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Janos Korn

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Co-evolution of technology and society

Janos Korn

Department of Design and Mathematics,
Middlesex University,
London, UK
Email: janos999@btinternet.com

Abstract: The current scale and complexity of human, technological activities have caused significant *problems* in society, to individuals and the environment. This may be seen as the consequence of the evolving, historical application of the relation between the invention/emotion driven technology and society or Industrial Revolutions. This relation is expressed as a conditional shown in detail in Figure 1 as an *instinctively* applicable problem-solving scheme. The alternative is the *deliberately* applicable problem-solving scheme in Figure 2. The suggestion is to introduce the alternative into wider use, if feasible, possible, or to question the elements of the conditional, both of which may help to alleviate the *problems*. An analytical method and the application of emotions are introduced into consideration of highly qualitative issues in society.

Keywords: technology; society; effect of emotions; industrial revolutions; systems theory; design; problem solving; linguistic modelling; logical conditionals.

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Biographical notes: Janos Korn graduated at Queen Mary College, University of London followed by MPhil and PhD degrees. After graduation, he was employed by Smith Industries, as a Development Engineer then became a Lecturer in the future Middlesex University until retirement. He worked for the Open University as a part time tutor and was a member of the Institution of Mechanical and Electrical Engineers.

1 Introduction

We describe *technology* as the practice of production of products inspired by specific manifestations of the mind such as: inventive ideas [invention of the steam engine, an idea for a book], knowledge accumulated by experience [spreading manure on land], knowledge gained from the applied sciences [use of semiconductors as switches]. Accordingly, the practice of 'technology' involves the conversion of an *idea* into some kind of a *material substance* obtained from an *environment* and turned into usable form by its *structure* imparted to it by an *intelligent agent*. By society we mean any human gathering ranging from an individual to a family, a manufacturing unit, a religious gathering, political party, nation society and so on in a dynamic state engaged in

exercising the practice of technology for the production and consumption of physical or mental *products* accompanied by the corresponding *waste* (Korn, 2022, 2023).

This description gives the impression of *intensive* activity which is propelled by the urge to survive and to achieve *ambitions* in the most *efficient* and *convenient* way. This manner of operation has resulted in the invention and production of the appropriate and increasingly *more complex products* or *artefacts* the consequences of which are

1 The increasing *complexity* of products is demanded by doing it better or more efficiently or more conveniently which is An inherent *human trait* and is required by the *competition for survival* and *achievement of ambitions*.

2 The *large scale* operation of manufacturing such products, their distribution, consumption and supporting systems consume more and more *resources* in quantity and offer more and more variety in quality. For example, the large variety of currently available passenger vehicles and their operation is accompanied by huge waste affecting the physical *environment.*

3 The products aim to benefit humanity by providing improved health conditions, availability of food, transportation and communication which have led to increasing population and reduced isolation in the world.

4 The products catering for more and more *convenience* and *efficiency* have affected the human body built for exerting more or less constant physical effort to ensure the availability of sustenance for survival.

5 The more and more widely available means of communication has resulted in the increased availability of *mental products* and in the possibility of stronger and varied *expression* of views by individuals and organised bodies such as protesters and their tolerance.

This description implies an *ever evolving technology* driving towards increasing complexity in a seemingly random manner. This dynamic feature of technology can be contrasted with the practically unchanging *emotions* over the history of humanity. For example, the

a ‘Desire for power, motivation for wealth, mental states of cruelty, dignity, loss of face, anger, envy, etc.’ have been around for millennia unchanged as far as known together with

b ‘Desire for love, helping others, happiness, sadness, etc.’ (Bateson, 1972).

It is the emotions in category A. or their possession which have enabled selected individuals to engage in activities to satisfy their emotions. We distinguish between two kinds of such activities:

1.1 ‘Activities for satisfying desire for power’

In ancient and more recent times such activities could have been carried out by individuals and leaders of nations by making use of available technology such as chariots used by Egyptians or bow and arrow carried by men on fast horses used by the tartars or Romans conquering most of the known world or creation of the British empire. Activities are more freely accomplished because of less population, availability of free land to

conquer and lack of communication for noticing what was going on by states which may have prevented such activities. Usually this kind of activities have led to *modification of societies* such as territorial increase or increase of influence by one nation over others as happened in case of the British empire.

Nowadays this kind activity although possible but not so easy to practice because of the immense development of technology in communication, means of warfare and the increase of population which means less land is available to conquer.

Activities internal to a nation society for satisfying the desire for power through influence or violence take place by political parties and other organisations whose activities are driven by beliefs.

1.2 Activities for accumulation of wealth

This may have been regarded as entrepreneurship and as such appreciated. However, the evolving technology used by entrepreneurs led to *evolution of societies*. For example, the invention of horse or ox drawn steel plough contributed to the possibility of accumulation of more land for cultivation by individuals and created a new form of society called *feudalism*. *Capitalism* may be seen to come about as the result of invention of the steam powered loom and railways which could employ and carry large numbers of workers from towns to factories. The recent, immense technological inventions have been exploited by individuals for accumulation of wealth in the form of very large industrial and commercial enterprises. They produce huge *quantities* and *variety* of products for satisfying convenience accompanied by significant exploitation of the physical *environment* and production of *waste*. This kind of activity can exert significant changes in society from individuals to nation societies.

Both feudalism and capitalism are terms describing forms of economic activities based on land and artefacts. They had led to polarisation of society or exploitation and domination by individuals unjust to the majority and usually achieved by means of wars and manipulations of the minds of people by the development of means of communication leading to reins by individuals such as kings or dictators.

A major response to this state of affairs had been the invention of ‘parliamentary democracy’. We can also list: revolutions, new ideas expressing the desire for and shape of envisaged societies such as utopia or the Garden of Eden, communism, socialism and means of alleviation of perceived injustices called 3rd and 4th industrial revolutions, investigations into global performance, efforts to reduce the effects of human activities on the environment and the use of supranational organisations like the United Nations. (Anon. 1968, Forrester, 1969, Meadows et al, 1972, More, 1516, Schwab, 2016).

We conclude that:

1 A society of any kind, i.e., individuals, families, manufacturing, religious, political organisations, nations, changes its form as a result of inventions by individuals of mental and physical products spotted and subsequently developed by individuals with *specific emotional or motivational state of mind* into operational products using full scale *technological* production for the use by society. This activity is defined in the first few lines above and is called the ‘*technology scheme*’.

   The results of this kind of motivated activity are products of increasingly higher level of complexity and variety requiring large scale production leading to large

scale consumption and waste. The effect of this kind of operation on the environment is damaging as currently observable.

2 The remedial response to the results as summarised here, appears to be sporadic and is not based on more fundamental notions as suggested by the integrated topics of X. Problem solving, Y. Systems theory/linguistic modelling and Z. Design thinking which is called the *visionary scheme* (Korn, 2022, 2023).

In this paper we intend to discuss:

- The details of the emotionally driven 'technology scheme',
- Its function in the evolution of society
- Its relation to the rationally driven 'visionary scheme'.

Also, we are going to show that Western societies have been evolved by the multitude of technology schemes and we are witnessing the consequences of this which is the problematic issue. Hence, we suggest if it is feasible, possible or desirable to supplement the technology scheme with visionary scheme at all levels of problem solving together with questioning the effect of the elements of the former rather than accepting them.

2 Historical evolution of technology and society

The description of technology given in the INTRODUCTION supplemented by the subsequent discussion, can be succinctly expressed as

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individual with *invention* prompted by *emotion* → creates technology → affects *society* which is called the 'technology scheme' and its *elements* are related so as to form the *logical conditional* or there is a *conditional or causal relation* between the elements. Formally

Invention ∧ Emotion → Technology → Society rel1

In words

IF there is a suitable invention AND there is *emotion* for creating wealth or any other outcome THEN there is likely to be new *technology*

followed by

IF there is new *technology* THEN there are likely to be consequences for *society*

If we interpret the term 'invention' as an idea or product of imagination and emotion as a motivation to act to satisfy the emotion then rel1. is a generally applicable relation used in human mental activities. For example: 'That stick is a suitable device and John hates his neighbour so he goes across to his house and beats him up which gives him satisfaction'.

2.1 Rel1: can be represented as a diagram in Figure 1

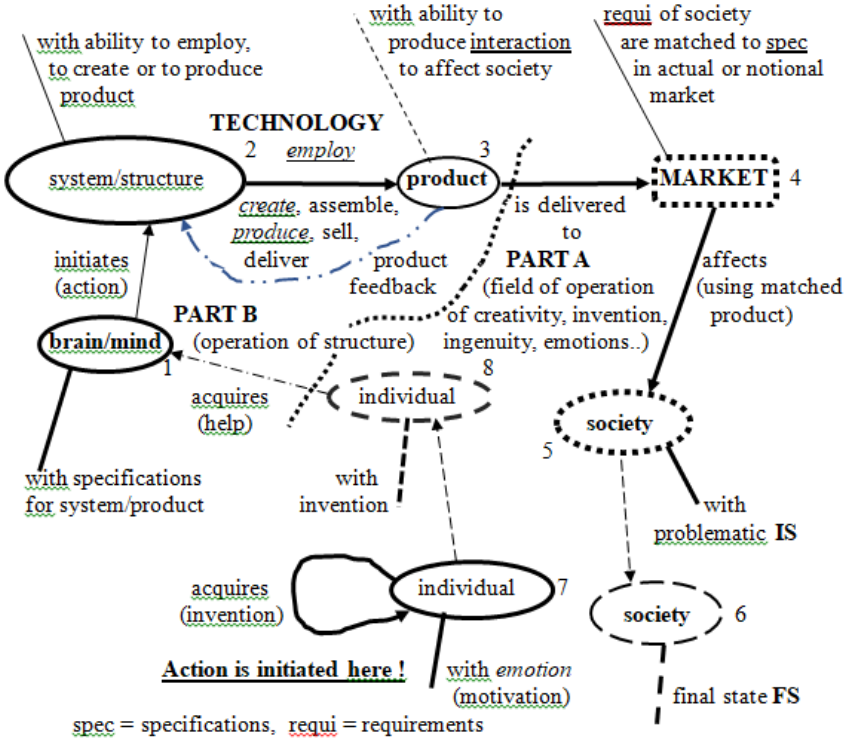
Which is its analytical form and is representable by *linguistic modelling* (Korn, 2022, 2023). The diagram can be read = The contours stand for noun phrases, the continuous lines represent adjectival phrases and the continuous, directed lines are dynamic verbs. For example, for contour 7: 'The individual with emotion acquires (invention)' where the

term in brackets is an adverbial phrase. The dotted lines represent *changes of equilibrium states*. The resulting declarative sentences are then expressed as logical conditionals.

The driving agent in this figure is invention and emotion which are the product of *chance*, an event which occurs fortuitously. Therefore, the 'technology scheme' occurs by *chance*. Since society appears to be driven by technology, *evolution of society also happens by chance.*

Furthermore, consideration of evolution of society in the past leads us to assert that industrial revolutions (Schwab, 2016, Ali et al. 2022) appear to conform to the pattern of rel1. Accordingly, we show the sequence of industrial revolutions as follows:

Figure 1 Diagram of technology scheme (see online version for colours)



- 0th Industrial Revolution (IndRev)

  Representative invention = bow/arrow, domestication of animals

  Emotion/enterprise = hunger

  Technology = hunting/gathering

  Society = tribal organisation with storing material and mental resources

- 1st IndRev

  Representative invention = horse or ox drawn plough, wind, water power

  Emotion/enterprise = wealth by acquiring land

  Technology = employment of workers cultivating land, large sailing ships

Society = feudalism, ownership of mills, operation of large sailing ships, polarisation of society

- 2nd IndRev

  Representative invention = steam engine driving loom and railway

  Emotion/enterprise = wealth by constructing factories

  Technology = employment of workers in factories rather than in cottage industry

  Society = capitalism, ownership of large factories, polarisation of society

- 3rd IndRev

  Representative invention = electricity, ic engine

  Emotion/enterprise = wealth by using many workers each with special job

  Technology = mass production, assembly line

  Society = capitalism, share ownership of means of production and distribution, polarisation of society

- 4th IndRev

  Representative invention = semiconductors, computers, AI

  Emotion/enterprise = wealth by creating automation

  Technology = automated factories, warehouses, supermarkets, large enterprises, waste affecting the environment

  Society = capitalism, share ownership of means of production and distribution, polarisation of society, effect of technology is noted

- 5th IndRev

  Representative invention = digital, personal computers, internet

  Emotion/enterprise = wealth by creating large, powerful enterprises

  Technology = application of AI to further automation

  Society = capitalism, current/future epoch, proposals for changes in society

2.2 Using rel1

The arrangement of elements from the sequence of industrial revolutions is shown as follows.

- 0th industrial revolution (IndRev)

  Representative invention = bow/arrow, domestication of animals

  Emotion/enterprise = hunger

  Technology = hunting/gathering

  Society = tribal organisation with accumulation of material and mental resources

---

IF there is bow/arrow AND there is hunger THEN there is hunting

followed by

IF there is hunting THEN society must keep moving because hunting grounds become exhausted

---

- 1st IndRev

  Representative invention = horse or ox drawn plough, wind, water power

  Emotion/enterprise = wealth by acquiring land

  Technology = employment of workers cultivating land, large sailing ships

  Society = Feudalism, ownership of mills, operation of large sailing ships, polarisation of society

---

IF there is horse or ox drawn plough AND there is desire for acquiring land THEN the likely result is large lands for cultivation by workers

followed by

IF there are large lands for cultivation by workers THEN society is polarised into workers and landowners

and so on for all Industrial Revolutions

The 'elements' of an IndRev are now explicitly shown in causal relations which enables their dependence and effects to be assessed and altered if desired and possible. Here we can see that the 'life of hunting' makes the 'society' moving. If this is considered undesirable another life style may be sought.

2.3 Remarks

1 The 1st IndRev represents a settled society relative to the 0th which has to move to where available fodder can be found. A society in the era of 1st IndRev usually has landowners living in residences with villages for workers. Cultivation of the same land disallowed movement.

2 The evolution of industrial revolutions shows a seemingly random pattern of inventions of products but it is not random: It evolves in a sequence from energetic, heavy material towards informatic, light material and is driven by the need to achieve more *convenience and efficiency*.

3 Industrial revolutions are concerned with means of production and distribution of products.

4 The expression of the technology scheme as a logical conditional of rel1. shows a *causal relation* of elements. This enables to assess their *relevance* and the *strength of causal relation* which can be investigated when Figure 1 is expressed in terms of *linguistic modelling* in a particular problematic situation. Examination of the details of the elements of this scheme can lead to questions regarding their:
Effectiveness in causing *social changes*

Relevance and desirability as far as social changes are concerned

5 The IndRev show an oversimplified picture of a huge variety and multitude of activities, innovations the totality of which drive individuals and a society.

3 Description of activities of living things

The innate, universal activity in living things is *problem solving* in the interest of survival or maintenance of current state or homeostasis AND *achievement of ambitions* or reaching a *consistent*, future state from an initial state [simple like to move for an animal or complex like to buy bread]. In other words, the activities are concerned with *maintenance and change of equilibrium* which is a universal concept and is identified here as the underlying concept of *problem solving*. Accordingly, changes of state in the *inanimate* world are regarded as particular case of problem solving which allows a unified approach to the dynamics of parts of the world. There is a direction of change in problem solving from an initial, seen as problematic to be transformed into a final, consistent, no longer seen as problematic state carried by a *changing object*. However, change of state cannot take place by itself, it needs an agent that is intended for carrying out the change called *system* or dynamic *structure*. The action of such system is stipulated by a perceived *need* for change by living things or arises by accidental occurrences in the living or animate as well as in the inanimate spheres.

However, for a change of state to occur an agent or system must *match* the changing object. Accordingly, problem solving in the inanimate and animate spheres consists of three parts:

1 Change of state carried by a changing object,

2 The agent or system which is intended to accomplish the change, and

3 Matching between 1 and 2 which together constitute the systems theory (Korn, 2006, 2012, 2022, 2023).

3.1 Remarks

1 Apart from adaptation for building own body, unlike plants and animals, humans predominantly and significantly *alter* material objects when they take them from their environment for their use and consumption. Even at the early stage of development men hit on the idea of selecting and envisaging what might have appeared suitable for preparation for an artefact and taking the appropriate *purposive action* to bring about the desired or envisaged outcome. A fried potato chip is significantly different from the potato just out of the ground or the difference between a horse drawn cart and a racing car serve as examples of *alteration*. This was a huge achievement in ancient times and has been carried on to the present day. It is the basis of *invention*, a spark of human intellect and *problem solving*, the basis for survival failure of which leads to extinction.

2 Unlike plants and animals, humans usually take *more* material objects from their environment for alteration and subsequent treatment like transport or selling than needed for survival. An open ground mine worked with huge machinery is an example. This is the result of *enterprise* for *enrichment*.

3 Unlike plans and animals, human emotions of individuals drive practically *unlimited* activities by self and can lead to organise others to fight for beliefs fuelled by envy and the desire for dominance for acquiring new territory, for example or wealth as discussed in the INTRODUCTION. Emotion like charitable feeling may result in

activity to help others, hate, on the other hand, can lead to conquering new territories and killing other people and their execution is aided by new technology. However, in current times of *increased population* the earth is significantly more densely occupied with many nations each with its interest in survival needing recourses and engaged in consumption and production of waste. As a result, emotion driven activities are highly restricted as opposed to many centuries ago. It is also more difficult to restrain such activities due to danger of war of the gravest consequences.

Points 1, 2, and 3 are the fundamental features of living things, in particular humans, they are at the basis of activities towards any further development. (*End of remark*)

4 Application of the concept of purpose

Problem solving activity is innate and universal in the living sphere. We have considered the 'technology scheme' as a method of problem solving governed by *chance*. The intention is to introduce the problem solving method which is practiced in accordance with *purpose*. It is regarded as the transformation of a purpose, an idea or objective by means of a system or dynamic structure into a product the function of which is to produce an appropriate interaction to accomplish a change of equilibrium state carried by a changing object. A purposive activity consists of two regions: One in which *information* or impression and the other in which *energy* or *ability* circulates, they are connected by an *amplifier* (technical (electronic, hydraulic), social (demonstration)) (Brown and Campbell, 1948, Wiener, 1948, Korn, 2022, 2023, 2024).

The innate problem solving activity is modelled or imitated by the systems theory as indicated by points X, Y, Z in the INTRODUCTION. Here the diagram of *problem solving or visionary scheme* which operates in accordance with a purpose, is reproduced with a simple example to show its operation.

4.1 Introduction to the visionary scheme

The basic idea is: In the scheme in Figure 2 the envisaged, final state generally known as the objective carried by the object with problematic issue (OPI 5) and the requirements developed in Part A., drive the selection and operation of the dynamic structures in Part B. so that it *matches* Part A. Matching is the condition for the successful, envisaged change of equilibrium state implied in Part A. Part A. is the speculative, discussion part of the scheme in Figure 2, Part B. is the analytical or symbolic structure represented as a *linguistic model* based on stories in natural language of scenarios which can lead to operational form. The implementation of both parts are given in detail in Korn (2022).

Part A. is the creative, inspirational part which allows speculation, Part B. is the analytical, executive part.

A simple example of a social problem is shown below.

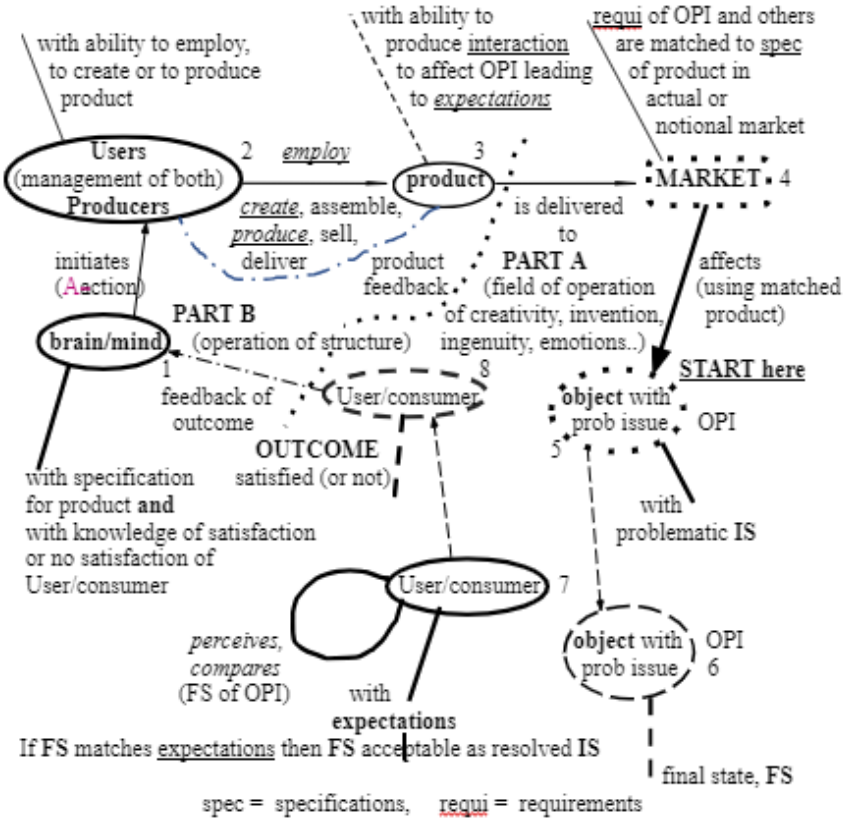
4.1.1 Implementation of Part A. of Figure 2

Story of the problematic situation

> "The Prime Minister (PM) must return to basic values to win the election, senior members of the political party warned. He was told that tax cuts and

house building would lure the many voters who stayed away from the polls resulting in recent defeats. The PM was also told to axe the 2030 ban on nonelectric cars".

Figure 2 Diagram of problem structuring or 'visionary' scheme



Analysis of the story to lead to *requirements* for product and systems design

1st STEP = To identify the initial state (IS) of object with problematic issue, OPI (5) which can involve considerable *discussion* until an agreement between the parties interested in the situation, is reached

IN THIS CASE = *The IS of OPI (5) is: Election with defeat performed by the electorate. (The term election means = The mental/physical process of selecting by vote (to be cast) for an office one or more persons (candidate) by a group of people (the electorate))*

2nd STEP = To identify the user/consumer (7) and H/her initial, mental state or expectations which involves *discussions* until selection is agreed upon

IN THIS CASE = *User/consumer (7) and expectations: All members of the political party expect the election to be won*

3rd STEP = The observer or designer produces, invents a choice of possible, desirable, consistent Final State (FS) of OPI (6) which may or may not be acceptable to the interested parties

IN THIS CASE = *FS of OPI (6) is: Election with winning which means the candidate of the political party to have obtained the majority of votes by the electorate (there is no alternative)*

4th STEP = Investigating the closeness of the final state of OPI (6) to the expectation or IS of user/consumer (7) to allow the latter to become FS of User/consumer (8) leads to.

IN THIS CASE = *FS of OPI (6) in the 3rd STEP is the only acceptable state for FS of User/consumer (8) to happen*

5th STEP = Selecting product (3) from a store of available products judged and *evaluated* to be capable of exerting the kind of *interrelation* with suitable properties to accomplish the change of state from OPI (5) to OPI (6)

IN THIS CASE = *interrelation: Affecting the mental state of the electorate so as to cast their vote for the candidate of the political party*

The material objects possessing the appropriate qualities and quantities or product (3) capable of producing *the interrelation* are:

1 The political party is to recall and to act according to basic values

2 The chancellor is to cut taxes

3 The construction companies are to build houses

4 The government is to drop the ban on non-electric cars by 2030 which are suggested from the story of the problematic situation, otherwise to be found by *creative imagination* or investigation, invention.

6th STEP = Suggesting the pertinent static and dynamic *properties* of the *objects and agents* involved in a problematic situation and using the Entailment Relation to generate the *REQUIREMENTS* for product (3) to cater for these properties. The objects and agents are

IN THIS CASE = *Interrelation* (I)

OPI (O)

User/consumer (U)

Objects external but relevant and interested in Part A. such as the physical and social environments (E)

which lead to 'product specifications'

I – Interrelation

1 The form of interrelation is information to *persuade*. It needs to be designed and constructed so as to be of *interest* to the electorate (Korn, 2022). In addition, information is to be delivered *tactfully*

O – Electorate

2 An electorate is usually a group of heterogenous people, here we assume that they are homogenous. They are elderly people preferring solid, time proven values, like tax cuts but not enthusiastic, live in their own houses, do not drive cars

U – All members of the political party

3 They are a mixture of elderly with a significant proportion of young people preferring new ideas, interested in tax cuts and house building, drive cars

E – Opposition party

4 Denies basic values, supports tax cuts and house building and preservation of the physical environment

7th STEP = Matching the properties obtained in the 6th STEP to those of product (3) obtained in the 5th STEP using the entailment relation followed by the object selector matrix (Korn, 2022)

The entailment relation is constructed as follows with the numerals referring to the properties of objects and agents in the 6th STEP

IN THIS CASE = A. *There are agents with properties of*:

Interrelation 1. Information of interest tactfully delivered,

Electorate 2. Elderly people with time proven values, like tax cuts but not enthusiastic, live in their own houses, do not drive cars

All members of political party 3. There is a mixture of elderly with a significant proportion of young people preferring new ideas, interested in tax cuts and house building, drive cars

Opposition 4. The opposition party denies basic values, supports tax cuts and house building and the preservation of physical environment

B. There is a product (3) with properties to fit those in A. which

C. REQUIRES properties of product (3)

Interrelation a. Well formulated information of interest advertised and delivered with consideration

Electorate b. Prefer political party with emphasis on 'basic values',

All members of political party c. Members of the political party are interested in new values, tax cuts, house building and drive cars

Opposition d. Opposition does not admit to basic values but they are all for tax cuts and house building also for banning nonelectric cars

The object selector matrix is

	Set of qualifiers of product (3)			
List of possible products (3)	a	b	c	d
Political party with basic values	1	1	0	0
Chancellor with taxes cut	1	0	1	1
Companies building houses	1	0	1	1
Government dropping the ban	1	0	1	0

4.2 Conclusions

- The composition of the electorate is a major factor in generating the products (3). Here one of the suggested products (3) is suitable to affect the state of mind of the electorate to vote for the political party. This is shown by the Object Selector Matrix. The PM was ill advised by the senior members of the party. Using 'linguistic modelling' Part B. is not attempted.

Implementation of Part B. is not given here.

Part B. is the analytical part in which a story of the problematic scenario can be converted into logical conditional sequences by *linguistic modelling*. (End of example)

5 Conclusions

This paper begins with discussing technology and its application by individuals and groups of individuals leading to the current problematic issues. The invention/emotion motivated technology and society is then seen as the industrial revolutions driving society and expressed in analytical terms as *technology scheme* alongside with the previously developed *visionary scheme*. Both schemes can be modelled by *linguistic modelling*

using the diagrams in Figures 1 and 2 which are derived basic considerations. This kind of modelling can lead to operational expressions to assess the effect of technology on society and the physical environment.

Inventions and emotions usually happen by *chance*. They drive society through technology, thus, society also evolves by *chance* which is likely to have led to the current problematic issues.

The technical scheme in Figure 1 begins with a seemingly accidental *invention* which is picked up by the same or other individual with the appropriate *emotion* which drives h/her to develop a *technology* for usually large scale production of a product based on the invention. Such a product may or may not affect *society*. The scheme operates in an *open loop*, the question of an *envisaged, expected resolution* does not arise. The whole usually operates by *chance* as far as the affected object is concerned.

The visionary scheme in Figure 2 begins with identifying an object with a problematic issue (OPI 1) and envisaging the same object but with no more problem which is achieved, if possible, by the action of a *technology* of systems, product (Korn, 2022, 2023). The whole is driven by an explicitly identified, debated *problematic issue* and its consistent *resolution*. It operates in a *closed loop* which enables iteration to take place until expectation is achieved. The whole operates according to *purpose*, it does not happen accidentally.

Both schemes are innate in living things and operate instinctively. The visionary scheme applies to existing scenarios through processing *sensual perception* by the brain/mind, technology scheme applies to creating novel scenarios by using *imagination* of the brain/mind. This paper suggests to model or imitate the instinctive performance of living things.

We have identified and made explicit TWO ways of problem solving:

1 Instinctive, predominantly emotional, accidental technology scheme in Figure 1.

2 Deliberate, predominantly rational, purposive visionary scheme in Figure 2.

As discussed, the application of the technology scheme by individuals and societies can cause problems and there seem to be TWO ways of alleviating or preventing them :

1 introduction of wider use of the visionary scheme if feasible, possible

2 the availability of explicitly stated elements of the technology scheme in rel1. which allows their examination and modification, if feasible, possible, before they can affect society.

For example, using the technology scheme or industrial revolution, we have:

- Invention = Ic engine
- Emotion enterprise = Wealth creation by constructing car factories by Henry Ford
- Technology = Mass production, assembly line
- Society/environment = Benefit of mobility, transport, harm to health and environment.

Which can be expressed as rel1.

> IF there is an invented ic engine AND there is a desire by the enterprising Henry Ford, the creator of the Model T car, to get rich by constructing car factories THEN the likely outcome is mass production of cars on assembly line
>
> followed by
>
> IF there is likely outcome of mass production of cars on assembly line THEN society can benefit by mobility, transport but harmed by health and environmental damage

Alleviation or prevention

- First, using the visionary scheme or Figure 2 we can ask: How can technology be modified for society to have mobility, transport without harming health and causing environmental damage
- Second, using the technology scheme or Figure 1 we can ask: How can Henry Ford as a matter of course operate so as to share his wealth with his workforce.

Once the elements of the technology scheme are expressed in a formal pattern questions of relevance and causal connections can also be raised.

Assuming it passes peer scrutiny, this paper is regarded as an initial discussion of how problematic issues arise and how remedial action can be taken. The discussion is rooted in basic notions as indicated in Figures 1 and 2 and their background, and inspired by ideas due to (Bertalanffy, 1950, Brown and Campbell, 1948, Popper, 1972, Lewin, 1981) and many others and the failure to resolve (Finniston, 1983).

The Sequence of Industrial Revolutions shows that evolution of society has taken place by chance. Thus, the current predicament is nobody's fault. International activity shows that it is already being corrected which could be more effective if the visionary scheme were recognised and used. The significant influence of *emotions* as motivation of human activities should be recognised. The paper has shown how an analytical method can be applied to highly qualitative situations.

Further development is needed to make the suggestions in the paper a working tool. More research is required in the fields of emotions, motivation, linguistics, mathematics, logic and their new role in education and in conventional science of physics triggered by the systemic/structural view of parts of the world.

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