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Chapter

Inertia in Assessing the Possibilities of Economic Development: Limits in Modelling Economies

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Abstract

We cannot transcend our world, our history and time to see ourselves from a broad enough perspective, and so our reasoning is limited by our being in the world. It is easy to draw conclusions a posteriori, analyse historical events and assume that our ancestors were, or should have been, aware of connections which we observe in hindsight. We also find it easy to interpret current affairs, label them and draw conclusions about their future development in accordance with the current theories and our zeitgeist. We are wrong to do so in both situations. Human perception is subject to the laws of inertia. Without realising inertia's immense influence, we will create models of the world which are distant from reality and short-lived. Players in (what appears to be) the information economy want us to believe that endless progress is possible. States and economic agencies behave as if this were given and no other possibility should be worth serious consideration. Every business and every country present prognoses showing ever-increasing indicators. We want everything to grow: the GDP, our profit margins and sales. Human population continues to grow as well, globally, but is progress the indicator of human population? Is development our destiny?

Keywords: economic development, limitations, crisis, risk, results

1. Introduction: progress as a virus

In his seminal 1976 book *The Selfish Gene*, Richard Dawkins famously posited that culture, which is a set of intersubjective rules considered to be true and real by human societies, can be viewed as a human virus [1]. Just as biological parasites strive to multiply their DNA without care for the state of their carrier, so too ideas strive to multiply without care for their carrier, human cultures and societies. Dawkins calls these ideas memes. Memes' only function is to spread from person to person, thus increasing the total number of believers in a particular idea. And by modifying individual consciousnesses, memes also modify the physical reality. The majority of contemporary economists who, like the priests and magi of yore, attempt to foresee future, believe that we can all carry on getting richer: individuals, corporations and states alike can keep on increasing their value and their resources. Humans consider themselves the top of the food

chain and, admitting no natural enemies, want to be the masters of the world and control its fate. We believe that, at least in theory, human activity has no bounds and we can endlessly create new beings, ideas and myths. It is true so far as ideas go, but in reality economic growth and other forms of "progress" can lead humanity to extinction.

2. The limits of the progress

Another unique feature of *Homo sapiens* is the ability to create unreal and unnatural entities. Only humans can describe reality and, consequently, to diverge from reality in creating ideas which as yet do not exist in reality. We can even imagine illogical beings and convince ourselves that they are real. In this way, we have been able to creatively explain our activities, and when we conceive of our explanations in universal terms—as laws or belief systems—they in turn change our consciousness. Humans have become masters of the world and have come to believe it their responsibility to subdue the earth [2]. This belief informs our repeated attempts to alter the reality. Since the times humans were hunter-gatherers, we have been limited by resource availability. We moved around in search of food, but nature could not have fed as many of us as we are now without human-led adaptation. Development in nature is limited to evolution and changes in resource use. Having reached the limits of what nature had to offer, humans had to adapt. Unlike animals, which evolve to adapt to the changing conditions, we changed the conditions. The subsequent agricultural, industrial and scientific revolutions of human culture and consciousness allowed us to alter our world without altering ourselves: without evolution.

Consequently, our bodies are still those of hunter-gatherers, rather than those of office and industrial workers. When our ancestors discovered that they can grow edible plants and keep edible animals, they changed their habits. They started tilling land, irrigating it and harvesting, storing and processing their produce in order to have a steady supply of food. The food did indeed become steady, but it was also more labour-intensive, and the new diet was less varied than before. Finally, it caused our ancestors to settle in one place. If we accept that evolutionary success is marked by the widest possible spread of specific DNA, we will also have to admit that, by choosing certain plants for cultivation over others, we have caused those plants' expansion. It is these plants, having us convinced by their properties to cultivate them, that are the true evolutionary winners: wheat, potatoes, oats and other plants which now dominate Earth, thanks to humans. Could it be said that, according to the progress-as-virus principle, these plants have domesticated *Homo sapiens* and, by proliferating so successfully, caused the extinction of other species and thus altered the ecosystem? Humans have done the same, however. We domesticated other species in order to secure more plentiful and more varied nutrition and increase our holdings. In effect, we have caused further changes to the ecosystems and in particular to biodiversity, and, indeed, locally we have caused resource depletion. In this new situation, new forms of life began to thrive: ones which found humans and their stores of food a favourable environment.

Progress, defined as the spreading of DNA and multiplying of the species, has always entailed a focus on short-term gain and cost dispersal to other species, which experience no particular benefits from the dominant species' growth. Earth's real estate is limited. Fresh water, arable land, mineral and fuel deposits are limited. The idea of endless progress may, therefore, be an unrealistic dream which exists only within a world view peculiar to our society: a collective consciousness. To understand the process of creating reality and rules which inform it, we must identify types of realities within which humans operate. There are three:

- Objective reality, in which individual beings exist independently of humans. Radioactivity, stones and wind exist even if humans deny their existence. We can name objects and states, but this does not alter their essence. At this level, progress is limited by the change in the form of existing resources.

- Subjective reality, or individual experience. Here everything depends on the individual. Their death ends it all. Two people can exchange experiences through speech and writing, but the recipient is entirely responsible for processing and decoding the message, and, in the end, everyone must live through an event in order to gain the experience of it. Subjective reality is also accessible to animals. We can train a dog or tame a horse. This does not, however, mean that all dogs and all horses are trained and tamed. In this context progress means making new associations, learning and experiencing. These functions are all specific to particular individuals.

- Subobjective reality, which exists only where many people share a belief, a mythology, or conviction that others behave according to agreed conventions. This type of socially constructed reality makes it possible to create legal fictions such as money, currency markets, or security. These fictions become real through behaviours which modify the physical reality. By introducing the notion of monetary value, we can assign purchasing power to pieces of paper and accept them in return for goods and services even though in reality it is impossible to attribute to them an absolute, direct usefulness. At this level endless progress is entirely possible.

It is the ability to create subobjective realities that separates us from animals. We can create anything we can imagine. This means that every conceptual system, every culture and every economy will work so long as the majority of its participants believe in it. We currently accept that all people are equal and each person has rights. We have created organisations whose sole aim is to ensure that these rights are protected, even though there is no such thing as rights in nature.

We must recognise that, when we assume the subobjective reality to be real and objective, we are bound to make errors due to our disconnection from the physical world.

Nowhere is our realisation of this disconnection better illustrated than in our recent creation of virtual reality, entirely unreal and yet capable of eliciting the same reactions from people, as the engagement with the real world.

3. The theory of inertia: limits of the progress

Humans are limited by their very being in the world and consequently, we will never truly understand ourselves. This is especially true of the entire workings of the human brain, understanding which would be the best basis for creating a perfect android. We do not understand consciousness because if we did, we would be able to transplant it onto non-human entities, and the idea of humanity would be forever transformed. Until this happens, our failure to account for our limitations leads us to create unverifiable myths. One of the chief human errors is the assumption that we can evaluate and predict the future.

When Isaac Newton published, in his 1697 *Philosophiae Naturalis Principia Mathematica*, the equations which describe natural phenomena in the language of mathematics, the process of altering our understanding of the world began. Since Newton's equations proved verifiable across many fields, people came to believe that

it is possible to formulate a universal equation descriptive of the workings of the entire world, or a part of it, even if this part is in fact a created subobjective reality.

The nineteenth century was replete with scientific discoveries; more and more exceptions to Newton's laws were recorded, and ever more sophisticated scientific theories were proposed. All of this culminated in the early twentieth century, with the development of quantum physics and mechanics. This intricate model explains the world better than Newton's laws, but it is not widely applied because of its complexity. Quantum theories broadly conclude that every macro-scale process is the result of laws governing the micro-scale. We must therefore realise that human behaviours are also the result of physical processes at the molecular level. Everything is comprised of atoms, and these are governed by micro-scale laws whose effect will be noticed in the macro-scale.

Let us assume that quantum theories are correct and that, accordingly, the only certainty is that any given activity will have an effect, but we cannot establish specific probability of a particular effect.

Alternatively, let us assume that the probability of each effect is 50%: it will either happen or not. Very frequently, processes progress differently than planned, and, therefore, any prediction potential will be flawed. Humans tend to rely on experience, but this method is never fully verifiable. We can capture the relationships between individual elements of various prediction models in (**Figure 1**)

In effect, the ability to foresee future precisely is very limited and flawed. The certainty of each event can be calculated as 50%, which should lead us to seek out not just the possible events but also their consequences. In existing models, probability is not the measure of objective reality but a subjective image of the existing models' ineffectuality.

We may form the following observations [3] based on the above diagram:

1. Possible events are not unlimited, and the number of possible events depends on the correlations between the relevant factors, with varying threshold limit values to each combination. It is also possible to define threshold properties of events, based on their combinations, although it is not always possible to identify individual events. At the same time, every possible event will be congruous with its nature, even if we are not aware of what it is.

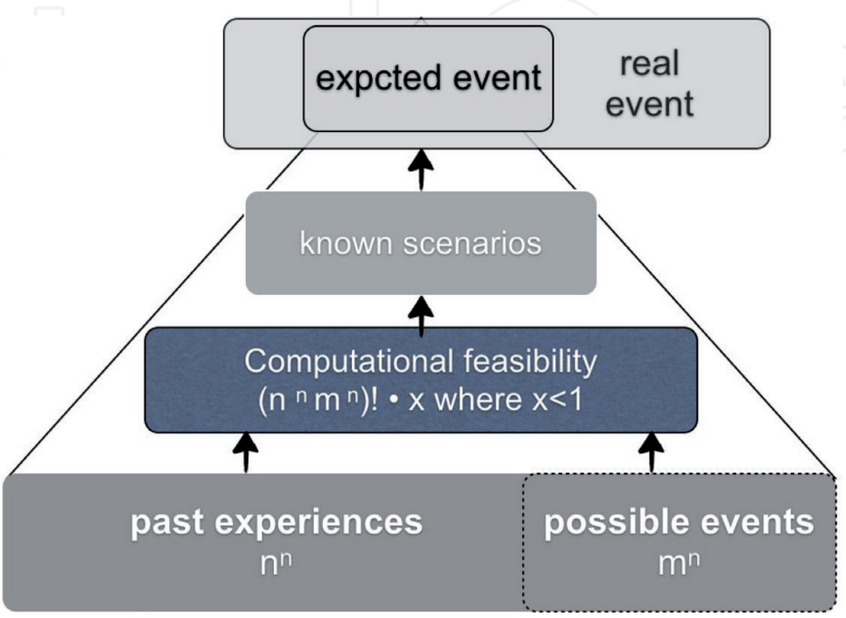


Figure 1.
Determinants of decision verifiability.

2. Human experience is based on concrete past events, recorded in the individual and the collective memory. Describing history as it does, this data set also informs us about the possible futures: the greater the set, the more possibilities for consideration. However, the set is never complete—giving rise to the black swan phenomenon, as well as sod's/Murphy's law. This appears to be congruous with the wider laws of physics and explains the inadequacy of future event prediction models which rely on computation using arbitrary coefficients.

3. Identification of possible events is based on computational feasibility; however, the focus should be on predicting possible consequences and deciding the course of action based on preparation for all eventualities, rather than on event probability. Stock exchange analyses are a particularly good example: the more complex the model, the better the analyses—which still does not rule out error. This is because human behaviours within markets result from subobjective processes and attempting to assess these processes alters the behaviours. However, if we account for acceptable losses and expected profits for each transaction, to succeed we simply have to ensure that expected profits outweigh acceptable losses. If we make 10% on a profitable transaction, we can invest five times in a row and lose 1%: we still make a profit.

4. Known scenarios (as expressions of the applied computational feasibility) will be appropriate to the degree to which past experiences and possible events are considered.

5. If, at the stage of future event assessment (identifying scenarios), we fail to consider possible events not based on experience, our analysis will be flawed.

Without a specific methodology, it is impossible to avoid the limiting influence of experience; therefore, no risk assessment is fully rational. It should, instead, be regarded as ancillary and not the foundation of decision-making.

The above arguments led to the development of the theory of inertia [4]. This model is informed by the following premises and correlations:

Premise 1. The probability of positive and negative outcome of our actions is always 50%. We have no influence over the outcome of our actions.

Premise 2. Since we cannot influence the actual event which will pass as the result of our actions, any focus on this event will be futile. The outcome for our enterprise will be the result of our preparation for the event, and not of actions taken to achieve the desired outcome.

Premise 3. Preparation for all possible outcomes (negative as well as desired) should be the goal of our actions. Lack of preparation is a decision which will result in negative outcomes.

Further, we note the following correlations:

Correlation 1. Negative outcomes of every action are the result of human errors or mistakes or machine malfunction. The risk of negative outcomes can be minimised through multi-level monitoring and controls which would verify that decisions are taken based on sound assumptions, that actions are followed through, and that machinery is kept in working condition with timely checks, repairs and part replacements.

Correlation 2. If the outcome of our actions does not result from human or machine factor, we have no influence over it. In such cases we must develop contingency procedures for all outcomes beyond our influence.

Two more correlations have been observed in addition to the above:

Correlation 3. When analysing real events and human behaviours, we must be aware that attempting to assess these events and behaviours may alter the

behaviours, rendering the analysis unverifiable. If an organisation publishes plans to increase sales and the market share, it can help achieve these plans if the potential investors respond positively, or it can have the opposite result if they react by supporting the competition, for example, in order to prevent a monopoly.

Correlation 4. Micro correlations must be reflected in the macro-scale. The family and the state should function according to the same budgetary norms. Neither one, nor the other, can freely spend means which they do not possess.

Failure to consider the above statements leads to a partial understanding of an event. A model which fails to consider alternative outcomes is incomplete, and analyses based on such a model are unverifiable. The idea of GDP growth based on direct investments financed by taxes entails limiting economic activity and degrading the purchasing power of all market participants. If our analysis does not consider this outcome, it will be uncertain and unverifiable. Analyses predicting constant growth and development can be equally unverifiable.

4. Market growth cycle

All social sciences—including the sciences of safety and of economics—assume that everything is subject to change. These sciences try to explain correlations and enable better forecasting of changes. Investments and the behaviour of market participants depend on the verifiability of such forecasts. As noted above, during planning we have to account for at least the following characteristics of the system within which we operate, in micro- as well as macro-scale:

- Non-analysability (first-degree system): analyses and their publication do not influence the behaviour of the system.

- Analysability (second-degree system): analyses and their publication can influence the behaviour of the system and the expectations of its development.

The second instance especially requires us to pay attention to avoid the limitations of inertia-led thinking. The benefits available to us are illustrated in **Figure 2**.

Every product and service, as well as other products of human initiative, such as notions of value or cryptocurrencies, are subject to economic cycles. Every entity begins, develops and then ends. The development of all aspects of human activity can be seen on the diagram.

We can assume that every product, service and state in the introductory phase are characterised by low sales or limited distribution. Next comes the growth phase, characterised by increased external parameters. After that comes maturity: the activity stabilises, and its features become fixed. Both latter phases are characterised by a steady sales growth (or another type of distribution growth). This is usually accompanied by the economies of scale effect: the decrease of cost of production/provision per unit. The activity's market success leads to the appearance of copycats; competition and imitations follow swiftly, except in situations where physical or subobjective barriers exist. This leads to market saturation and, eventually, to the decline of the activity: sales fall for all producers.

Growth parameters do not always mirror cost parameters. Usually the costs are high to start with, and then they fall. The diagram below illustrates it with segment A–B. Usually, this tendency prevails until the moment cost parameters fall below growth parameters (**Figure 3**).

Segment C–D is the state of maturity: costs fall, and profits stabilise. New players enter the market, interested in a share of the profits. Usually, this results in falling

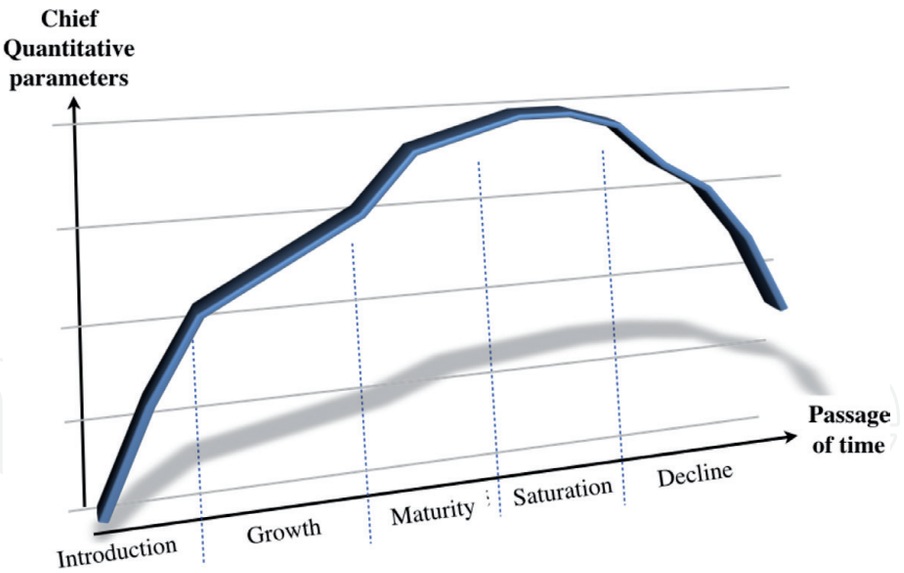


Figure 2.
The development of all aspects of human activity.

consumer prices, but product/service creators can continue to lower their costs, and so their profits continue, despite falling prices. By the time we reach market saturation (segment D–E), it appears that costs have been borne and our continued operation entails only direct costs of production. When the market shrinks and we produce less, our direct costs also fall. However, we may be faced with indirect costs. If prices of land or means of production fall or if the costs of invested capital, which cannot be freed up in a particular situation, grow, our profits will diminish. The current sciences of marketing and management provide a lot of ideas on cost cutting, efficiency maximising and measuring the quantitative parameters of our activities. A lot of time and effort is usually devoted to extending the maturity phase and preventing falling sales. Marketing at the micro-scale and regulation at the macro-scale can extend maturity and saturation, but they cannot change physical and systemic limitations. If our analyses remain only partial, losses become a real risk.

According to the theory of inertia presented above, growth is only possible until the limits are set by the physical and subobjective reality.

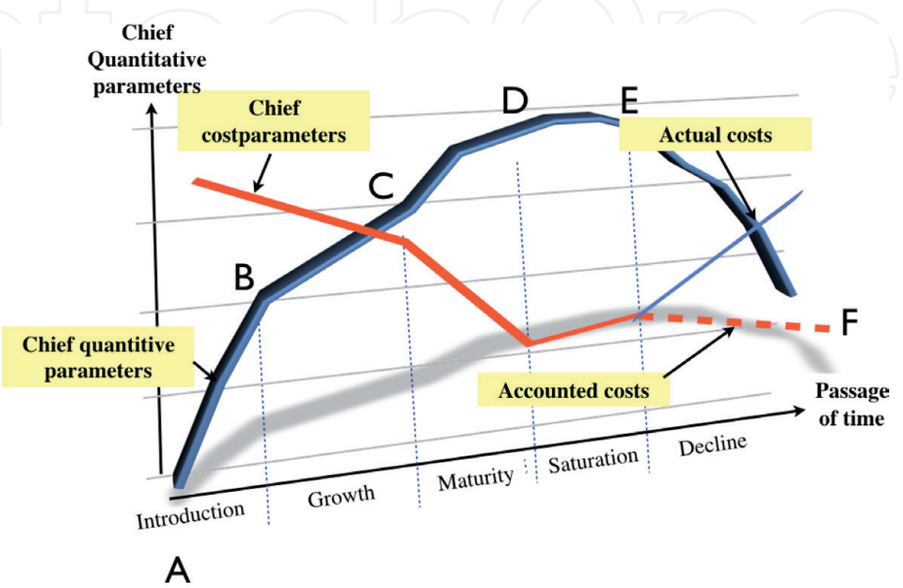


Figure 3.
Main trends in activity.

How does this theory influence our vision of the life cycle?

Broadly speaking, every civilisation develops until the point when its foundational system of subobjective beliefs is exhausted. Political and religious powers are part of this system and are not above it. Political and religious tweaks to the system can alter profoundly the subobjective and physical reality. If the consumption of a particular type of meat becomes a moral norm, it extends the maturity and saturation phases for the meat producers. The curves which illustrate the real economic cycles differ significantly from the relevant theoretical considerations. Particular phases are longer or shorter, and they develop faster or slower. Our desire for domination pushes us towards maximisation. We want forever more and forever new, but a moment comes when we cannot demand greater prices for the goods and services we provide and where there is no greater efficiency to be striven for. When we reach this point, we have three options.

Option 1. Our idea/activity succumbs to stagnation or decline. It will cease to excite or inspire confidence and will attract fewer buyers. Consider black and white television sets or cassette players. After growth and saturation, these products no longer sell, and offering them is not cost-effective. A niche market may continue for connoisseur consumers, but it will be characterised by high prices due to high costs resulting from a lack of economies of scale.

Option 2. Our idea/activity stops developing and becomes irrelevant to the market. Maturity-/saturation-level indicators hold for a long time beyond this point.

Consider the bicycle. More or less 150 years old, it was expected to be superseded by the motorcycle and the motorcar. More recently we have had electric bicycles, but the original idea continues to inspire and attract purchasers. Today nobody tries to unseat the bicycle with a new invention, although within the category new ideas and new technologies supplant old ones. But the basic concept of a human-powered two-wheeled vehicle remains the same.

Option 3. Forced development. After the market saturation phase, it remains possible to maintain high quantitative parameters, however, at disproportionately high costs. We can force development by way of profit concentration and cost dispersal and lower profits per unit. Take steel. The technology dates back to the seventeenth to nineteenth centuries, when it developed rapidly and with revolutionary results. The twentieth century relied mostly on technologies which had already been in place, and in global production terms, we reached peak steel. First steel-related patents appeared during World War One. The task of patents is to limit competition and concentrate profits: such moves aim to maintain or increase quantitative parameters through increasing barriers and costs. The technology itself moves slowly: we have electroslag remelting of stainless steels and continuous casting. We add new elements to create new alloys, but these are incremental changes, nothing revolutionary for the technology or profits it promises. To get more steel, we simply have to increase our ongoing depletion of the natural environment. As a result, other measures are deployed to increase/concentrate profits, such as offshoring production to countries in which the costs of production are lower and environmental regulations less stringent. Steel production profits invariably migrate to regions other than where it has been made and are limited to fewer individuals than the numbers of those affected by the costs of production and environmental destruction.

Let us look at warehousing. First, we had pallets and pallet racks. These became a standard even in small warehouses. Improvements followed: half-pallets, folding pallets, etc. More recently, automated warehouses have appeared, which can be developed until the limits of construction or organisational safety are reached. What is more, it turns out that economic indicators adjust to the majority view. Do we need automated warehouses? It cannot be known, but the majority of vocal economists view them as a necessary development.

Another example is crash statistics: The larger the vehicle, the greater the damage, and the greater the surface and load capacity, the more damaged goods. Which way do vehicles develop? We make vehicles lighter and yet larger, more capacious. We create gargantuan warehouses and monster vehicles, which are then driven bumper to bumper. The ever-decreasing efficiency and the ever-increasing environmental costs of such a system are clear for all to see. Growth will occur, but at the price of environmental destruction and, what follows, human annihilation. This is where growth is heading, if we ignore correlations stemming from the theory of inertia. Currently, we try to limit the effect of transport on the environment by tweaking fuelling technologies which cause toxic emissions. We imagine that electric vehicles will solve the problem. Indeed, we will reduce the emissions of CO2 *during* transport; however, the production, utilisation and disposal of car batteries are an environmental time bomb which we choose to ignore.

What volumes of greenhouse gas will we create in making electricity to power these batteries? As road users, we do not know and we are not interested. We focus on a popular topic and meanwhile we ignore facts. We keep alive a fossilised system, the costs of whose preservation will continue to grow and in which the concentrated profits generated by the transport industry will be neutralised by dispersed losses. Instead, we should modify the economic model to reflect real observations. We can do this by accepting the necessity to account for the inevitability of the end. In teaching economics, we should point to the opportunities for growth but also to the indicators that an activity should be ended. In accordance with the proposed theory of inertia, it is impossible to secure endless growth, but it is possible to identify the criteria for points (or states) at which an existing system ought to be reconfigured into a different system or subsumed by another system. We can illustrate it in (**Figure 4**).

For the time being, we shall ignore costs and efficiency; instead, we shall focus on the quantitative parameters of a system, such as sales or production quantities.

To start with (segment A–B), growth is slow and requires considerable investment. Initial implementation is the goal at this stage. Ideas are all-important, and sales are in the hands of those who own the product. At this stage of creating a sector, an organisation or a product, intellectual piracy can happen: the general public learns about the

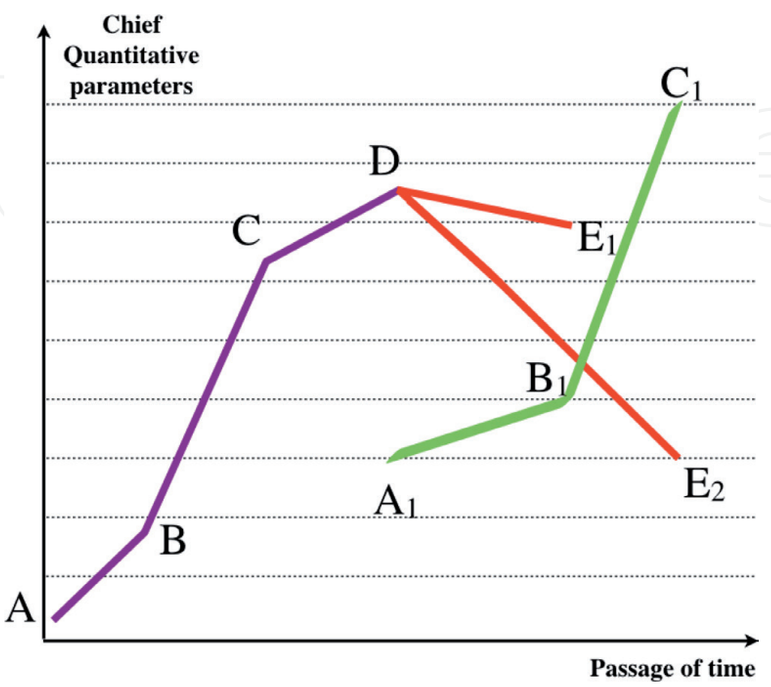


Figure 4.
Activity analysis.

real creators of revolutionary activities after many years or never. The more time passes since the creative act, the easier it is to foster a creation myth. In this way we can build an intersubjective reality which will help develop the product and its market potential.

By the time we have passed point B, the proposed model is widespread; however, most consumers prove to be happy with a lower-quality product or service than initially expected.

The digital revolution follows the same rules. The idea of storing and processing information as binary code on digital media has become universal, but initially few organisations were able to use computers as their creators intended, to their full capacity. Initially, computers were bought mainly to serve as digital typewriters: the idea and its possibilities were ahead of their time, and the creators had to accept this restricted use—both the consumers and the producers tacitly agreed to self-limit. Technology does not stand still, however, and subsequent product and market innovators made improvements to data processing itself and to the way in which it was presented for consumption. Progress has occurred; we move from theory to practice. Organisations reproduce each other's solutions. Improvements (and patents) increase. The system develops until all possibilities have been exploited and there is no further economic reason to continue further development. We have reached point C. In reality, this point is often reached inconspicuously. Organisational inertia occurs: too many people are interested in saving the status quo, what they know and what they are used to, to accept that an idea or activity has reached the end of its possibilities. From this moment on, any development is forced at a disproportionate cost. As mentioned above, when a new service enters the market, we can observe increased innovation. In the marketplace, this is reflected by an increase in patents, utility models and new solutions. Innovation is especially high at the beginning and at the end of the growth phase (segment C–D).

The second peak of innovativeness results from the above-mentioned inertia and is an attempt to prolong the life cycle of the product/service. The growth phase is characterised by maximum efficiency and productivity. After we have reached point D, we enter stagnation, and our indicators are less advantageous.

At this stage we can choose one of the three options discussed above.

Option 1: stagnation and decline, illustrated by segment D–E1

Option 2: acceptance of lower quality or other parameters, illustrated by segment D–E2

Option 3: forced development, illustrated by segment D-E3

The D-E2 and D-E3 variants are characterised by increased costs. The only way to fulfil the potential would be to make deep changes or introduce new solutions, before point D. This is illustrated by the line A1-B1-C1, which mirrors the earlier line A-B-C and is subject to the same life cycle conditions: it runs inevitably towards D1, at which point its further development will be limited.

The solution is to transform an existing system into a part of another system or reevaluate the assumptions. The economy will grow until one of its resources no longer provides any possibility of growth. If we reformulate our goals and replace the old system with a new system before this happens, the economy will survive. If it does not, natural selection will occur, and only those who are best adapted to the new conditions will survive.

If a country's GDP reaches a level determined by its limitations (e.g. agricultural resources or mineral deposits) and at the same time the country's population continues to increase, a shortage will occur which will encourage people to concentrate profits and disperse losses, that is to say to displace the costs of maintaining assets.

In the past, war was a frequent means of rebalancing this shortage.

Currently, instead of war we are observing increasing segregation: the drive to maintain the assets of the rich West is causing a displacement and dispersal of costs.

Cheap production in the East is causing environmental destruction and natural resource depletion but also the division of people into those who have and those who do not have the means to participate in concentrated profits.

Developing countries bear the greatest costs of the continued growth of developed economies because they do not have the means to optimise these costs. Climate change—all the violent weather we are already experiencing—is chiefly the result of the developed countries' activity. However, the repercussions affect mainly the poor nations. Additionally, if financing development is achieved through loans, we have a continual vicious circle of dependency. Poor countries must produce more in order to pay off their debts to the rich countries, who create the debts with their lending policies. Ultimately the costs are borne by the whole of humanity.

5. Conclusion

Economic theories, like every creation of the human mind, are cyclical: they are created, develop, linger and pass away. The theory of inertia stresses that awareness of the possibility of unplanned events, and being prepared for the effects of any such unplanned events, is crucial to our success and survival in real market situations. If we assume that the probability of every event is 50% and take measures to prepare for the effects of all possible future events, we increase our chances of survival. According to the theory of evolution, future-proofing is the basis of survival. Close inspection of our environment should convince us to make such changes to our existing system as to best utilise our resources and create new possibilities. Our analyses should consider the possibility of failure. What is important is not whether we reach a level of development indicated by a given value of GDP (Gross domestic product), but whether we are prepared for growth as well as for stagnation or shrinking of the economy.

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