, explained in this section.

Life calls upon us to constantly make decisions – from relatively small everyday choices to bigger decisions including a change of workplace, making financial investments, choosing a career path, changing place of residence, or getting married. Ho-Shin stands for "give everything to remain full"; making important decisions you should certainly consider everything carefully, assess the situation – odds versus risks – consult the wise and experienced and avoid unnecessary haste. Yet, once decided, at that moment give everything with no doubt, no hesitation or fear of failure.

In other words, once decided, "give your heart to it", as doing things half-heartedly you are always half

in the past and half in future – never fully here and now. Now you may ask – don't I lose my flexibility and ability to adapt and adjust if I do things with such complete determination? It seems that we are discussing two different, possibly mutually exclusive, approaches:

1. Giving everything to something you do – mentally and physically – with no hesitation, no doubt, no unnecessary control while allowing yourself to make mistakes.
2. Keeping my options open – being flexible, able to change, adapt, adjust to new situations and circumstances.

Many people feel the above two attitudes cannot coexist; well… When using your conscious – aware, analytic, analyzing – mind, there seems to exist a paradox and that is why most people would go "halfway", doing things cautiously, half-heartedly, presumably keeping their options open should conditions change calling for a new direction – decision and action. Therefore, it seems that there exists an internal duality or conflict – I do it yet not fully as I am "keeping my options open".

Ho-Shin stands for the opposite – it suggests that by doing something fully, being completely at one with your action with no doubt, hesitation, fear of mistake or failure you create a space freeing mental resources that enable you to actually be more flexible to adjust to new situations instantaneously and spontaneously with no gap or recalculation, by simply fully being there with a "single mind".

Ho-Shin for adaptation and mental flexibility – while it is important to plan ahead, assess situations and have a strategy, it is equally safe to assume actual events shall not unfold exactly as planned, hence it is critical to acquire the skill of (instantly) adjusting to unplanned and at times unfamiliar scenarios, and to avoid rigid "emotional attachment" to our original plans.

Ho-Shin Summary

In BuDo as well as in actual life situations, we assess circumstances and set a corresponding strategy, yet often the situation evolves in different ways, and we must have the mental flexibility to adjust in real time to the new conditions and spontaneously act accordingly. This translates into being "here and now" within the situation rather than acting as an outside observer doing strategy recalculations. The big concept of Ho-Shin is key here as it appears (surprisingly to many) that it is by investing everything in a current task, removing all doubt, hesitation, and mistake concerns that we can actually not only act with determination according to our decision, but also create the mental space to adjust efficiently to new unexpected situations.

KiAi and AiKi

Use of KiAi

One way of recruiting all human faculties for a given task at a given moment, removing all doubt, hesitation, or fear of mistake, acting with complete determination and Ho-shin spirit is by using the big

concept of KiAi – fully projecting your Ki (mental energy) out.

Physically, we use breathing with a strong exhale from our center, allowing air to flow through our vocal cords resulting in the familiar sound often associated with martial art training called KiAi. The KiAi sound is a physical expression of our intention, projecting our energy in a given direction and executing it with full determination, which in turn helps recruit all our physical-mental faculties for a single purpose. Executing KiAi with a clear image of our goal, giving all breath from our core has profound influence on our mental state, resulting in enhanced determination and full focus on the task at hand.

It is advisable to start developing this skill using actual strong sound, letting all air flow through your vocal cords making strong KiAi. Yet realizing that making such sound might be problematic and at times unrealistic in many real life "engineering situations", as you gradually gain experience you should be able to execute KiAi with the same complete determination – yet internally, without the actual external sound.

I use KiAi very often in my life – every time my energy is low, I feel hesitation, I am not fully connected to the situation or in general unable to pull myself together for a given task. Using strong KiAi from my center, giving all intention and breath into it, enables me to act with complete determination while staying aware, sensitive, and responsive to my surroundings and the ever-changing circumstances.

Use of AiKi

While KiAi stands for complete determination and strong spirit removing all doubt or hesitation, the same two Japanese words (Ki, Ai) used in the reversed order stand for the big and complementary concept of AiKi.

AiKi (as in the well-known martial art of AiKi-Do) stands for mental flexibility, adaptation, understanding and flowing with the other or external circumstances rather than resisting or acting against them. As life is full of challenges, difficulties and at times failures – the AiKi way suggests adopting a proactive, flexible, and creative approach to dealing with such challenges through learning, flowing with the circumstances and finding creative ways to leverage such difficulties to promote your goals. This was nicely put by Vivian Greene: "Life isn't about waiting for the storm to pass... It's about learning to dance in the rain".

KiAi + AiKi Summary

For an engineer in a very dynamic and often stressful setting, characterized by uncertainty, the key point here to understand and implement is that KiAi and AiKi and the mental attitudes they stand for are not mutually exclusive – they can and in fact should coexist and be jointly applied in your life and professional daily routine.

It is within our human ability to simultaneously be assertive, have a strong opinion and stand for it while being sensitive to others, understand their views and positions, try connecting to them, convincing,

influencing and leading through cooperation. This (KiAi + AiKi) approach is particularly useful when implemented within conflict situations when emotions are high and your ability to employ the winning combination of assertiveness with sensitivity and flexibility is of great value.

On your way to becoming a Black Belt Engineer, start exercising the winning KiAi + AiKi combination in your life and in every situation, enhancing your confidence and assertiveness with KiAi while employing the concept of AiKi to be sensitive, read people, and connect to them seeking creative ways to collaborate without losing your way, beliefs, or core values.

KumiTe

Kumi-Te is a key term and concept in BuDo that translates (from Japanese) to "integrated hands", with the deep meaning of the two practitioners – at times opponents – ultimately becoming one. As a tool for life, KumiTe serves to enable people to connect with others, enhancing environmental awareness, connecting to and being at one with the surroundings and others, developing sensitivity and responsiveness, and the ability of anticipating and influencing while being completely within the current situation here and now.

KumiTe is a great tool for *many* suffering from attention deficit disorders, as the essence of the situation in facing an opponent enforces complete "being here and now", as letting your mind drift might have severe consequences.

Practicing KumiTe you shall learn and acquire:

- Tools for proactively taking control at will over your mental race
- Reducing the uncontrolled hopping of thoughts and running what-if scenarios
- Creating an inner peaceful space within stressful situations
- Reducing attention disorders (ADHD) and recruiting all mental-physcial faculties for a given task
- Enhanced awareness, sensitivity, and responsiveness
- Connecting and becoming one with the environment rather than being a "side observer"

Employing BuDo's KumiTe exercises, you learn to read clues and signs exposed by others about their intentions, tendencies, and habits. We start with Oji-Waza (response theory) exercises, where one side initiates an action while the other learns to connect, anticipate, and respond with good timing. Next, we exercise Shikake-Waza (setup creating opportunities theory), taking calculated risks to make others expose their intentions, take action, or make commitment thus providing us with an opportunity. In the words of Bruce Lee: "To hell with circumstances; I create opportunities".

All of the above can be considered as "BuDo Meditation", as these exercises help (and ultimately force) you to stop your mental race, completely be here and now, connected and at one with the situation and partner, mentally flexible, responsive, and determined.

It is important to practice KumiTe according to the old tradition of *Shi-Ai* which means "testing each other" for the purpose of guiding future development rather than simply for winning. Thus, I bow to my partner as I thank him for helping me test myself and improve, rather than see him as an "opponent" and consider our training as a way to prove that I am better. This concept makes a big difference in the way people learn to connect to others.

Tanden – Discover Your Center

In BuDo training we learn to discover and connect to our center – (Gedan) Tanden, physically and consequently mentally. Physically, we collect our extremities to our center, then initiate any movement or technique by breath, from our center. We learn to perceive our opponent from our Tanden (serving as our antenna), project our intention or Ki from our center, become in tune with our opponent, connect to him and initiate any action from our center. Collecting ourselves physically to a single "control center" stimulates a **General Recruitment** affect, enabling us to summon all mental-physical faculties at a given moment for a given task.

When your mind wonders, attention is scattered and you wish to collect yourself for the best performance of the current task, Tanden awareness and activation enable mental-physical Oneness, as physical unity influences mental stability, enabling being fully Here and Now with a single mind. Such Tanden meditation helps to achieve stable emotions, taking control over our mental race that is often manifested by a drifting, scattered, and uncontrolled mind. Tanden-generated KiAi further helps raise energy level and determination.

When acquiring effective timing response (Oji-Waza), employing the concept of Mu-Shin (no mind), we try to bypass our analyzing brain for an immediate, intuitive response with the image of perceiving and accordingly initiating an immediate, effective response from our center. Through training, a mental-physical change occurs and a skill is developped. Thus we percieve, feel, project, connect, initiate and in a way experience life from a stable, peaceful core, less affected by external fluctuations: anchor – Tanden.

Allow Mistakes

Accepting the possibility of making mistakes, allowing yourself to step out of your comfort zone and in a way even welcoming the former is key in becoming a Black-Belt Engineer, as "allowing mistakes" is the only path for true learning and growth.

This does not imply making mistakes intentionally but rather not preventing spontaneous responses or avoiding attempting new ways out of fear of failure. This is true for all and particularly for the perfectionists, who always try to be perfect and avoid mistakes at all costs.

For many, the concept of "allow mistakes" seems contradictory to the BuDo spirit of "always do your best, as if it is the last chance of your life". However, you can never do your best if you do not accept

mistakes; you will always be inhibited, limited to your current comfort zone, you will do things too carefully and will not be able to dedicate your whole being to your current action. Only when we accept mistake can we go into unknown areas, away from the habitual and the convenient.

This relates directly to the concept of Ho-Shin as by giving everything, letting go and accepting mistake we create the "free space" in our mind that enables us to better perceive the next situation and respond more efficiently, showing mental flexibility and a full "being-here-and-now" awareness.

Sensei Nishiyama used to say: "Once you go, only god knows if you win or lose; don't worry about results". This means that once all "what...if" considerations are done and a decision is made – let go, remove all inhibitions and fully be there, for a moment switching off the "multitasking" and constant hopping with which our brain is constantly involved.

Mistakes are our best opportunity for growing and developing; they allow us to be creative. Making mistakes allows you to experiment, to go beyond your boundaries and into the unknown, enter the discomfort zone, trying what feels risky, in order to become free to apply the basic principles in infinite ways, and find what fits your body and your personality, rather than just imitating your teachers.

In BuDo we say that the Sensei is like a compass: he points the finger to the right direction, but the student must walk the way, to experiment, to fall and make mistakes, and if he gets off track, the teacher will point the right way again.

If you are not going to allow mistakes you will only be able to respond to situations with which you are familiar, but if a circumstance is not within your experience, you will get stuck and be hesitant. If you do not accept mistakes, you will always be too careful and rigid and not be able to fully commit yourself.

Sensei Nishiyama noted that it is common for champions to become more rigid and tight, and that is because they are expected to perform at a certain level and are afraid to make mistakes or fail to achieve what they or their environment expects of them. His advice to competing athletes was "don't try too hard – just enjoy it and do your best" – by forgetting about winning or losing you do not worry about mistakes and only then you can really do your best.

There is a thin yet clear line between, on the one hand, being irresponsible, not fully committed to doing your best to achieve your goals and, on the other hand, letting go after preparations have been fully done and allowing yourself to do what feels right without the constraints and limitations imposed by the fear of mistake.

BuDo encourages students to let themselves make mistakes so they can grow, discover, and master new domains.

Bibliography

Offir, Amit and Eyal Nir. 2016. *Breakthrough in Business and Life: The Secrets for Creating Opportunities – The BuDo-Way*. CreateSpace Publishing.

Byung-Chul Han and *The Burnout Society*

Ofer Nordheimer Nur

Dr. Ofer Nordheimer Nur is a lecturer at Tel Aviv University, in the Multidisciplinary Program in the Humanities. Nur is a historian by training, and lectures on the culture and sociology of the Internet. His book Eros and Tragedy: *Jewish Male Fantasies and the Zionist Revolution of Masculinity* was published in 2014.

A new thinker has entered the world of philosophy and cultural criticism: Byung-Chul Han. Han was born in South Korea but lives in Berlin and writes in German. His books are short and catchy and combine reading and interpretation of the great philosophers with contemporary cultural, sociological, and philosophical insights. He also bases his arguments on the thinking of well-known contemporary writers and filmmakers. Just as Yuval Noah Harari explicates complex historical issues, so Han explains philosophical and cultural issues for the same educated public. When asked who he is and what he is, Han answered, following Michel Foucault, that he is a philosopher – and what is a philosopher? A philosopher is a radical journalist. This means that the philosopher is preoccupied with actual questions and discusses them in the most profound way possible.

A new philosopher has recently entered the global stage of ideas and scholarship: Byung-Chul Han. Han was born in South Korea but lives in Berlin and writes in German. He wrote almost twenty books that were translated into thirty-five languages to date. His books are short and catchy and combine reading and interpretation of great philosophers such as Martin Heidegger, Walter Benjamin, Friedrich Hegel, or Martin Buber with contemporary cultural, sociological, and philosophical insights. Han also bases his arguments on his reading of well-known contemporary writers and filmmakers. We are witnessing the appearance of a kind of 21st-century Erich Fromm (a Frankfurt School thinker who had been writing for the general public since the 1950s), i.e., a thinker and cultural critic who is also dedicated to clarifying concepts and processes for the educated public. While Han draws upon prominent Western philosophers and authors, his writing style is arguably Asian: an almost aphoristic style, making concise, measured, and catchy claims that are based on observation, and containing clear truths and sharp insights, sometimes surprising and occasionally chilling. Just as Yuval Noah Harari explains complex issues, so Han explains philosophical and cultural problems to the same

educated public.

Han burst onto the bestseller stage about a decade ago with his book *The Burnout Society*. In the book, which has been translated into dozens of languages, Han claims that there are clear reasons for the fact that many in Western societies experience depression and exhaustion since ambitiousness has been fixed as a central value. From a society of constraints imposed on us by external factors, Han claims, Western society has become one of capabilities and potential. Our life nowadays requires each of us to diminish their being a subject – a thinking, autonomous, free-willed agent that is on a journey of discovery and existence while facing prohibitions and constraints – and to be more of a project, a venture that must be nurtured, marketed, and presented to the public in a world of positivity. The self today is a pinnacle of accomplished fulfillment. In the preceding social-mental structure we lived while dealing with authoritative external constraints. We have internalized the external and we act today in response to an inner voice that urges us to move forward, persevere, fulfill, and achieve. And this, Han claims, exacts a heavy price in mental health.

Continuous Exposure

According to Han, we have become our own slaves, in our attempt to please a sort of inner boss who demands more and more from us and does not relent. Since the boss is internal, that is, he knows everything about us, we cannot avoid him and employ tricks of hiding and evasion. We no longer function as a subject under external control, but as a project with an internal engine: we persist in reinventing ourselves, shaping our image and displaying it. Our self no longer aligns with the external dictates of this or that boss, or the state, but with our own selves. We have become the entrepreneur behind our self. The ambitiousness that drives us has committed us into servitude, because it turns out that when we are our own boss, that boss is tougher, more demanding, and as a result more exhausting than an external boss. The positive, creative, and optimistic "I can" is a recipe for a more intense loss of freedom than the authoritative "You must!", with its instructions and decrees.

One of the conditions that intensify the exhaustion we experience is the one that involves incessant exposure to information. 1996 saw the creation of the term "Information Fatigue Syndrome", which deals with exhaustion and the inability to concentrate, a general feeling of discomfort and the inability to complete tasks responsibly. This syndrome was originally diagnosed in work environments where employees are tasked with processing large amounts of information. Today, this syndrome characterizes the society at large. Here Han uses a play on words: information has become deformation. A flood of information prevents us from understanding and making correct decisions, and this also intensifies exhaustion and the inability to carry through tasks to their satisfactory completion. We must accept the fact that the world is more than information; we must experience the world not through information.

Self-presentation is another element that causes us to live in chronic exhaustion. The elimination of the clear distinction between private and public in the age of social networks subjects us to intense visibility. We are exposed to our partners on social networks, for example, our "friends" on Facebook. This exposure pushes us to a marketing-style self-presenting; we know that we are constantly being

watched, so we strive to present ourselves attractively. According to Han, this awareness, that we are being watched, eliminates the private space, which he defines as that space within which we are not watched, and we are not judged. The private space that we have lost, being private, is a space of calm. Han gives us an explanation of the term "retreat", which has even been ridiculed in out time, but it contains, even etymologically, a pointed truth: people go to a "retreat" since it is a place of refuge, a shelter, a place of solitude that enables a spiritual process focusing on our inner world, while disconnecting from the external environment that constantly stares at us from the screens.

Walls of Alienation

Han has many insights into capitalism in the age of neoliberalism, digital communication, and life in late modernity. In this he continues the philosopher and psychoanalyst Erich Fromm, who presented a compelling and depressing analysis in his 1955 book *The Art of Loving*, a bestseller that was translated into dozens of languages and is still being sold in bookstores. Fromm dealt with the mental effects of capitalism on society and the individual and noted the building of the walls that separate people from one another, and the alienation and loneliness that began to characterize existence in Western society, bringing with them shame, guilt, and anxiety. The situation today has worsened, claims Han. If, in the past, when we went to the dentist, we used to hold someone's hand during a painful procedure, today more and more patients are holding on to their mobile phones for comfort. This is a situation in which there is no longer any hand to hold. We are holding a device that has become part of us, an extension of us, as we become an unhappy, orphaned cyborg.

From a different perspective, Han argues that capitalism commits us to productiveness. Today, idleness is an undesirable and even threatening condition, which society looks down upon. The proper life in the neoliberal era requires us to be constantly active. The time when we do not create anything is also defined by productive time: we call it "leisure". Han advocates idleness and calls us to adopt a policy of idleness – to not be afraid to sit in a room or take a stroll and just "be".

Han's critique is also based on presenting capitalism as the source of the emotional and mental pains of humans today. He defines the neoliberal era as a "mutation" of capitalism. Han claims that today's social-economic configuration produces depression among many of us. He sees this depression as a sign of a crisis of freedom. As independent projects, we lost a dimension of freedom; it has been robbed of us and we accept this situation willingly. This economy centers on the robbery of freedom and it does so with the consent of the participants – not against their will or their ire. Freedom, in Han 's opinion, involves socializing – there is no freedom without some kind of friendly relationship, as in the saying "It is not good for the man to be alone". That is, when a person is alone, there is no good in the world, according to one of the interpretations of this verse, since doing good requires at least two people. In contrast, the neoliberal situation cuts us off from one another until we have become more and more isolated, confined to our homes, conducting our social, intellectual, and even sexual lives on screens.

Being our own bosses, we have become enslaved, and the result is depression, because there is no

figure against whom we would wish to protest. While there are nations far away or very close living under oppression, the situation of the modern western man is even more difficult because, while he was freed from political oppression and material deprivation, he is depressed and needs medication accordingly.

Transparency as a Negative Value

Han explicates the consent to lose our freedom by the concept of "positivity". The neoliberal society is a positive society, and it emphasizes the mitigation of authoritarian relations. One of the signs of this situation is transparency, which is also a central concept these days. The neoliberal era has turned transparency into an important value. Transparency includes visibility without hindrances, and guarantees fairness and decency of all procedures, and the exclusion of deceptive intentions. The fine print (that implies deliberate convolution) is indeed small, but it is still there, and whoever reads the fine print will make use of the promise made by transparency. However, Han condemns transparency; it requires looking, sometimes piercingly, whereas he claims that our civil society also requires respect – *re-spect*, which etymologically means "look back", the inverse of incessant gazing (gawking, ogling) at screens. This situation, according to Han, creates disrespect.

Respect between people is also possible through creating distance. This is the reason that authoritarian leaders create distance between themselves and their audience – see, for example, Vladimir Putin's ridiculous table. Then they keep playing with that distance. Adolf Hitler, for example, was the first to go down to the audience and caress the head of a baby, even holding it for a few seconds, thus opening a populist window into the continuation of the 20th century, since there is no leader these days who does not flatter the public by erasing the distance even if for a minute. The Internet, according to Han, erases the distance even more – it obliterates the distance: all things are equal and accessible and tangible. And this being the case, the respect required to maintain civil proceedings is erased. Is it conceivable that a judge in a court of law would have a chat with the accused? In Israel, we already saw a few years ago how a prosecutor in a trial conducted a flirtatious chat with a defense attorney. Han sees this as a major retrogradation from the principles of civil society. Anonymity also thins out the respect necessary for the existence of such a society. In a situation like that, the chance of being treated with a lack of respect increases; you can curse, insult, and harass under the cover of anonymity. Every talkback reader knows this. Han sees this, too, as a serious fault leading to the destruction of civil society in our age.

When asked who he is and what he is, Han replied, following Michel Foucault, that he is a philosopher – and what is a philosopher? A philosopher is a radical journalist. What he means by this is that the philosopher is busy with everyday questions and discusses them in the most profound way possible. These are the intellectual credentials of this unique thinker, who is at the top of the list of philosophers being read today.

AJES Journal is a journal that seeks to be a platform for the interdisciplinary connections that engineering has with the various content worlds of our time. As a result, it presents papers on a wide range of topics between which engineering is the link. We introduce to the readers, among other things, thoughts on digital culture, analysis of socio-economic justice theories, examination of ethical dilemmas in engineering, case study evaluations, new considerations concerning the role of engineers in face of the climate crisis and more.

The journal's editors do not consider the concept of science as exclusive to research fields characterized by mathematical formalism in their construction of scientific theories, and by strict adherence to quantitative methods for scientific examination. We regard the concept of science as an attempt to expand the human mind, and in doing so, we recognize the importance of qualitative research methods and their scientific status, equal to that of quantitative research methods; this is, of course, while matching the method of research to the subject under study, and to the properties on which we seek to shed light.

AJES Journal
Journal of Engineering & Science

Afeka College | 38 Mivtza Kadesh St., Tel Aviv