Invited Speech on Tuesday 24 October 2023 at the 18th International Conference on Quality in Research, Bali   QiR

"The Impact of ICT on Economy and Society"
- Towards Synthecracy -

ir. Jaap van Till, visiting professor Digital Infrastructures
Oct 24   13.00 /01.00 PM local time (Bali's time) – 13:30

- How to create value together ?-
Some patterns noticed in Europe, to inspire constructive scenarios

Blog: TheConnectivist dot wordpress dot com

SUMMARY   **The Impact of ICT on Economy and Society, Towards Synthecracy.**
                  Ir. Jaap van Till, visiting professor Digital Infrastructures, The Netherlands.

ICT, and more specific Digital Infrastructures, can be noticed to have huge impacts on society. Young professionals and children live on
Internet & WWW, glued all day to their mobile phones or laptops with WiFi. Below that are the meshes of glass optic fiber cables carrying
light pulses and wireless electromagnetic links. I define that layer as the "*WorldWide Net*", which is growing fast, with ever increasing bandwidths.

To navigate in the direction of 'NetZero Emission through Green Technologies and Policies' it is essential to identify the obstacles and recognize
what lies at the core of the present multiple crises that politicians are wrestling with: (1) The malfunctioning of *hierarchies*, where loyalty has priority
over competence; (2) the inability of central governing elites all over the world *to cope with Complexity*. This demotivates young professionals
and young politicians. Examples how to cope with (1, 2) are given:

I Both are shown to be overcome by the development, since 2014, of a battlefield information management system in the Ukraine war.
   It has 'collective intelligence with decentral authority', informing all the military men and women who are fighting and observing, with drones,
   peer-to-peer cooperation, self-organizing and invention based on what works or not in the field. These are the keys to success and survival.
   They turned the war into an online gathering and correlation of information war with network links including wireless and low orbit satellite links (Starlink).

II Another important new development to cope with these turbulent times is the organizational physics recommended by "the BetaCodex Network"
   people in Germany. It urgently recommends to change the functions of people into an IT connected web of small teams, with very competent,
   diverse skilled, innovative, learning and creative specialists; that together focusses on value creation. Not top/down or bottom/up but effective
   inside/external co-creating.

Building on such new ICT networking and cooperation we see societies where the "*Trias Internetica*" division of tasks appears: Civilians, Companies
and State authorities; understanding and supporting eachother. If this Trias functions well we will move in the direction of an ecology I call a
Synthecracy. Value is then no longer extracted, at the expense of people and Nature; but created: by synthesis and synergy. With special new
functions for STEM professionals (Science& Biology, Technology, Engineering and Mathematicians), the now unhappy nerds & techies & pirates
& hackers I mentioned above. Their emphasis is on innovation, problem solving and critical thinking without permissions. A growth industry.
For all of these transitions we can learn a lot from Nature and how we are part of it. Indonesians understand this better than we in the "West"
(Europe and USA). And flocks of birds, schools of fish and ants in their hills already know how to cooperate and with their collective intelligence produce
emergent behaviour. We can also learn from:
•How jungles and forests are connected subsoil with roots and fungi wires for food and information.
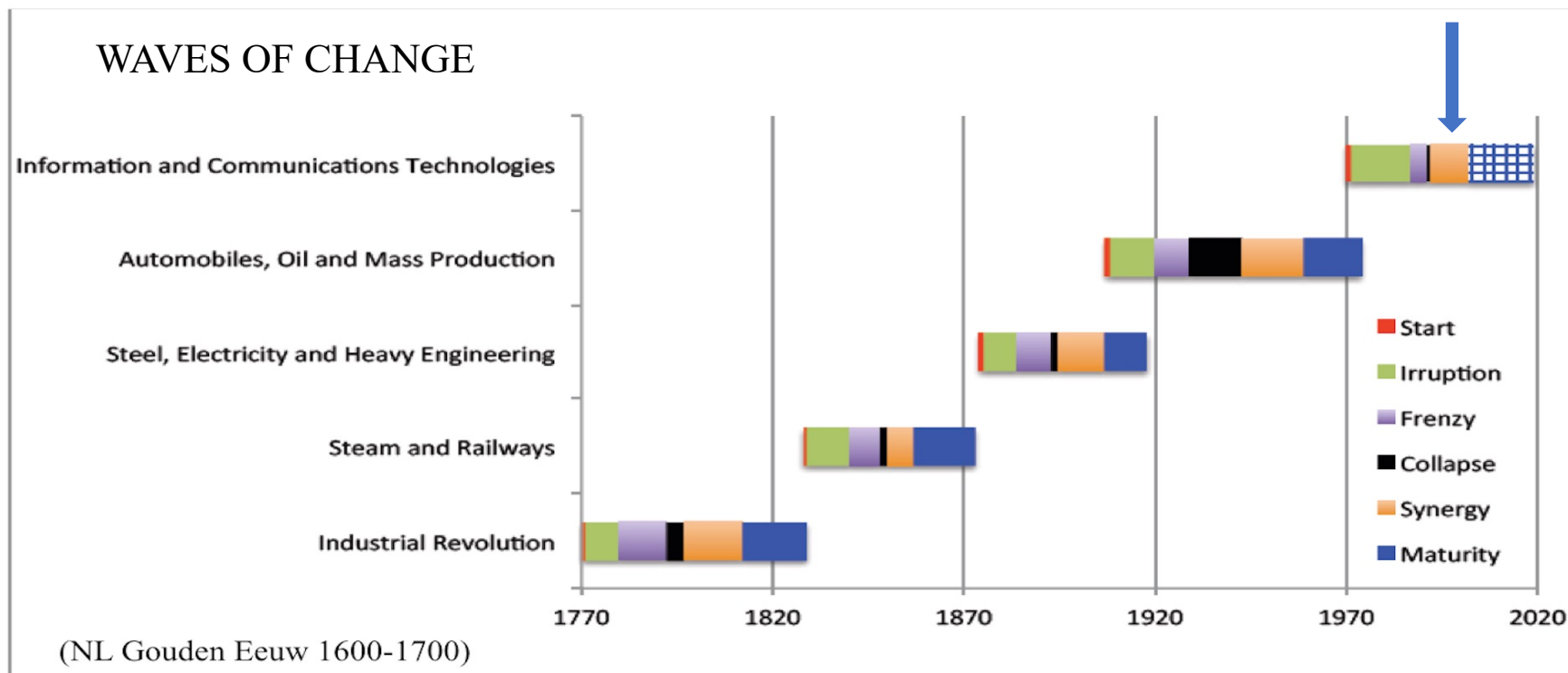•How the human brain and nervous system links grows and adapts with neuroplasticity, also at older ages!
Humans are part of Nature and therefore we should be aware how the flow of energy and information though the networks and ecologies work,
with or without support of computer chips and routers. This is about the Forces of Life we are discovering.

1. **Introduction:**
   What are the Problems
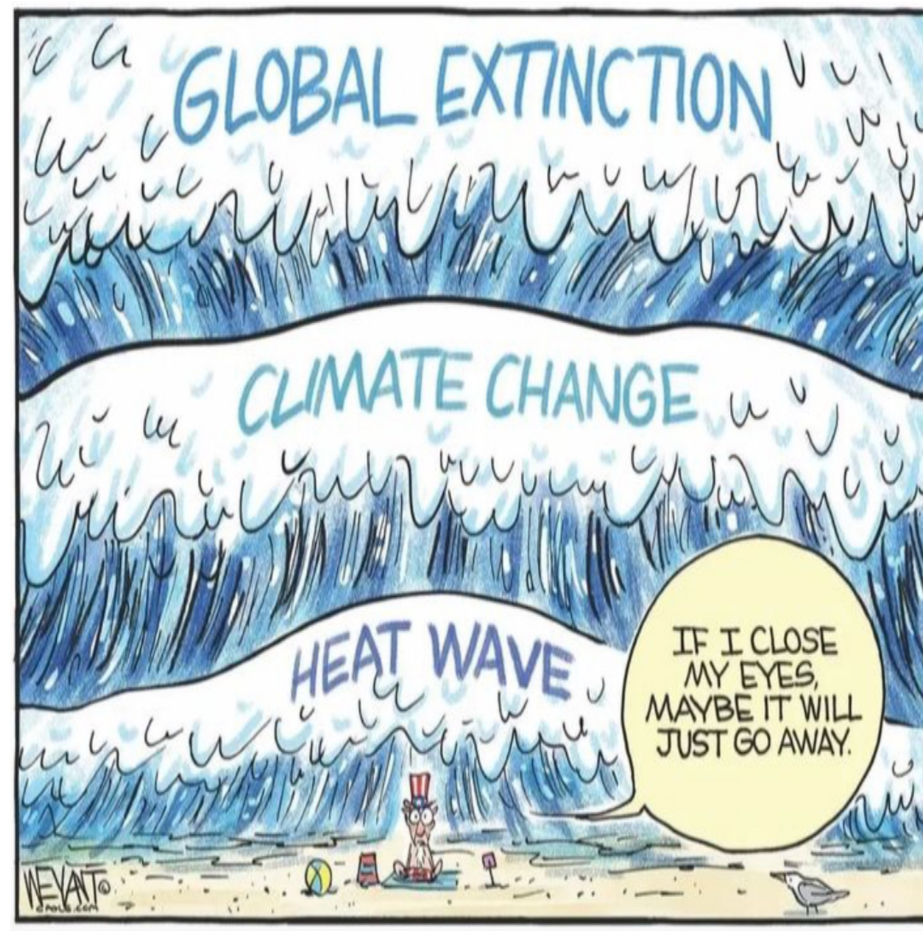
- Unexpected? Governments and press jump from Crisis to Crisis. I counted at least 32 issues which are not adressed/ solved

- NL 1 million people below poverty level → our Teflon PM: " do not blame me " , WEF does not know HOW solve: Extracting Value?

- Solutions? Postphoned. Complexity (interwoven) -Fighting symptoms? Get stuck !   Unhappy and depressed young people: Future?

- Stronger Command & Control vs   extreme viewpoints   THEY BOTH JUST DO NOT WORK Politicians: Rebuild, rebuild HOW?

Recovery from the 2007-2008 Financial Crisis (Collapse) ?   No, we are still in a TRANSITION halfway that Crisis

WAVES OF CHANGE

Information and Communications Technologies

Automobiles, Oil and Mass Production

Steel, Electricity and Heavy Engineering

Steam and Railways

Industrial Revolution

■ Start
■ Irruption
■ Frenzy
■ Collapse
■ Synergy
■ Maturity

1770   1820   1870   1920   1970   2020

(NL Gouden Eeuw 1600-1700)

Other transitions:

* Countries →
Connected Urban
Area's

• Electronics →
Optical

*Text Processing
→ Image
Processing,
Patterns , AI

Figure 1: Technological revolutions since 1770 for the five different technology disruptions.
(Source: C. Perez (2004) and authors' calculations)

Former Wave: Industrial Know how: drivers where **Oil, Chemistry, Electro-Mechanics** as *General Purpose Technologies (GPT)*
Present Wave: ICT is GPT = Computer HW, SW and Connections,   logistics of networks
          Rifkin : "The Age of Infrastructures" Convergence of Infrastructures for transport of **Energy, Physical stuff, Data**.

4

2. What is coming
The following learning curves and infrastructures are approaching: (Innovation clusters)

- 6. 2024 **Circular Economy**, Biotech, Nanotech, repair and re-use. Donut economy.

- 7. **Regeneration** of *Ecologies of Life* **in and subservient** to 1Planet Nature, topsoil (16 cm)

- 8. Construction of networks with "**collective intelligence & decentral autothority**", fractal stacks, holograms, networked democracy CONNECTED !!!

- 9. Building of the **Global Brain**: connectivity of $> 10 \,\char`\^\, 10$ people

- 10. **Gaia** wakes up, is conscious and starts making contact with other planets

For explanation see video: https://www.youtube.com/watch?v=Tz6_Zuvvrt0

Obstacles: Assumptions, structures, habits and policies in (Civil) society are still INDUSTRIAL THINKING

What is the problem: Neoliberal Capitalism does not work any more.

Value extraction at the expense of people (slaves) and nature.

old hierarchical organizations (Napoleons army central control) Taylor: Thinkers/doers

can no longer cope with COMPLEXITY   --→ Simplifications, ineffective

- Too many levels of management
- Decisions Too slow (reaction time)
- Inward looking Command & Control
- Endless meetings, present/approval
- Filtering (bits, simple, good news)
- Upwards information (aggregates)
- Downwards: instructions
- No overviews, no explanations
- Could not communicate with
  lower layer employees
  NOW WE CAN !!
  (networked transparency)

- Central Overview (model) Too simple
- Out of touch with reality (busin. process)
- Confirmation of "working" model only (prejudices);
  Push R&D → market
- Cannot cope with unexpected surprises
- Vulnerability * huge bureaucracies (Ashby's Law)
- Organization does not Learn, innovate
- Talent and creativity wasted : young nerds
- Does not scale up well
- Cannot cope with diversity
- Middle management, admin jobs ?? AI ??
- Competing silos, power struggles, non sharing, does
  not work. Mis- trust , Controlaholics
- Both young & innovative ignored,
  excluded

Silos

External:
Complex
Reality

Business Process

aanpak : Kantelen & P2P Co-creation
Value chain of partners
Aanpak complexity : Liebig's Law

<u>Obstacle: Complexity</u> of structures (highly interwoven). Is not the same as "Complicated systems"

- How do we solve our most urgent societal challenges, such as the ecological breakdown, growing inequality, and the spread of misinformation? Solutions include unprecedented societal and technological changes in highly interrelated systems, balancing fairness and other moral principles in the process. To understand and communicate such interdisciplinary problems, we need a common language: *Complexity*.

  Complexity refers to a property of many systems – global climate, traffic jams, trees, forrests or the human immune system – where their emergent features make them hard to manage. It typically means having multiple different elements interacting and adapting in ways that are not intuitive.

- Society and economy are driven by that very property of complex cooperation and creativity: emergent features produced by Synergy !

  That is what creates value.

In times of War innovations are tested out quickly, matter of survival.　Ukraine De-colonized.
Ukraine has since 9 years, after the Maidan-square massacre snipers 2014 prepared and
digitized the war.　Example: huge number of remote operation of Drones, UAV's against tanks.

Important is Battlefield Information Sharing: Decentral initiatives and authority but with Collective
Intelligence: Shared vision and mission. Connected. VALUE CREATION "Delta system" [1]
RT updated by observations from many sources, combined but also fed back to the teams in the
frontlines (overviews of the opponents to the contributors).　Incentive !!　Co-Creatie. Experience
tested and fed to others. Learning and innovating network organisation.　Concern for people !

n-

-

Periphery

Center
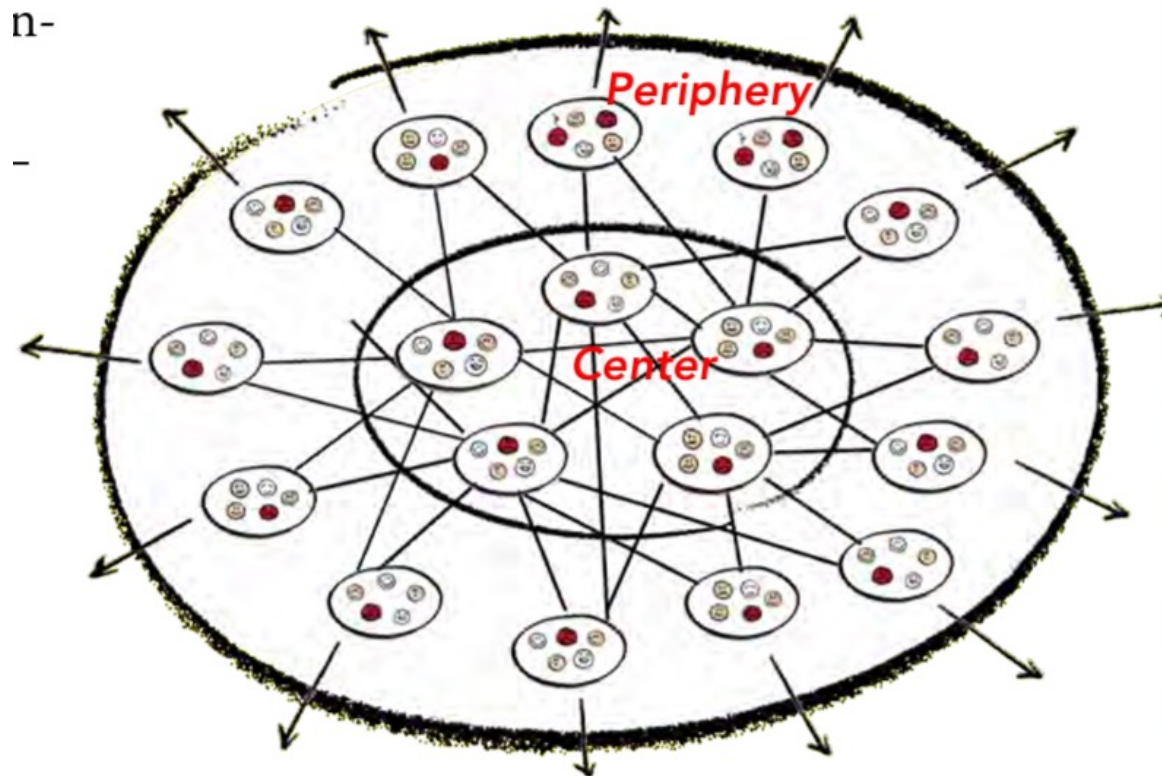
Delta system, see [1]. Digitized war.
Decentral authority & Collective Intelligence
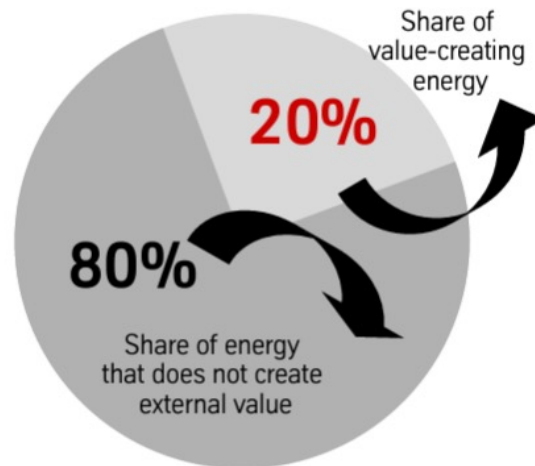Management ??? Only for certain tasks (strategy)

Diversity (multidisciplinary)Skilled people teams
Cooperating Self stearing, co-creating
Connected tablets and smartphones
Starlink , Wifi and optic fiber links

Top down → bottom up? Intern /Extern
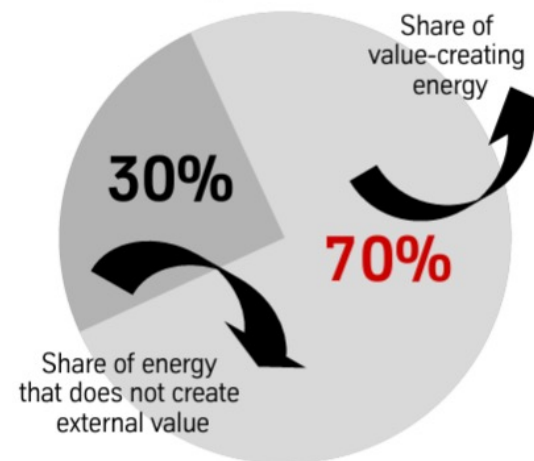Small teams. Fast reactions, learning, creative

Organizations today are grossly ineffective. Because most of us have flawed ideas about what actually makes them tick

The average organization

Share of value-creating energy

20%

80%

Share of energy that does not create external value

The best organizations

Share of value-creating energy

30%

70%

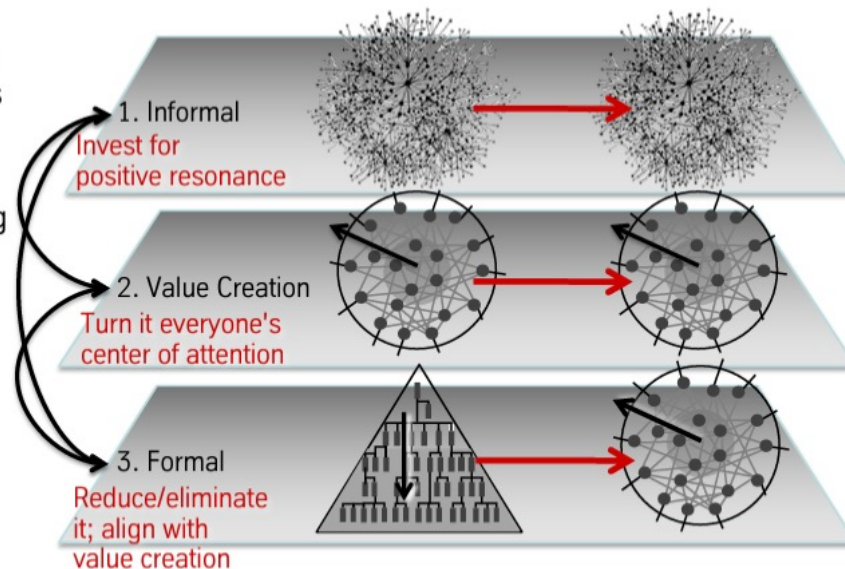Share of energy that does not create external value

Organizations work through structures. And every organization has three of those. Not one. The problem: Hardly anyone in business is aware of that - and that's why so much investment into effectiveness and change simply misses the point. Let's consider why this is urgent.

BetaCodex Network white paper No. 11 | Org Physics - Explained

5

A

What "organizational transformation" is. And what it means.

Organizational transformation intended to produce higher organizational and individual success, effectiveness, and happiness, should consequently focus on the following guiding principles:

1. **Eliminate Formal Structure**, as much as possible, by fully aligning it with value creation and by allowing it only for external compliance. Make the work independent of formal structure.

2. **Focus all organizational energy (e.g. with regards to learning and mastery) on the first two structures** - *not* on formal structure, which is trivial. Approach Informal and Value Creation Structures with a systemic mindset.

3. **Support the positive effects of Informal Structure** through high levels of transparency, investment in self-awareness of teams, radical decentralization of decision-making towards the periphery, and also through bonding rituals, and strong, shared values and principles.

1. Informal
Invest for positive resonance

2. Value Creation
Turn it everyone's center of attention

3. Formal
Reduce/eliminate it; align with value creation

Focus on VALUE CREATION in Small teams.

Management less Important NON-TAYLOR Industrial thinking

Treat each person as valuable and respect!

Putting it all together.
The three structures and their interrelation

The three structures of an organization strongly influence each other.

Remember:
Value creation only occurs through the 2nd structure, whereas the 1st is a natural collateral of social interaction and bonding. The 3rd serves only for external compliance, while it can easily get in the way of value creation, due to disempowerment of an organization's people.

Inter-relations

1. **Informal Structure**

2. **Value Creation Structure**

3. **Formal Structure**

14C
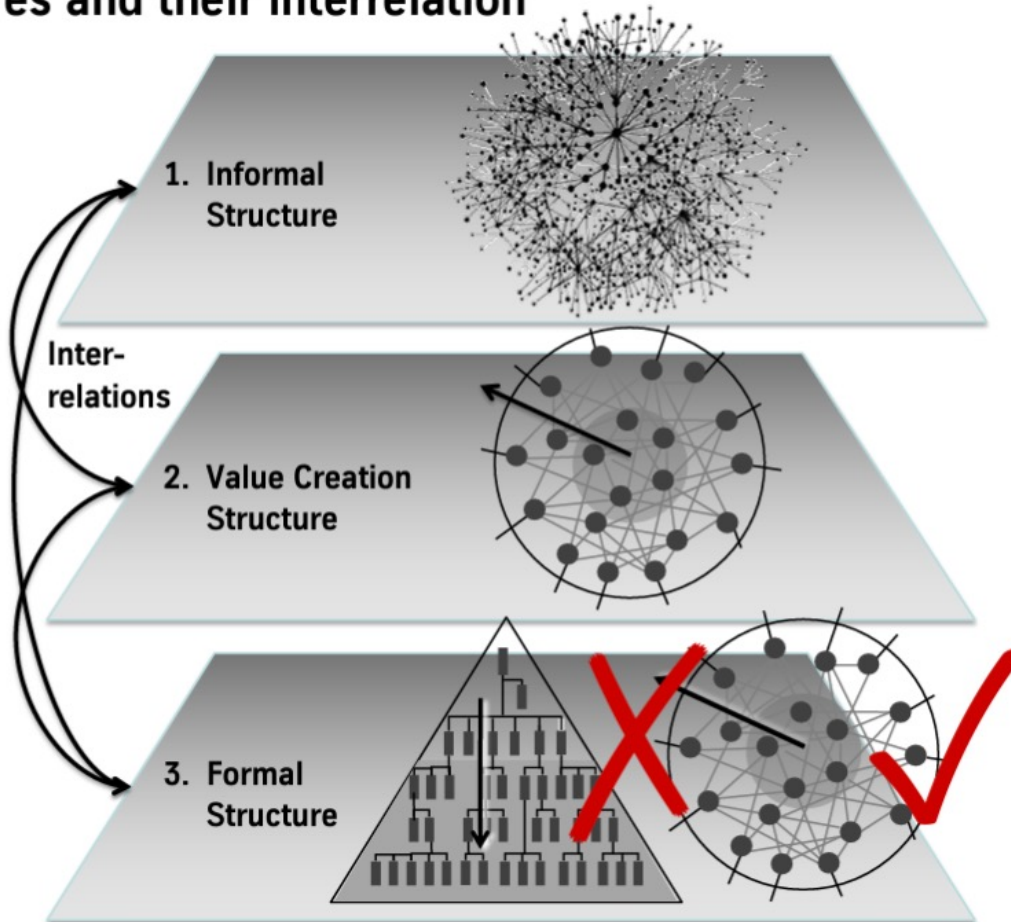
Different than other organizational design approaches discussed currently, Cell Structure Design is based on the crucial insight that **decentralization is paramount, and in fact inevitable, in complexity.** While Cell Structure Design is rather new (it was published in 2021 by Red42 as an open source social technology), the insight that decentralization of decision-making should be the cornerstone of coherent self-organization, market-orientation and organizational democracy, is not. The idea of decentraliza–tion shines through in the work of early pioneers of organizational theory like Mary P. Follett, as early as in the 1920s/30s (as explored in our white paper No. 18), and it can be found in the work of Kurt Lewin (1930s/40s), W. Edwards Deming (1950s to 1990s) and Peter Drucker (1060s to 2000s), among others. See overview in our white paper No. 14.

Notably, the *Socio-Technical Systems movement* around Merrelyn Emery, Fred Emery and Eric Trist of the Tavistock Institute, added a lot to the deeper understanding of decentralized organizational design. Starting in 1998, the Beyond Budgeting Round Table added further depth to the approach, thanks to its case-study research on firms like Handelsbanken.

In our work at the BetaCodex Network, several white papers are a testament to our own research and advances around the matter of decentralization. First came *Turn your company outside-in!* from 2008, then papers on *Org Physics* and *Organize for Complexity* (from 2011 and 2012, respectively). The year 2021 finally saw the publication of Cell Structure Design as an *open source social technology*, available to all. For additional information, visit cellstructuredesign.com.

Market

Periphery

Center
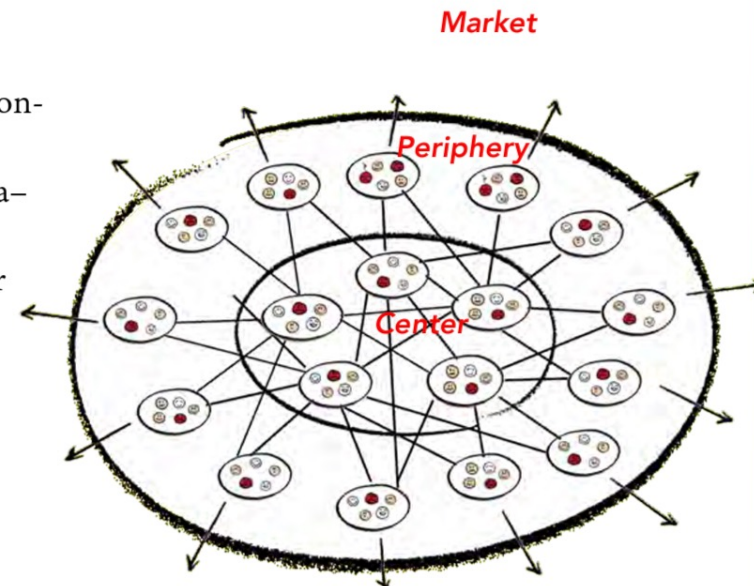
See [2]
(Open source)

Transparant
Information
Sharing !!

With
computer
Networks

Pattern
Extraction
From large
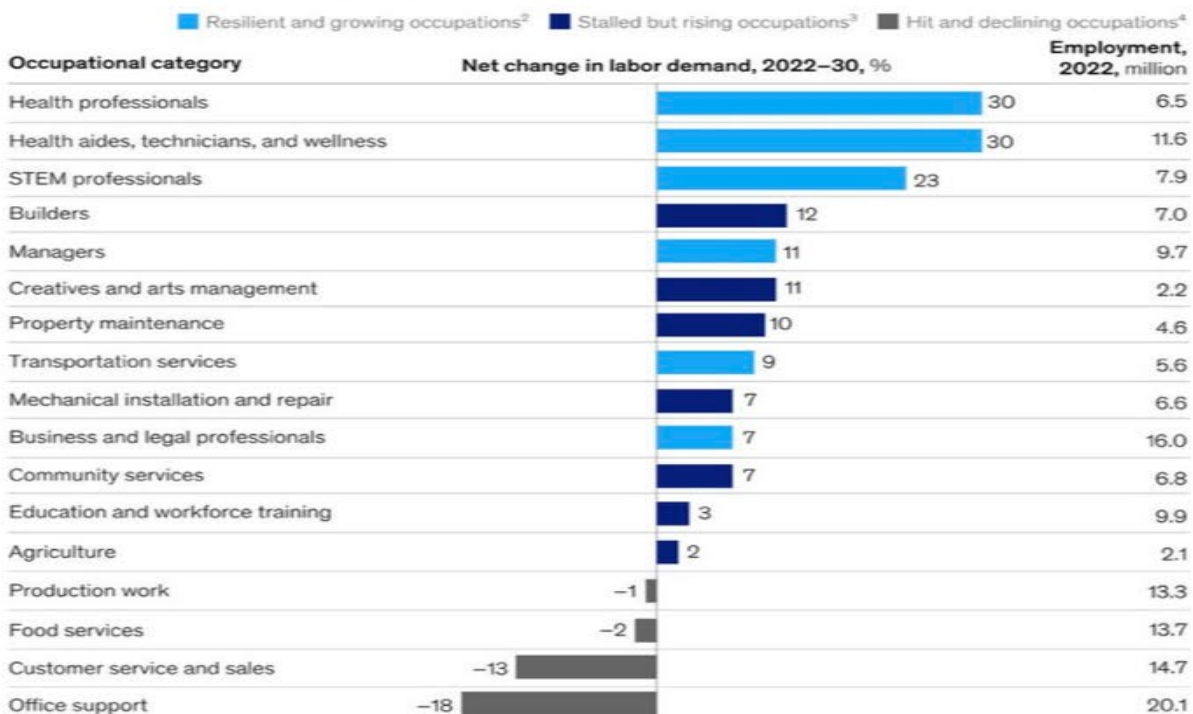Datasets:
AI
(Available
for all)

Synergy

Synthecracy

ASML = Advanced Semiconductor Materials Lithography   Value Chain/network of the best contributors in many countries!!

4. WHO STEM : professionals in **S**cience (+Biology) , **T**echnology, **E**ngineering and **M**ath
including programmers, digital infrastructure engineers

Healthcare, STEM, and builder roles could grow, while demand for office support and customer service roles could decline.

Estimated future US job growth by occupational category
Midpoint automation scenario,[1] with generative AI acceleration

Shortage?

Stop treating them like slaves !

■ Resilient and growing occupations[2] ■ Stalled but rising occupations[3] ■ Hit and declining occupations[4]

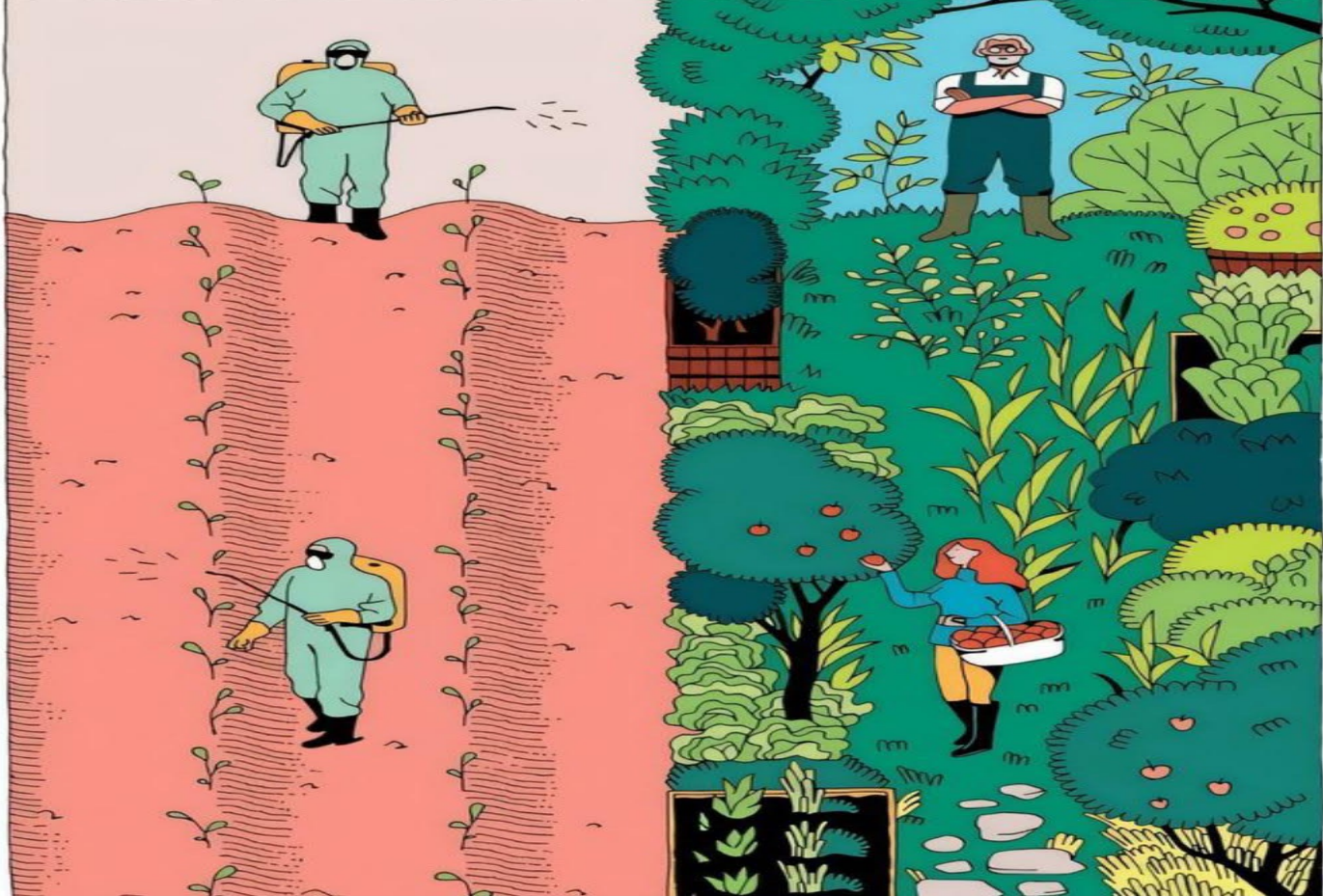| Occupational category	Net change in labor demand, 2022–30, %	Employment, 2022, million
Health professionals	30	6.5
Health aides, technicians, and wellness	30	11.6
STEM professionals	23	7.9
Builders	12	7.0
Managers	11	9.7
Creatives and arts management	11	2.2
Property maintenance	10	4.6
Transportation services	9	5.6
Mechanical installation and repair	7	6.6
Business and legal professionals	7	16.0
Community services	7	6.8
Education and workforce training	3	9.9
Agriculture	2	2.1
Production work	−1	13.3
Food services	−2	13.7
Customer service and sales	−13	14.7
Office support	−18	20.1

[1]Midpoint automation adoption is the average of early and late automation adoption scenarios as referenced in *The economic potential of generative AI: The next productivity frontier*, McKinsey & Company, June 2023.
[2]Resilient during the pandemic, 2019–22, and expected to grow between 2022 and 2030.
[3]Stalled during the pandemic, 2019–22, and expected to rise between 2022 and 2030.
[4]Hit during the pandemic, 2019–22, and continuing to decline between 2022 and 2030.
Source: O*NET; US Bureau of Labor Statistics; Current Population Survey, US Census Bureau; McKinsey Global Institute analysis

Industrialised
Farming

COMMAND &
CONTROL
NATURE ??

RE -
GENERATION

With many life
forms
In Nature
blooming
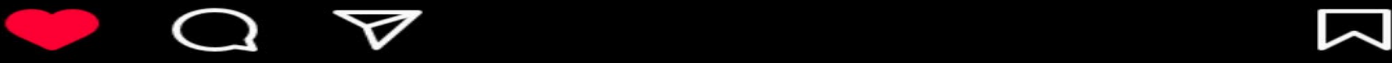
Also in-body:
Neuro-plasticity

16

We should be humble: each of us is one of the trillion AI connected braincells of GAIA's Global Brain

Articles which give background to this lecture

[1] https://warontherocks.com/2023/08/open-source-technology-and-public-private-innovation-are-the-key-to-ukraines-strategic-resilience/

[2] https://issuu.com/nielspflaeging./docs/betacodex-organiseervoorcomplexiteit
The other white papers 1 - 19 are in English and can be found atj:
 https://betacodex.org/white-papers/

For further reading 1

- Jaap van Till, Chapter 3 in "Handbook of Research on Software Quality Innovation in Interactive Systems", Editor: Cipolla-Ficarra, Francisco Vicente; IGI Global, 2021.

- George Monbiot, "Regenesis"" - Feeding the World without devouring the planet - ; Alan Lane; 2022.

- Joshua Cooper Ramo, "The Seventh Sense" – Power, Fortune and Survival in the Age of Networks"; Little, Brown and Company; 2016.

- Jeff Hawkins, "A Thousand Brains" - A new theory of intelligence-, Basic Books, 2021

- Sibylle Berg, "Grime" - A Novel - ; St.Martin's Griffin, 2022

- Philip Blom, "De Onderwerping" - Een geschiedenis van de verhouding van de mens tot de Natuur- ; Carl Hanser Verlag Gmbh, 2022

- Peter Russell, "The Global Brain" - The Awakening Earth in a new Century- ; 2007

Futher reading/ viewing -2

* David Weinberger "Everyday Chaos"
• Kate Raworth "Doughnut Economics" –Seven Ways to Think like a 21st-Century Economist, 2017
• Carlota Perez "Technological Revolutions and Financial Capital" - The Dynamics of Bubbles and Golden Ages- ; 2003.
 • Peter Corning "Synergistic Selection" –How Cooperation Has Shaped Evolution and the Rise of Humankind- ; 2018.
• S. Frederick Starr "Lost Enlightenment- Central Asia's Golden Age, from the Arab Conquest to Tamerlane-", 2013.
• Boulton, Allen and Bowman "Embracing Complexity" –Strategic Perspectives for an Age of Turbulence- ; 2015.
• Peter Csermely "Weak Links"-The Universal Key to the Stability of Networks and Complex Systems- ; 2006.
• Albert-Laszlo Barabasi "Network Science"; 2016. Readable online at http://networksciencebook.com
• Jochai Benkler "The Wealth of Networks"; 2006.
• Eliyahu M. Goldratt "The Goal"- Introduction to the Theory of Constraints (Graphic Novel) ~ Liebig Law of bottlenecks.
• Film: "The Seeds of Vandana Shiva", see Youtube. Twitter: @drVandanaShiva and other subsoil initiatives.
• Films about Fungi networks, connected woods, etc
• Peter Russell "The Global Brain"-Speculations on the Evolutionary Leap to Planetary Consciousness- 2007
• Philipp Blom "Die Unterwerfung" –Anfang und Ende der menschlichen Herrschaft über die Natur – 2022, in Ger, IT, NL
• Dirk Helbing and Jeroen van den Hoven "Beyond Smart Cities, 2019.
• Niels Pflaeging Creating Value: see redforty2.com and #betacodex (cell structure design); 2023.
* The AVATAR films
• Jaap van Till, blogs: TheConnectivist.wordpress.com
  Zie: https://theconnectivist.wordpress.com/2023/01/11/the-vantill-transition

• My two recent lectures for KIVI = The Royal Institute of Engineers, The Netherlands. (In the Dutch language)
   Both can be found on my Blogpage TheConnectivist and then viewed on Youtube
 https://theconnectivist.wordpress.com/2023/01/22/my-lecture-for-the-nl-royal-institute-of-engineers-kivi/
https://theconnectivist.wordpress.com/2023/07/09/op-donderdagmiddag-6-juli-2023-gaf-ik-een-inspiratielezing-in-den-haag/