

# Looking at the Current Political and Economic Crisis Through the Lenses of Complexity Science

George Rzevski

Emeritus Professor, Complexity Science and Design, The Open University and Owner, Rzevski Research Ltd

[rzevskiresearch@gmail.com](mailto:rzevskiresearch@gmail.com)

## Who is Responsible for the Current Global Crisis?

Every major stepwise transition in socio-economic evolution is difficult, and the current one – the transition from industrial to digital economy – is no different.

Globalisation, the legacy of the industrial economy, has increased *physical connectivity* between countries and individuals by creating intercontinental supply chains using huge container ships, cargo flights and juggernaut lorries and by increasing business travel.

Building large-scale factories in developing countries to reduce manufacturing costs created ugly unintended consequences:

*Waste of energy, increased pollution and increased business travel* to a level that is unsustainable.

*Amplified butterfly effect* - the notorious example being the rapid spread of coronavirus infection, which converted a single case in Wuhan into a global pandemic in a matter of days.

*Vulnerability of nations* – the Coronavirus pandemic and the war in Ukraine showed that, in a global crisis, nations focus on what they think is the best for them, ignoring needs of others. Even within the European Union nations competed rather than cooperated for access to resources in short supply, such as protective equipment for Covid. Locating our factories in faraway places makes us truly vulnerable in case of a conflict. The war in Ukraine demonstrated that *globalisation, as practiced, is too dangerous*. Some of the Western nations naïvely exposed themselves by relying heavily on Russian energy.

On top of globalisation, digital communication technology – the internet and mobile phones – *increased digital connectivity* of the world population. There are currently nearly 5 billion internet users, which is over 60% of the total world population of just under 8 billion.

*The combination of the two - the physical and digital connectivity - caused an exponential increase in complexity of the political and economic environment in which we live and work.*

Exactly as Stephen Hawking warned us, *“the 21<sup>st</sup> century will be the century of complexity”*.

Complexity is a scientific term.

*A situation or, more formally, a system is complex if it has a large number of diverse, partly autonomous participants engaged in intense interaction among themselves and with their environment without being centrally controlled.*

*Outcomes of complex situations are unpredictable but not random – they follow discernible patterns.*

Complexity creates *uncertainty and unpredictability*, whilst we long for stability and a clear cause-effect relationship.

Due to complexity, both the global political constellation and global markets are in turmoil – the unexpected war in Europe triggered a sharp political realignment and disrupted supply chains, which were already badly affected by the Covid, causing shortages of food; energy supplies were interrupted increasing the cost of heating homes and businesses and producing goods and services. Increases in the cost of energy and food, generous handouts during Covid and the enforced staying off work during pandemic created inflation.

The political and economic uncertainty hit the unprepared population used to relatively stable economic cycles of industrial era. It is not surprising therefore that voters react by blaming politicians without realising that the tide of socio-economic evolution is not of their making.

Nevertheless, unforgivable political mistakes have been made by Western professional politicians who are simply not equipped to handle the increased complexity of the world. Here are few examples:

Setting targets for transfer from petrol and diesel to electric propulsion of all vehicles without investing into expansion of electricity supply networks.

Setting targets for net zero without securing safe energy supply for the transition period.

Allowing to be totally dependent on countries that are clearly not very friendly for energy supply and production of consumer and infrastructure goods; gullibility of Western decision makers was beyond belief - consequences are significant.

The problem is made worst by the traditionally trained experts – economists, political scientists, bankers, investors, lawyers, epidemiologists - who still see the world through the industrial era lenses and are blind to the fact that the world has changed.

High complexity of the current geopolitical system and the internet-based global market are directly responsible for extreme events such as:

Global financial crisis of 2008.

Rapidly spreading pandemic of 2020.

Economic impact of Ukraine war.

Let's look briefly at each through the lenses of complexity science.

## Financial Crisis of 2008

The financial crisis of 2008 was caused by a *drift into a failure* of financial services.

A drift into failure occurs when a complex system enjoys prolonged positive conditions. Feeling no pressure, some participants begin to neglect their duty and, even, cheat, simply because under conditions of plenty it is easy to hide insignificant irregularities. However, small wrongdoings accumulate and when the tipping point is reached, a failure occurs.

This is exactly how the global financial crises was caused – loans were offered to people who could not repay them in order to get bonuses – toxic loans – which over time accumulated and the system failed.

Many books were written about the crisis providing explanations from a variety of viewpoints none showing any understanding how complexity of the global financial system masked the build-up to the crisis.

Only a rudimentary knowledge of complexity science is required to grasp how easy it is to prevent the next financial crisis [1] and yet the resistance to new ideas that contradict the well-established out-of-date mindset of experts in financial services will likely ensure that the new crisis will be even worse than the last one.

And technology for preventing global financial crisis has been developed [2] - *emergent AI* - technology capable of checking loan applicants' financial circumstances and use them to approve loans. It will never cheat to get a bonus. And it is cheaper to employ than loan executives.

## Rapidly Spreading Covid Pandemic of 2020

A rapidly spreading pandemic is a typical *butterfly effect* – a single small disruption at one end of the planet causes massive infection all over the world in a matter of weeks. We were not prepared for the rapid Covid pandemic hit.

Are we prepared to face the next?

*The contention of this post is that current models of coronavirus pandemic are inadequate because modellers have attempted to model a complex process – epidemic – ignoring principles of complexity science.*

Shortcomings of current coronavirus epidemic mathematical models, as perceived by the author, are:

Different models provide radically different values for the average reproduction number R (infection rate).

Reproduction numbers for different social contexts are not calculated.

Virus adaptation and mutation are not covered.

Group behaviour of viruses and potential victims is ignored.

The cost-effectiveness of various protection policies is not investigated.

A good example, highly relevant to the modelling of virus behaviour, is a group of viruses deciding if they should stay longer in the cells of a victim or switch to a new host [3].

Here is how the article “The Secret Social Lives of Viruses”, published on the website of the prestigious journal, Nature, on the 18<sup>th</sup> of June 2019, depicts a group of viruses making decisions: *“the viruses .... were chattering away, passing notes to each other in a molecular language only they could understand. They were deciding together when to lie low in the host cell and when to replicate and burst out, in search of new victims.”*

The eminent scientists investigating the pandemic of 2020 all belong to the traditional version of science and is therefore not surprising that they completely ignored the fact that viruses attack in groups and that epidemic is an adaptive system – viruses when threatened (say, by lockdowns) adapt by mutating into a new version of itself, usually much more infectious.

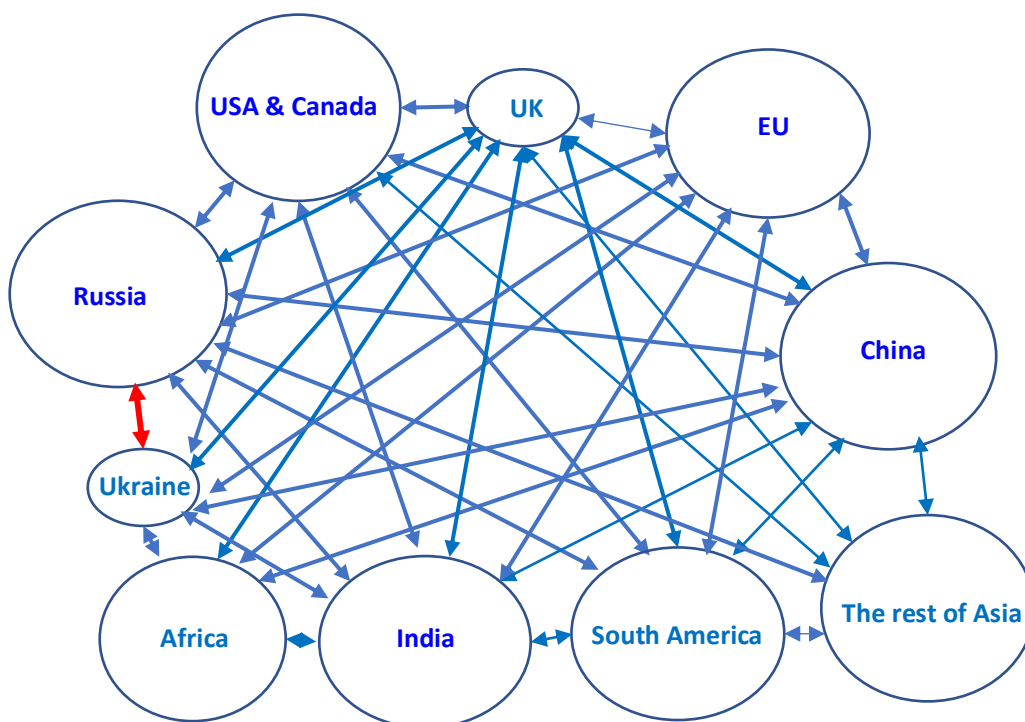
An effective AI-based pandemic simulator is an essential tool for the preparation for the next pandemic.

## War in Ukraine of 2022

The war in Ukraine is an *extreme event* hitting the complex global village.

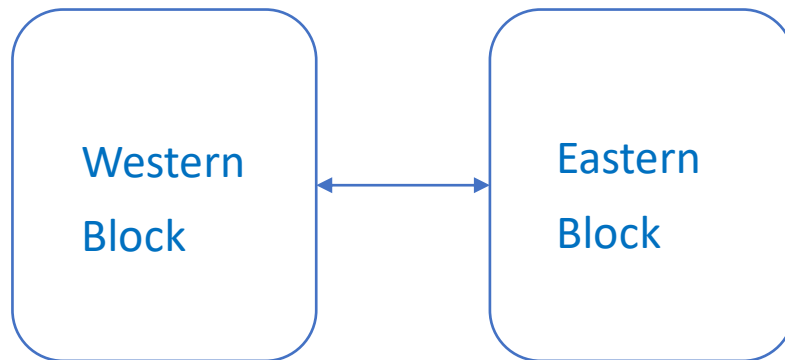
Both sides in the conflict are major suppliers of agricultural products and one side is a key supplier of energy (oil and gas). It was, therefore, inevitable that the war will have an impact on the world trade at a critical point in time, just when the planet is slowly recovering from consequences of Covid.

No previous local invasion of a neighbour ever caused worldwide political and economic disruptions on this scale, but then, the world was never so complex. The diagram below illustrates the connectivity among world regions at the time when the war began. Globalisation increased economic interdependency of world regions and in the process, unwittingly, destroyed self-sufficiency of nations, which is priceless during global crises such as a pandemic or a war.



The war in Ukraine caused military and economic consequences on a large scale, most of them unintended (OECD warned that the invasion will cost global economy at least \$2.8trn).

Military and political decision makers ignored high complexity of the geopolitical and economic constellation at the time. Which is perhaps not surprising considering that during the last major conflict, the cold war, the world was in a stable, rather than complex, situation as illustrated below.



My research shows that starting a military intervention is an irresponsible act - *since Napoleonic times no nation that started a war managed to win it.*

Napoleon lost in Spain and Russia in a guerrilla warfare and was finished at Waterloo.

Franz Józef not only lost the 1<sup>st</sup> world war, but his Austro-Hungarian Empire was dismembered.

Hitler was reduced to killing his dog, his mistress and himself in an underground bunker when he lost the 2<sup>nd</sup> world war. At Stalingrad his army of millions could not subdue Russian guerrilla-like resistance.

Japan surrendered after two atomic bomb hits.

Soviet Union run out of Afghanistan after 9 years of guerrilla warfare.

USA lost in Vietnam, again in a guerrilla warfare.

UK & France could not regain the ownership of Suez Canal in 1956.

Mighty NATO could not overpower guerrilla resistance in Iraq and Afghanistan.

After all these years, Israel still cannot win a guerrilla war with Palestine.

It is a pattern, isn't it?

Guerrilla is a Spanish word for a "small war", invented to describe how Spaniards fought Napoleon, by autonomous small groups and individuals cooperating with each other and, who, although coordinated, were not under a central control, like regular military units. This description of guerrilla matches the definition of a complex system.

Guerrilla warfare is therefore a complex system – and its complexity is a reason for its success.

Here is why.

According to the *law of requisite complexity*, a system can operate successfully in a complex environment only if it is as complex as its environment. And guerrilla resistance is as complex as a modern war whilst regular military units are centrally controlled.

## How to Survive and Prosper in the Complex World

We need to understand, at least, basics of complexity science to be able to live and work successfully under conditions of complexity. See, for example, [www.rzevskiresearch.uk](http://www.rzevskiresearch.uk).

Let's look at some of the solutions that complexity science (CS) offers to deal with current problems highlighted above.

## Problem 1

Complexity of the global political, social and economic systems (environment in which we live and work) is increasing. As a result, we have to live under unstable, volatile political, financial and economic conditions. However, because our environment is not under our jurisdiction, we cannot control its complexity.

### CS Solution 1: Withdraw from Globalisation and Maximise National Self-Sufficiency

*Cut our nonessential physical connectivity* to the rest of the world by bringing manufacture of critically important goods home and by developing local energy sources, and thus *reduce economic dependence on other nations*. As a bonus, this will reduce transport of goods across the planet and thus decrease global energy wastage and pollution.

In other words, we should strengthen our sovereignty on expense of globalisation. Brexit should be a good start.

## Problem 2

Even if we partially disengage from globalisation we shall have to trade in the complex internet-based global markets and deal with the complex global political situation.

Traditional strategies and methods are not designed to deal with uncertainty created by steadily increasing complexity.

### CS Solution 2: Transform our Businesses and Administrations into Adaptive and Resilient Organisations

To be successful, organisations operating in a complex environment must be *adaptive* and *resilient*.

Businesses and administrations can be transformed into adaptive and resilient organisations by replacing outdated enterprise resource planning (ERP) systems with *smart real-time schedulers* based on *emergent AI* (a new version of AI which does not require to be trained) [4].

Smart real-time schedulers are capable of:

- Spotting instantly a disruptive event (a modification or cancellation of orders, a disruption of supplies, an electronic attack, a fraud attempt).

- Immediately identifying parts of the enterprise that will be affected by the unexpected disruption.

- Rapidly rescheduling affected resources to eliminate or, at least reduce consequences of the disruption, without disturbing the rest of the enterprise.

They can complete the whole cycle within minutes and, in some cases, in milliseconds [2].

## Problem 3

To increase our living standards and generate income for implementing net - zero targets, we need to grow our economy. How?

### CS Solution 3: Create Economic Growth by Focusing on Digital Services and AI

Let's follow the example of the federal state of California. Whilst United States are in recession and deeply troubled by political wars, the GDP of California has recently surpassed GDP of France and then GDP of the UK and is expected to grow higher than GDP of Germany.

How could economy of a federal state with less than 40 million inhabitants create consistently more wealth per annum than economies of European nations with 60 - 80 million citizens?

The answer is simple: *By focussing on digital technology and, particularly, on AI.*

Because the world is in the early stage of digital transformation, demand for digital services outstrips supply by a very large margin. The example of California clearly shows the advantages available to digital pioneers.

Digital industry also offers a unique opportunity for participants to work from home or as *digital nomads*. An estimated 30 million of digital workers currently work full time online and, at the same time, move across the planet from one country to another making use of easy-to-obtain *digital visa*.

Therefore, *hiring digital workers is not conditional on the availability of local talents*.

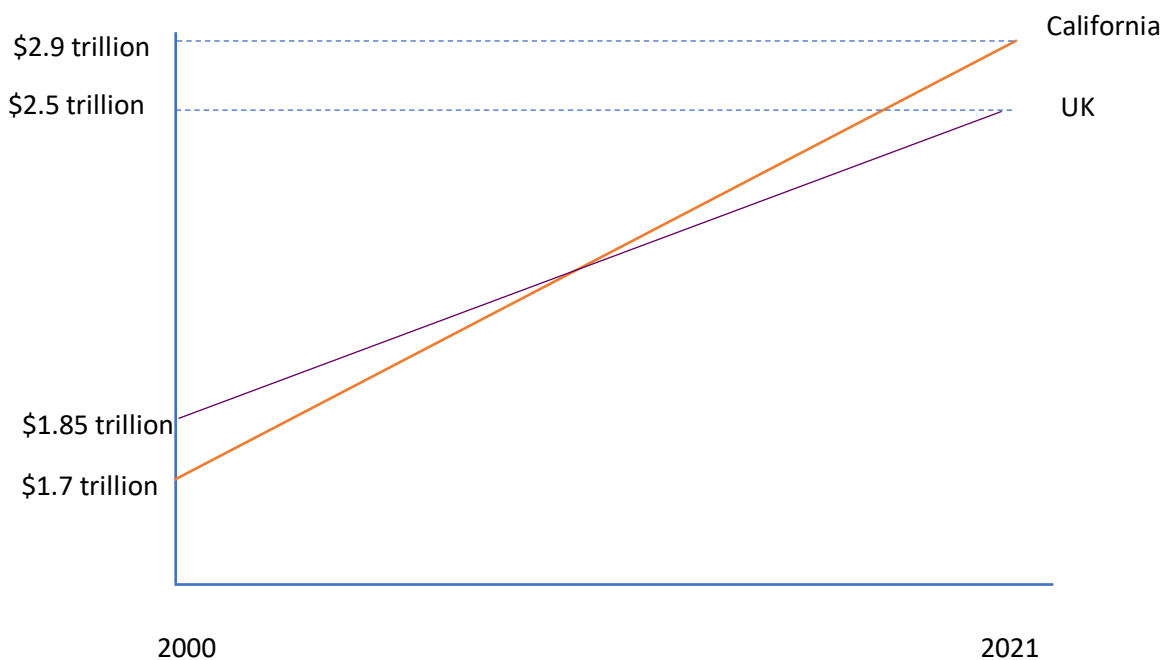
But, of course, instead of being a nomad you can stay put, enjoy your local culture and *work for a far-away digital employer*.

Will politicians, national and local, ever understand that training our youth in digital technology and helping them to find a *local or remote employment* is a cost-effective way of levelling up.

Every local community in the UK needs a Digital Growth Centre.

Listening to the UK politicians and bankers with warnings of the imminent long-term recession, double-figure inflation, tax increases and sharp rise in living costs, I wonder if they are so busy proclaiming doom and gloom that there is no time left for working on a wealth creating digital strategy. Or is it simply that they still live in industrial era - they need to wake up to see the real benefits offered by digital revolution.

The diagram below illustrates the rapid growth of GDP of California compared to the UK (data sources are World Bank website and Wikipedia).



## References

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4. Rzevski, G.; Skobelev, P. "Managing Complexity". WIT Press, Southampton, Boston, 2014. ISBN 978-1-84564-936-4.