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Economics as a common interdisciplinary platform–a cybernetic approach

Abstract

Cybernetics is the study of communication and control processes in biological, mechanical, and electronic systems and as such more relevant to the study of human behavior than simple paradigms, for instance Bounded Rationality (BR). Cybernetic Economics has like other cybernetic systems three levels:

A. Economics aims to maximize the utility of goods and services

B. Relevant Feedback is QALY-effects, for instance:

1) Eco effects, 2) Human relations and 3) Personal income

C. System Management:

Ad 1: A carbon neutral economy by a global CO_2-emission Tariff (ET)

Ad 2: Operation of the Big5 by Neuroeconomic Model (NeM)

Ad 1-2: Informal bottom-up support of tripartite management (3P)

Ad 3a: Market-based economic growth

Ad 3b: Equalization of the market-based income by Universal Basic Income (UBI)

Conclusion: A test course indicates that Cybernetic Economics can be disseminated to laymen. The major dissemination challenge is to give specialized researchers an introduction course in Cybernetics. Dissemination of Cybernetic Economics should have top-priority, because it's critical to better democratic guidance of Mankind towards the best possible QALY.

Keywords: cybernetics, neuroeconomics, behavioral economics (BE), democratic economy, tripartite management (3P), Big5

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Introduction

Marshall launched 1890 a vision of Economics as a common tool for utilitarian guidance of human behavior as alternative to religious belief. After WW2, mankind was recognized to have two separated value-systems, the Humanities centering individual values, and the natural sciences based on logical empiricism.[1] Economics integrates the two systems into a utilitarian pragmatism. The Paradigm of Bounded Rationality (BR) advanced by Simon 1955, has been useful for the breakthrough of industrial growth in daily necessities. However, sustainable growth in a globalized economy has revealed a number of shortcomings to BR (market-failures) as long-term paradigm of economic behavior:

i. As already claimed by Simon many people act selfish for career purposes in corporations and institutions

ii. As demonstrated by Kahneman many are blocked by loss aversion in periods with economic recession

iii. In complex choices like healthcare and Eco-protection, a minority is ruled by risk-aversion

iv. Students have called for a pluralist approach regarding theory, method and interdisciplinarity.[2]

Since the nineties, interdisciplinary integration has been studied in a cybernetic framework in Annual Symposia in Baden-Baden, Germany, organized by International Institute of Advanced Studies (IIAS). Cybernetics studies communication and control processes in biological, mechanical, and electronic systems.[3] Cybernetics is supposed to give a better approach to biological systems than simple linear systems such as BR. The present approach to Cybernetic Economics aims to identify new broad empirical system parameters of both micro- and macroeconomics.

Method

Referring to the classical Utilitarians,[4] Cybernetic Economics aims to maximize the utility of goods and services. The relevant feedback systems are identified reviewing empirical studies of the major domains of Economics:

a) Behavioral economics

b) Democratic economy

c) Business management

As part of this review process, evidenced means to correct the identified growth factors, are reviewed, too.

Results

Behavioral economics

Neuroeconomics presents a complex model of decision-making (NeM) integrating Neurology, Economics and Psychology based on McLeans Triune Conception of Brain and Behavior where the basal

neurodynamics is between Frontal Cognition and Limbic reward-seeking (Autonomic Nervous System (ANS).[5] The integration of ANS and Frontal Cognition is determined by the shape of complementary empiric decision-making profiles:

A. Intertemporal choices (IC) finding a majority of Rationalists dominated by Frontal Cognition at a moderate ANS.

B. A minority of Risk-averters dominated by ANS at a low Frontal Cognition.

C. Another minority of IC decision-makers are Explorers with low ANS and moderate Frontal Cognition.

The curvilinear relationship in Figure 1 identifies Risk-willingness (Temper) with these basal correlations: Car driving (r=0.49), Financial matters (r=0.50), Careers (r=0.61), Sports/leisure (r=0.56), and Health (r=0.48) [Dohmen et al., 2012]. This identifies risk-willingness (Temper) with moderation as a performance optimum as a basal parameter of human behavior.

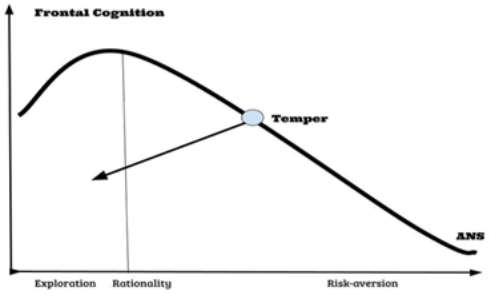

Figure 1 Neuroeconomic model (NeM).

5 basal personality traits are identified by correlations between empirical studies of personality. The Big5 adds a new Temper to the 4 classical Tempers, the Open-minded. The genetic rooting of extreme Tempers as Extraversion and Neuroticism makes them rather inflexible. Open-mindedness is an in-between Temper that grows for instance from Conscientiousness by Liberal upbringing, tertiary education and personal life experiences in family and business life. Big5 correlates with Risk-willingness: Extraverts and Open-minded correlate positively with the Dohmen Score while Conscientious, Agreeable and Neurotic correlate negatively (As a diagnosis Neurotics is omitted). NeM orders the Big5 in Table 1 for decentralized sensitivity training, see.[5] A heuristic for yourself and others learning is a crucial skill to decision-makers in most domains of Economics and it comprises only 4 categories because Neuroticism is a diagnosis that should not be applied among laymen.

Democratic economy

Mainstream Economics focuses on the direct interaction of producers and consumers externalizing eventual third-party effects leaving them for political synthesis. This leaves mainstream Economics as a closed system with poor communication with borderline disciplines, which is critical because the greenhouse effect knows no national borders in the globalized economy. For instance, Neoliberalism is outdated due to negative side effects such as 1) Global warming, 2) Increasing inequality and 3) Epidemic job-related stress. Also the opposite, the economic experiment with a centrally planned economy in Eastern Europe 1917-91 had a poor outcome.[6]

1762 Rousseau advanced a social contract on collective agreement in democracies on finance of common goods like correction of market-failures for democracies as an alternative to the ideological fighting of wings characterizing the history of democracies. The social contract implies a strong reciprocity by collaboration across the center between social liberals and social democrats as illustrated in Figure 2. The parameters of a pluralist democratic economy form a general framework for sustainable economic transactions in accordance with the 17 UNSG Appendix 2 p. 226].[7]

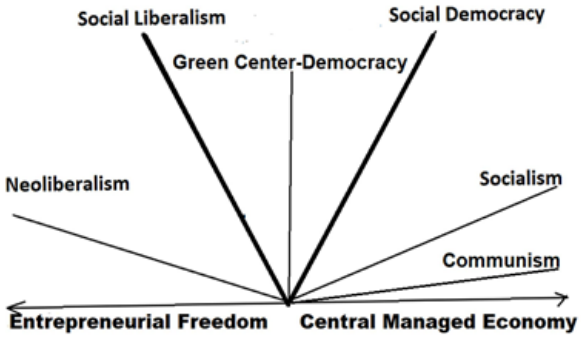

Figure 2 Democratic economic policy.

Important examples of reciprocal democratic collaboration on common economic goods à la Rousseau are:

1) Principles of Political Economy[4] is a British parallel to Rousseau recommending redistribution policy which is best implemented as Universal Basic Income (UBI) simplifying tax and subsidy systems

2) Expansive Keynesian fiscal policy after WW2 to recover from demand-based recessions

3) Health systems with universal coverage in most industrialized democracies except the US

4) A Pigovian CO_2 Tariff towards the greenhouse effect is claimed by economics since 1920 (ET)

The central economic criteria is Quality-of-Life (QALY) - integrating Economics and Medicine in technology assessment of healthcare (HTA). Universal Technology Assessment (UTA) assesses quality-of-life across Economics, Medicine and Ecology including third-party effects in the standard analysis. The outcome of UTA is - like in healthcare - QALY (Quality-Adjusted Life Years) - combining quantitative and qualitative effects. Basal parameters are identified from NeM:

1. Frontal Cognition operates as economic growth
2. Limbic System (ANS) operates as the stress level
3. Parameters 1-2 operate in the Ecosystem wheretore an eventual ecological impact of economic transactions represents a third parameter in the CTA

As explained above, the most effective legislation for implementation of a carbon neutral economy, has for 100 years been known as a CO Tariff (ET) that makes the emitter pay for his damages and creates an incentive to alternative solutions. However, changing conditions of national economies, due to the globalized economy with a national conflict of interests between green economy by ET and national protection of business and employment, is the slow implementation of ET. To overcome this obstacle, ET must be imposed on nations from the international level (UN) as an alternative to the present national political-administrative technocracy around the Paris Agreement 2015.[5] However, an effective international ET at the level of 50-100 USD/Ton has a gross budget more times higher than any

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recent UN intervention which requires new standards for international economic collaboration. A new relevant technology with long-term unit costs corresponding to the contemporary difference between fossil and renewable energy can facilitate the financial obstacle, it is Direct Air Capture of CO_2 (DAC).[8] Financing DAC Plants by the revenue from the UN ET on nations removes CO_2 directly from the atmosphere in a cost-effective way as well as strengthens the national incentive to implement ET.A series of Nobel Laureates (Milton, Meade, Samuelson, Simon, Solow, Tinbergen and Tobin) recommend Universal Basic Income (UBI) as the most effective means to equalize personal income and suspend relative poverty. For left-wingers in the post-industrial economies, UBI at the level of 50% of the median income suspends relative poverty, for right-wing liberals UBI can be financed without deteriorating the national level of internal competitiveness and at the same time simplify and clarify the system of personal income tax. Recent sample studies on UBI, for instance in Finland, reject the classical liberalist objection that UBI undermines the willingness to work and long-term growth.[5]

In all, the cybernetic state of Mankind, defined by UTA, has three basal parameters. The marginal state of UTA is that the negative side-effects (2-3) today far outweighs the positive effect of growth (1).[6]

Further implementation of the democratic targets (§2)

The full implementation of the targets of the Democratic Economy comprises a broad economic legislation, for instance

I. Income taxes and subsidies on persons and corporations as well as tariffs/subsidies on products/services.

II. Labor protection, for instance regarding formation of labor unions and hiring/dismissal of employees.

Complementary to direct policies such as ET and UBI, a relatively new positive trend in implementation of the UTA targets is the 3P Management model that`s like a Doughnut where material economic transactions go on in the environmental Ecosystem with an inner core of common values. The 3P in Figure 3 is already implemented in more corporations with good results, for instance Novo Nordic Both corporations and institutions contribute directly to the implementation of a green circular economy as framed by politics.

Figure 3 Tripartite bottom-line of management (3P).

Planet: Eco-effects; Personnel: Job-Stress; Profit: Business driver.

Progressive firms work out a green corporation account for internal discussion, planning and improvement. For instance on 1) CO_2 emission, 2) Handling of Garbage and 3) Reuse. The collaborative skills of the Personnel can be improved by sensitivity training in the simplified Big5 model in Table 1 and further developed by Human relations Development (HRD). It's important that a number of multinational companies today see a self-interest in contributing actively to the common goods in the globalized economy.

Table 1 Personality profiles for individual identification (☒)

Extravert: ⊏⊐	**Open-minded:** ⊏⊐	**Conscientious:** ⊏⊐	**Agreeable:** ⊏⊐
- Stimulated by Other	- Receptive to arguments	- Organized	- Collaborative
- Outbounded	- Cultural experience	- Responsible	- Considerate
- Energetic	- Aesthetics	- Diligent	- Orderly and Quiet
- Talkative	- Curious/Innovative	- Efficiency-oriented	- Sympathetic
- No Reservations	- Not necessarily consistent	- No Procrastination	- Non-selfish

A prototype of 3P Management is the "Pilot-in-the-plane entrepreneur" with 4 personality characteristics[9]:

1) A pragmatic preference to "Bird in hand" instead of "Birds on the roof"

2) Moderation of the profit motive to an alternative Worst-case budget defining an eventual necessity to stop the project

3) Open-mindedness with a good ability to communicate and collaborate with others (Personnel dimension)like in healthcare

4) A lot of optimism to overcome non-predicted difficulties as symbolized in the saying on turning sour citrus into a sweet lemonade.

A recommended framework for the development of strategic corporate management is an analysis of Strengths, Weaknesses, Opportunities and Threats (SWOT Analysis).

Dissemination of cybernetic economics

Antique Greece discovered scientific synthesizing as a dialectical process between thesis and antithesis. In the 17th Century, British Empiricists like Bacon, Locke and Hume added empiric falsification to the dialectical process to overcome prejudices by religion, tradition and personality. Cybernetic Economics as systemic know-how on Quality-of-Life identifies subjective biases as special cases of Type 1-2 Errors to the positivist method, see Table 2. This implies that economists must learn to control their subjective biases to gain representative knowledge. This is a barrier to laymen without basic scientific education!

Table 2 Dialectic positivism in economics

True value	**Sample-based probability**		**Outcome**
	Accept	**Reject**	
Most probable scenario	Representative Knowledge	Type I Error (Conscientiousness)	-QALY -Ecoprotection -De-stressing
Worst-casescenario	Type 2 Error (Extraversion)	INTEGRITY	-Profit

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Cybernetic management knowledge has 3P as the central parameters. The dissemination of such an approach has been tested on a group of students in Public Administration at the Niels Brock Business School in Copenhagen. The feedback clearly indicated that the students appreciate it as a simple comprehensive introduction to modern economic-politics. The 3P is implemented in the legislative regulation of economic behavior, for instance income taxes, corporate law and labor unions.

The real challenge of disseminating Cybernetic Economics is to upgrade specialist researchers in the social sciences to an interdisciplinary level! Such dissemination has been tested in more Discussions of individual sub-papers at Academia.edu with several thousand of positive respondents. The major finding is that researchers in BRICS, where economists are still searching their identity in the globalized economy, is a central target group. For instance, the Indian management researcher Jyoti Satpathy has founded Institute of Neuro-economic Management (INM) in Bhubaneswar, India, for this line of research.

The overall conclusion on Cybernetic Economics is that a broad dissemination to laymen is a realistic target upgrading specialist researchers to a common interdisciplinary level of thinking by an introductory course in Cybernetic Economics. Knowledge on Economics is in itself a growth factor.[10,11] Following the Human Capital model improved public knowledge on effective means to correct evidenced market-failures (UTA) is the most effective means to economic growth (rising (QALY) in a fragmented world, for instance compared with basal technological improvements in digital technology.

In a global perspective, Chinese Confucianism is a non-democratic alternative that accepts natural hierarchies, but also expects authorities to fulfill duties, for instance Eco-protection. Only the future can show whether Western democracy or Chinese Confucianism provides the best quality-of-life.

Discussion of cybernetic and circular economics

Future sustainability is alternatively studied as transition to a circular economy. Nica et al.,[12] aims to clarify the problems of turning a national economy (Romania) circular in accordance with EU policy. Multiple Linear Regression of data from EUROSTAT was applied to assess the impact of variables such as Waste per capita, Recycling rate by region, Labor productivity, Production of environmental goods, and Circular material use rate on real Gross Domestic Product (GDP) 5 per capita. Given these results the model studies the long-run and short-run causal impact of independent variables on real GDP per capita. Major results are how greenhouse gas emissions from production activities and labor productivity per person employed and hour worked affect the generation of municipal waste per capita. So, the study complements the present one.

Nica et al.,[12] claim that the novelty and significance of their article relies on advancing specialized literature in a holistic analysis from a cybernetic perspective and its integration with econometric models. Our analysis shows that effective promotion of a circular economy is not possible without a strong international collaboration on a global ET. Further, our study referring to Universal Technology Assessment (UTA), also faces inequality and epidemic stress as basal negative side-effects of a one-sided national focus on the growth of GDP.

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Conflicts of interest

Neither author has any conflict of interest.

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