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Short-Term Forecasting of ES Evolution and Methodology for Taking Market Aspects of TESE into Account

Abstract

A methodology for forecasting the evolution of commodities of type "ES - Human" for the nearest future is described in the present paper. It is common knowledge that innovation process requires expenditures on scientific studies. The higher these expenditures are, the less eagerly companies follow the route of expensive innovations preferring less expensive ones. This process always existed in the history of technology evolution and has already been named "engineering mimicry" (EM). The essence of this phenomenon is reduced to the fact that external appearance of a system is made similar to that of another system, - e.g., a lighter made as fire extinguisher, a pen made as a cigarette, etc. For *Phenomenon of EM*, see [1,2,3,4,5,6,25,27].

However, acceleration of technology development also leads to increasing frequency of using this scenario of commodities evolution. Consequently, special tools are required for practical work and for taking these phenomena into account during forecasting.

The initial interpretation of this phenomenon (i.e. during the period 2003-2008) appeared to be oversimplified. More detailed investigation into this phenomenon conducted during recent years showed that EM phenomenon represents a particular case of phenomenon characterized by a higher rank of significance, which was named "Goods of Surprise" (GS) in the present paper (GS) [1,5].

Phenomena of EM and GS are related to sub trends (mechanisms) of the trend of coordination – discoordination in the author's system of interpretation [2,3].

A methodology of practical use of these additional scenarios from TESE represents an outcome of performed work. Application of methodology for forecasting 36 possible options of GS, including EM phenomenon, is illustrated with several examples including materials reflecting the experience of a real innovation company that have been working at the Russian Federation market since 1999 [28,29,30].

1. Why short-term forecasting causes interest for researchers.

1.1. Reason -1 Differences in goals. "Voice of Consumer", "Voice of Engineering System", and "Voice of Manufacturer".

Subdivision into "Voice of Consumer" or VC and "Voice of Engineering System" or VES has already appeared in modern innovation and TRIZ models [16,17,18,19,20].

These terms are used to distinguish two fundamentally different approaches to designing of new commodities. The first of them – VC involves a traditional inquiry of focus groups with the aim to obtain a portrait of future commodity based

on such inquiries. The first approach offers the following "epithets" for us: comfortable, cost-effective, pleasant, durable, etc.

The second approach – VES – is an approach that is based on a possibility to objectively describe the functioning of ES (or future commodity) using the language of function analysis and parameters instead of epithets. Specially developed analytical procedures enable to understand: which of the parameters can be and should be improved, so that a future commodity would represent an obvious improvement not at the level of epithets, but at the level of numeric values characterizing convenience, durability and cost-effectiveness.

The fact of undoubtful improvement at the level of parametrical approach VES reduces the risks involved in the course of introduction of new commodity to the market, which is shown in the results of work conducted by well-known American consulting company [32].

The notion of "ES ideality" existing in TRIZ and TESE does not enter into conflict with these approaches, but, to the contrary, combines them together.

However, in this connection, it has to be pointed out that the notion of Ideality is used here by the author from the standpoint of Consumer.

At the same time, one can quite clearly imagine the existence of another version of Ideality - namely, "ideality from the standpoint of Manufacturer".

Ideality of Consumer and Ideality of Manufacturer are very different. They are in the state of conflict of interests.

For Consumers, constant innovation support of commodity selected by them represents a real value. For example, the market offers over 50 kinds of toothpaste or cigarettes, but you, as a rule, become a consumer of one particular brand and continue buying it.

Your logic is simple. This brand is characterized by high enough quality, and the company producing it improves it from time to time, thus demonstrating the innovation support of this brand and care for its consumers.

As a rule, such improvements are rather small. It is not the composition of the toothpaste, which is changed, because it is too expensive, but the shape and design of the cap, case, design of the very toothpaste tube and cardboard package.

From the standpoint of manufacturer, ideality is very different from ideality of consumer. The best option for a manufacturer - absence of new models of commodities, because all this is only an item of expenditures, while the goal of any business consists in increasing income from it.

Inevitable administrative contradiction between a level of expenses on innovation activities and level of income increase resulting from the growth of sales associated with the introduction of new model to the market sooner or later is

encountered in business activity of any company. The first level, in the opinion of any Manufacturer, should be minimal, while the second one should be maximal.

This knot of conflicting circumstances in engineering evolution could be formulated in a simple way - "People develop engineering in the direction of eliminating Disadvantages, trying to find the cheapest possible resources for this purpose" - or in a much more cumbersome way, which would disclose the existing conflict between Manufacturer and Consumer.

People develop "machines" (artificial systems of engineering or information character) in the direction of eliminating circumstances, **on the one hand**, and increasing profits from the growth in the number of consumers of machines ("sales"), **on the other hand**, using an algorithm of selecting the cheapest resources currently available for the attainment of these goals. In this case, a "disadvantage" is a variable parameter depending upon time; therefore, the process of development of machines-commodities is endless [10,15].

Goal of Consumer consists in satisfying any of his needs using a *minimum* of expenditures.

Goal of Manufacturer consists in making *maximum* profits from the act of satisfaction of consumer needs.

Let us call this circumstance "Voice of Customer".

Conclusion from this section, Reason -1.

There are two diametrically opposite levels of objective definition in the innovation process. Innovations (or, to be more exact, expenses on innovations) are profitable for manufacturer, if they are insignificant. For consumers, the issue of Manufacturer's expenses is not interesting at all; they are interested only in the very fact of appearance of new and modern commodity at the market. Thus, we distinguish between the notions "Voice of Consumer" and "Voice of Manufacturer".

Consequently, a Consumer (when he is a Client ordering a forecasting project) is first of all interested in the low level of expenses on innovation and minimal depth of forecasting study. The majority of companies in the world refer to medium-size and small companies. They are interested in long-term forecasting only from the standpoint of considerations "how soon should we expect a potential catastrophe in the form of appearance of a fundamentally new product".

1.2. Reason -2. The process of engineering evolution acceleration

We observe indications on acceleration in engineering evolution in the overall reduction of service life of any kind of engineering equipment [26].

Besides, data on forecasts of population growth and forecasts of gross world product growth are characterized by expressed dependence.

Engineering products, being a part of the gross world product, develop much faster than the number of people on the planet, see Fig 1. [26].

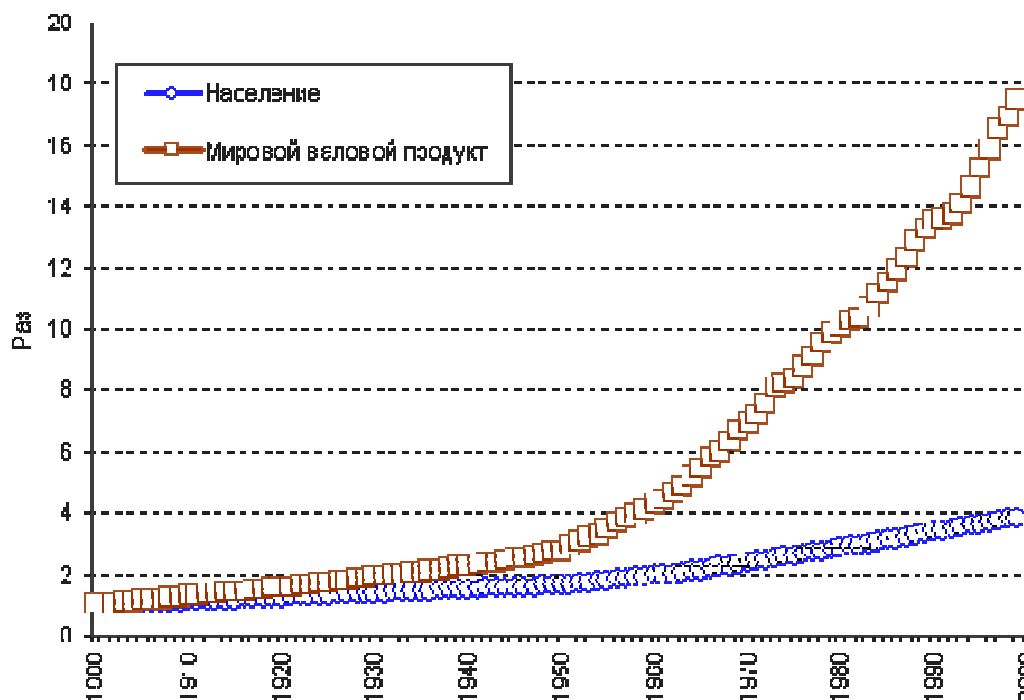


Figure 1. Growth of population and gross national product.
Official information: World population in 2300. Highlights.
ESA/P/WP.187, Draft. UN, New York, 2003, Tables A-1, A-3, A-4.

This situation should lead to the aggravation of contradiction between the necessity to participate in the innovation process and desire to reduce expenditures on scientific research, without which it would be impossible to create a fundamentally new product. A stable tendency to spend as little money as possible for each new development has emerged. How could it be provided?

2. What is a phenomenon of Engineering Mimicry (EM) and substantiation for it?

2.1. Description of Engineering Mimicry phenomenon

Resolving the contradiction "there should be innovations" because without them it would be impossible to win in competition at the market, and "there should be no innovations" because this requires expenses from manufacturer on development, purchase of new equipment and technologies (with high risk involved in these investments/expense), manufacturers have found several simple solutions long time ago.

The simplest direction in finding solutions of this kind consists in surprising buyers with unusual shape of a product. This phenomenon reminds to a certain extent a phenomenon of mimicry in the nature [6]. It was described many times by different authors in specialized publications on TESE [1,2,3,4,5,8,25].

For the first time this term appeared in 2003 in [27].

This phenomenon can be subjected to classification based on two categories of resources for engineering development. The first resource is anthropological properties of humans to have sensory organs and ES parameters, which could be distinguished by these organs, and the second resource is four main intended purposes of solutions that were identified after studying the examples of this phenomenon manifestation in engineering. This classification system is presented in Table 1, which also includes examples illustrating the manifestation the EM phenomenon.

Table 1. Phenomenon of Engineering Mimicry. Classification system.

first explanation of the morphological approach

Four simple rules for invention ↓	person feeling organs and parameters of goods (systems)					
	eye		skin	ear	nose	taste buds
Amuse Развлекать (удивлять) F1	color	form	Form of surface	sound	smell	taste
scare away (предупреждать) F2				SOUND	SMELL	TASTE
Mask Маскировать (прятать) F3						
Pay attention Призывать (обращать внимание) F4						
	P1	P2	P3	P4	P5	P6

It is obvious that this approach offers a possibility to obtain 24 quite distinct formulas for producing new solutions within the frames of this approach. The structure of these possible solutions is given in Table 2.

Table 2. Morphological classification system intended for describing the engineering mimicry phenomenon.

morphological matrix anthropological resource and special function

senses	eye	eye	skin	ear	nose	taste buds
Parameters of system function	form	color	Form of surface	sound	Gas, aerosol	Liquid, Solid body
Entertain	1	2	3	4	5	6
scare away	7	8	9	10	11	12
mask	13	14	15	16	17	18
Pay attention	19	20	21	22	23	24

A database of examples of manifestation of this phenomenon in engineering covering all 24 specified situations is given in Table 3.

Table 3. Simplest database of examples illustrating the Engineering mimicry phenomenon.

Sensory organs	System parameters	Amuse as additional function	Scare away Warn	Mask	Attract Pay attention
Eye	Shape	1.1. - 1 Lighter shaped as a fire extinguisher	1.2.-2 False video cameras	1.3.-3 Shocker in the form of cell phone	1.4.-4 Advertising inflated mug of huge size
Eye	Color	2.1. - 5 Blue ketchup, Shocking package	2.2. -6 Orange color of road workers clothes	2.3.-7 Camouflage color, road mine in the form of a stone, inflatable tanks and missiles	2.4.-8 Red color of a fire extinguisher
Tactile receptors	Surface shape	3.1.-9 Plastic wall panel looking like stone surface	3.2.-10 Barbed wire	3.3.-11 artificial silk, velvet paper	3.4.-12 "Chocolate gadgets"
Ear	Acoustic vibrations	4.1.-13 Sound of claxon horn as a cow bellowing	4.2.-14 Horn of car signalization	4.3.-15 Systems of active noise suppression	4.4.-16 Bell ringing
Nose and odor receptors	Gaseous substance, aerosol	5.1. -17 Felt pen with vanilla smell, Candles with the aroma of flowers	5.2.- 18 Additive of mercaptan to gas for household needs	5.3.-19 Antipolizei, deodorants	5.4.-20 Perfume industry, perfumes with ferromones
Tongue and taste receptors	Liquid, solid substance	6.1. - 21 Eatable chess pieces	6.2.- 22 Bitter substances in the practice of feeding babies	6.3. - 23 Chinese cuisine. Chicken with taste of fish.	6.4. - 24 Chocolate invitation (made of chocolate).

Obviously, the use of this phenomenon can take the form of combinations of different scenarios. The general approach to the use of this Table is illustrated with Figure 1a.

<p style="text-align: center;">Formula for use of TM phenomena = $(F_1+F_2+F_3+F_4) \times (P_1+P_2+P_3+P_4+P_5+P_6)$</p> <p style="text-align: center;">Simple rules for invention (Heuristic) = Verbs F_i with help of Noun P_i</p>
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Fig. 2. The simplest formula for producing solutions within the frames of described EM phenomenon.

As an example, one can easily imagine a new variant of business card, - a business that is very widely spread in the world, which can use several EM mechanisms concurrently.

Example.

A. Phenomenon of change of image or inscriptions shape. Recollect a similar commodity from the field of postcards with optical effects. When you slightly rotate such postcards in your hands, a lady reproduced on the postcard starts "winking". This effect is obtained due to using a special plastic film, which is made as a multitude of very small prisms closely adhering to one another. In our hypothetical example we can characterize this as a situation when "a business card pretends to be an amusing postcard". Besides, a text of the card in Russian and Korean languages may serve as a changing visual element. In the proposed classification system, this is euristics (simple rule for obtaining a solution) number 5.

B) Phenomenon of sound emission as a result of touching. At the market of postcards, such commodity has been known for a long time. It is called "music postcards". Upon the opening of a two-sided card, one hears a melody. In our case it could be pronouncing your name and position. Euristics number 13 "surprising with the aid of sound".

C) Phenomenon of conferring pleasant odors. Felt pens with the smell of strawberries and bedclothes with the odor of frosty freshness have been known at the market for a long time. Our new ES – business card can easily "pretend to be one of these goods". In this case we can say that we used euristics number 17.

2.2. Hypothesis for explaining the phenomenon of Engineering Mimicry.

There is a hypothesis that this phenomenon is characteristic of Stage 1 and Stage 3 of ES evolution. Fig.3

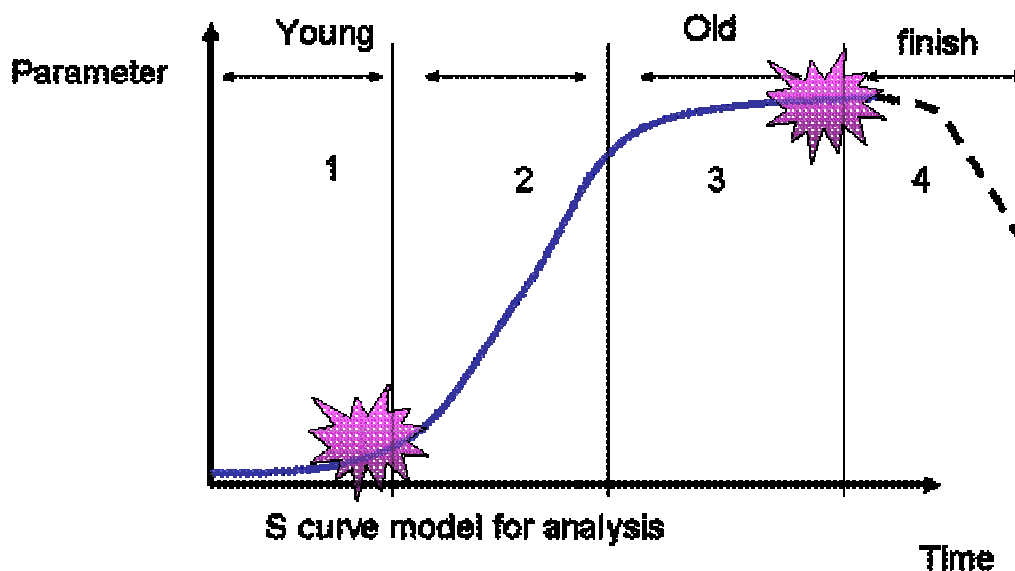


Figure 3. Location of EM phenomenon.

Motives for taking such decisions by innovation designers are understandable. Excessive novelty of commodity represents a disadvantage typical for Stage. Hence, EM phenomenon within the context of assertion “Our commodity is a well-known object” represents the opposite pole for excessive novelty. At Stage 3, when the process of reduction in sales starts, the use of EM phenomenon is changed for the context “Our commodity is the same as the one produced by our competitors,

“Voice of customer” and “voice of manufacturer”

- Exist typical conflict between **Customer** and **Manufacturer**

$i = \frac{\sum (f)}{\sum (\$)}$ <p>A. i is ↑ if $\sum f$ is ↑ B. i is ↑ if $\sum \\$ is ↓</p>	$M = \frac{\sum (\text{Profit from sale } \$)}{\sum (\text{Level of change and expenses of } \$)}$ <p>A. Profit must ↑ B. expenses must ↓</p>
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but it can surprise you and improve your mood. This is its auxiliary function”. And this decision represent an intersection of interests of two versions of Ideality, about which we spoke earlier - namely, Voice of Customer and Voice of Manufacturer. Figure 4 illustrates two formulas of Ideality.

Figure 4. Two formulas of ideality, which intercross in the zone of creating systems with an option of surprise.

3. What is understood under “Goods of Surprise” and possible model for interpreting them

A phenomenon of EM is a subset for phenomena, which got the name “Goods of Surprise”(GS).

Variants of definitions:

- GS represent an insignificant additional property of commodities, which promotes sales.
- GS represent an additional property of commodities (embedded ES) that creates an emotional impulse for purchase, which, as a rule, subsequently fails to meet the expectations of the Buyer, which leads to the situation of a “one-time purchase”.

A detailed description of the phenomenon with a large number of examples is offered in [1]. Let us give only one example for clarification: a multicolored pencil, the slate of which is made as fused-together slates of four different colors: red, blue, yellow and black. It is inconvenient to draw with such a pencil, but it will decidedly cause surprise in a buyer and at least one sale of such goods is guaranteed.

Based on this property of commodities, let's introduce the notions of Short-Term Commodity (STC) and Long-Term Commodity (LTC).

STC is a sort of commodity, which the Buyer acquires only once (being surprised by it) and does not buy once again due to disappointment produced as a result of using this commodity.

The notion of Long-Term Commodity (LTC) was described by B.Zlotin, who called them "perfect systems" in [8]. More accurate numeric values, according to which commodities could be classified into STC and LTC, cannot be given. It is natural that this classification approach implies the existence of goods with "normal duration of market life", which account for the majority of commodities.

The model of using the notion of SG in the context of forecasting projects with minimum depth.

It can be supposed that a mechanism of SG creation, which is worth analyzing when performing a forecasting project, could be described as a combination of two goods: LTC and SG. Figure 5.

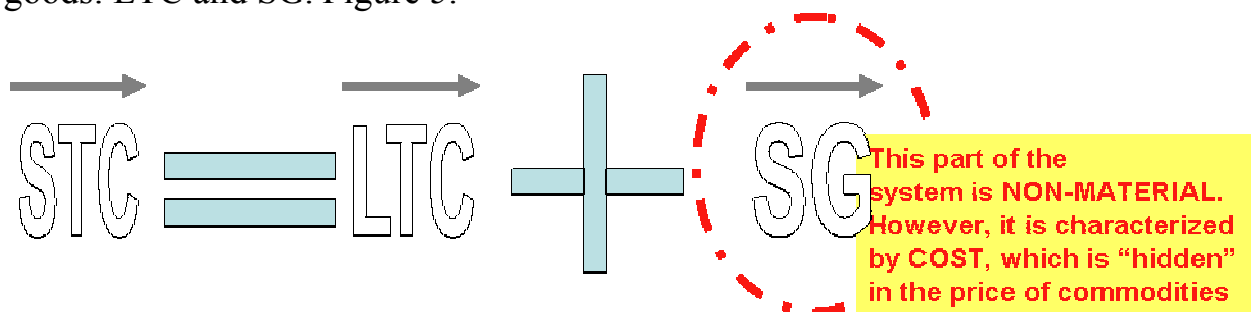


Figure 5. Possible mechanism of creation of forecasting image for STC.

3.1.Note 1. The vector sign above objects of addition operation implies what was long ago noticed in the works of S.Litvin and V.Gerassimov on integration of alternative systems and in [33], namely, non-additivity of the processes of addition of objects as applied to engineering. Integrating a notebook and mobile phone we obtain a communicator, while integrating a phone and notebook we obtain a smart phone [11]. Very many examples like this have been identified [7]. The use of vector presentation enables us not to miss this important property of engineering evolution in the future.

3.2. Note 2. The presented approach includes a new and potentially productive outlook on possible formation of additional directions in TESE. Speaking about such new parameters of ES as their life duration, we imply the possibility of existence of a new discipline and corresponding practical methodology, which could be called "engineering gerontology". The potential number of sales (which actually represents a measure of life duration), as a parameter for evaluation and comparison, would definitely be interesting for the customers.

4. The place of SG phenomenon in the system of TESE

The phenomenon of surprise was described both in Kano models [22] and in works by Durrell Mann [23,24] as a formula for developing solutions described in the language of Principles for resolving EC. According to author's standpoint, this approach is correct because the Principles should be included in TESE, and many such approaches to increasing forecasting power of TESE could be encountered in the works by V.Petrov and M.Rubin [34] as well as in the publications by A.Yefimov [35], but describing this phenomenon only using the language of principles would be insufficient.

According to author's hypothesis, the phenomenon of SG, which also includes the phenomenon of EM, represents a boundary case for three identified trends: Conductivity, Ideality and Coordination - Discoordination. A diagram describing this idea is presented in Fig.6.

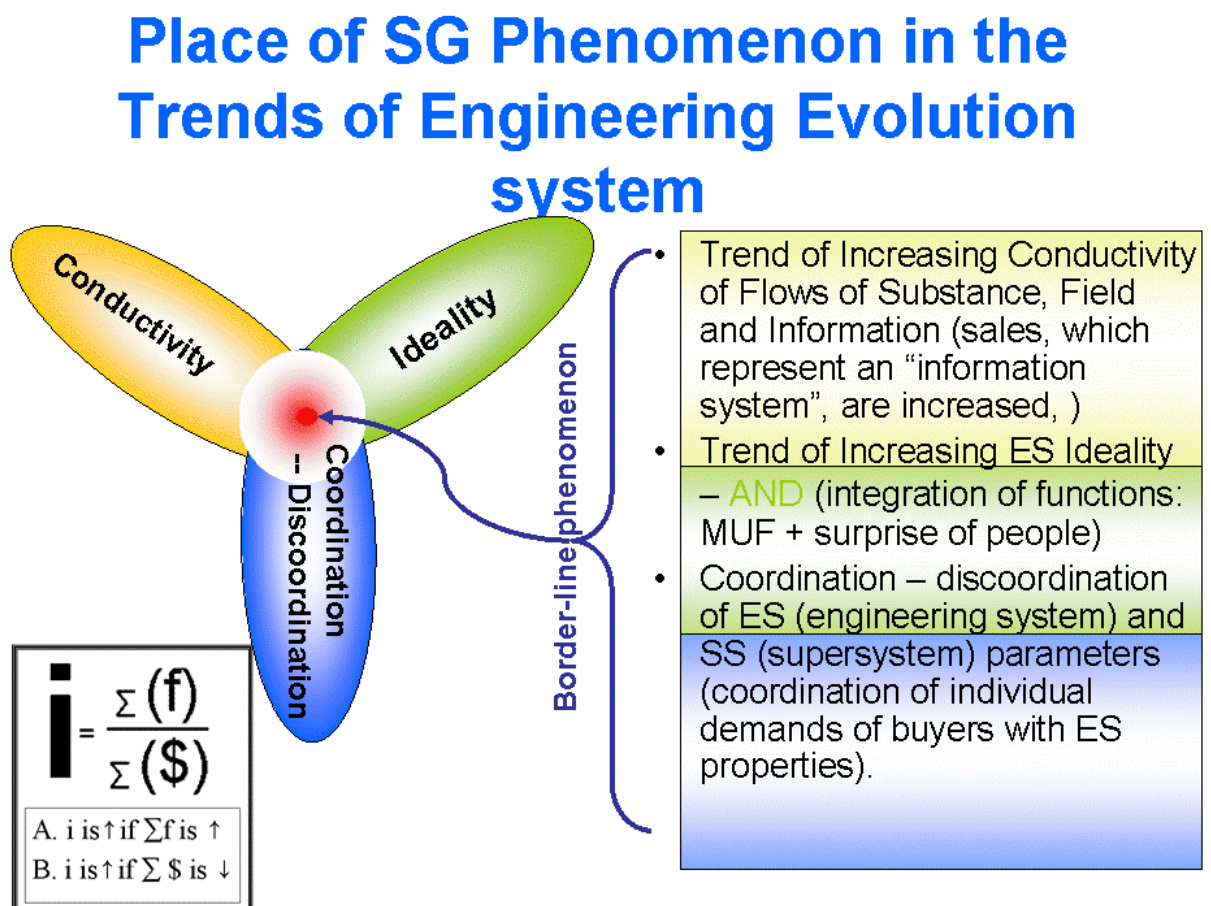


Figure 6. The place of SG phenomenon in the system of Trends of ES Evolution.

Note: Similar to the case with two versions of Ideality - namely, Voice of Customer and Voice of Manufacturer, - the phenomenon of SG is a boundary case, and it could be equally related to both to the content and sense of Trends of Conductivity, Ideality and Coordination – Discoordination.

5. Methodology for designing 36 variants of SG.

Analysis of this phenomenon allowed to name the main mechanisms for producing the process of surprise. The list of these mechanisms could be looked upon as the simplest algorithm for selecting the options.

The area of methodology application: systems of type "ES - Human", which are different from the systems of type "ES-ES" by their ability to influence the decision making by a buyer to purchase this commodity based on its external appearance. Example: a pen is a system of type "ES - Human", but the refill of the pen is an example of the system relating to type "ES-ES".

5.1. Check-list algorithm, "What could a buyer be surprised with?"

The buyer could

1. Be surprised with the shape of commodity, which looks like an animal or different ES (engineering mimicry, see 24 options of implementation from Table 1)
2. Be surprised with the aid of inversion (this is made inversely, *principle 13*)
3. Be surprised with "specialization" (goods for fans)
4. Be surprised with unusual size (giant – dwarf – slim format)
5. Be surprised with unusual color or transparency, *principle 32*
6. Be surprised with mobility of components (make immobile objects mobile)
7. Be surprised with built-in information devices and instruments
8. Be surprised with reduction in movements
9. Be surprised with price (disposable objects), *principle 27*
10. Be surprised with addition of a game element
11. Be surprised with addition of alternative channels of perception ("talking clocks", and so forth).
12. Be surprised with status of "smart things"*, *principle 23*
13. Be surprised with status of "electronic things"*

*"smart things" and *"electronic things are still "young". Therefore, they will be unable to yield stable versions of Long-Term Commodities (author's hypothesis).

All these directions for working out potentially possible forecasting solutions could be illustrated with a database from Table 2

Table 2. Resource classification of SG phenomenon with a database

Horizontal classification: resources for engineering evolution EURISTICS Vertical classification	SUBSTANCES Solid substance - LIQUID - GAS- plasma- phase transitions	FIELDS MATCHEM [27].	SPACE 0-1-2-3-00 And phenomenon of action axis pivoting [13,11].	TIME (economy, increase of velocity)	INFORMATION (mono-bi-poly- compound*)	INFORMA- TION Needs Amusement Economy
25."VICE VERSA"	Clocks with immobile hands	"Sandglass" with upward movement of the sand	Washing machine. The linen is immobile. Washing is performed by ions.	Gloss agents: for moving photographs, for immobile photographs	Glasses for 3D image are put on the screen	Hotel in a dirigible
26."SPECIALIZATION"	Washable keyboard	Pen with laser pointer	Chewing gum with bubbles	Safety cushion for legs	Mobile phone with a projector	Mobile phone for fishermen
27.SIZE giants - dwarfs	Aircraft show drawing with inverse jet flow	Piano, entertainment attraction: playing with legs	Slim format of commodities	A spade for dandelions	Underwater restaurant	Ice palace, sand sculpture
28.COLOR OR 0 (Transparent things)	Transparent body of computer	Changing the colors of the mug	Transparent washing machine (dwarf)	Transparent door in a car	Multi-colored keyboard	Candles with different color of flame
29.DYNAMICITY	"Love measuring" device	Device producing cracking sound in the course of printing	Flying clock, disk ripper	Foldable things: chair, glass	Clock with a "notepad dial"	Sand pictures
30.INFORMING	Clocks with springs for amusement	Cold neon, luminescent wallpaper	Paper batteries	Batteries with indicator	Slippers with flashlight	Rain sensor in umbrella and in car
31.REDUCTION OF MOVEMENTS	Keyboards- manipulators	Remote control for TV	Loudspeakers in a car	Instant porridges	Garbage can with pedal	Rebranding of Marlboro cigarettes
32.DISPOSABLE THINGS	"Machine-gun" soap bubbles	Matches with pictures	Eatable plates	Razor with an indicator	Toilet paper with anecdotes	Glass with a picture of nose
33.GAMES	"how a battery could be sold"	Winking pictures	Gambling clubs and sales of virtual things	TV-set in a car	Tomogochi game in mobile phone	Canned grass lawn
34.ALTERNATIVE CHANNELS	Singing fountains	Mobile phone with "handshakes"	Fireworks accompanied by music	Mirror windmill produces sound to frighten off moles and birds	Abrasive xylophone	Speaking clocks
35.SMART THINGS	Smart wallpaper glue	Pressure sensor in the car wheel (tire)	Air-conditioner with automatic cleaning of filters	Dictograph	Robotized sweeper	Smart toilet basin
36.ELECTRONIC THINGS	Electronic cigarette	Electronic book	Digital drugs	Teminvox	25 th frame in language learning	Electronic devices without batteries

5.2.MINI algorithm for using Tables 1 and 2

- The disadvantage is already specified for us: "low level of sales or no sales at all"
- **Step 1:**

- Conduct genetic and component analysis of an object under study and its relatives. Certain property of past generations will be necessarily repeated, hence the importance of this analysis. Examples [11,12,13,14].
- **Step 2:**
- Solve a system of heuristic equations according to Tables 1 and 2

{	Я хочу удивить покупателя эвристикой	Номер X	X от 1 до 24 по таблице 1
	Я могу использовать ресурс	Номер Y (от 1 до 6)	и от 25 до 36 по таблице 2

An example with business card.

A) The owner of a furniture shop can have a business card shaped as a foldable table. Heuristics number 26 "specialization" and number 29 "dynamicity".

B) Conventional way used for applying information on business cards is polygraphic processes. We can apply cutting-out instead of printing and record the information not by means of "printing ink substance", but via "absence of substance" or "emptiness", which was among the categories of TESE as sub-trend "increase of emptiness" 15 years ago. This example illustrates use of heuristics number 25 "make it vice versa".

6. Examples of using the methodology as applied to real business

- Innovation company "Star of longevity, LLC" established by the author of the present publication functioned during the period from 1999 till 2004.
- The company sold exclusive streetlight lamps intended for landscaping design JOINTLY WITH A PATENT for a useful model (these patents were granted and are enclosed).
- Rather wealthy people, directors and owners of big enterprises in Saint Petersburg were the clients of the company.
- Short review of the history of this company could be found in [30].
- During the period of its existence the company performed approximately 120 projects, which were never repeated.
- The company management was accompanied by conducting rather detailed "business diaries", which were later on generalized and became the basis for describing these methodologies.
- In 2004 "Star of Longevity" was sold in connection with owner's moving to South Korea, where he has got a job. The new owner appeared to be unable to keep the business, because he did not have required connections and popularity in the Russian business community. In 2009 the company continued its business activity under the leadership of a new manager [1].

Described methodology is mainly based on generalizations from rich practical material obtained from experience of actual innovation business.

Detailed descriptions of two examples from the history of this company are given in [1].

1. Use of "transition to the supersystem", when two kinds of art were integrated: performance of musicians (typical LTC) and installation "Lamp piano" and "Jazz on the Stars". Figure 7, left.
2. Use of such resource as attraction inherent to many people for mystics and occult science. Fractals and the problem of health. Figure 8 (right).



Figure 7. Program of sales of show "Jazz on the Stars"(left).

Figure 8. Program of sales of lamps with positive psychological support (right).

Note: This lamp has a very unusual ornament. This is a fractal made of papillary lines of author’s palm, which was created by a special computer program. Fractals in mathematics are solutions for Mandelbrot equations. For details, see a specialized web site devoted to the sales of these services.

<http://fractoscope.ucoz.ru/>

6.1. Application of methodology as shown by Example 1 on Figures 9 (left) and 10 (right)

Интерпретация в моделях ТУ

34 АЛЬТЕРНАТИВНЫЕ КАНАЛЫ	Поющие фонтаны	Мобильный телефон с «рукожатками»	Фейерверки под музыку
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Этот бизнес можно было придумать по Технологии 34 (классификация товаров удивления, диаграмма 2).

Интерпретация в моделях технической мимикрии

Органы чувств	Параметры систем	Развлекать
глаз	форма	Занимать в форме огнетушителя

Это решение можно было получить по технологии 1.1

Светильники в форме икосаэдров

Fig. 9. Interpretation according to SG model (Euristics 34 , Prototype from DB "fireworks accompanied by music").

Fig. 10. Interpretation according to EM models, Euristics 1.1 out of 24 (Prototype for designing "Lighter in the form of fire extinguisher")

6.2. Application of methodology as shown by Example 2 on Figures 11 (left) and 12 (right)

Фракталы в медицине ООО "Айрэс Технолоджис" 2

• http://www.aires.ru/shop/index.php?id_group=3
 • цитата ООО "Айрэс Технолоджис" выпускает различные виды матричных аппликаторов. В упаковке с аппликаторами содержится инструкция, включающая общие рекомендации по применению, методики терапии различных заболеваний, информацию о противопоказаниях, побочных эффектах, рекомендации по транспортировке и хранению. Матричные аппликаторы выпускаются двух типов – стандартные (различных видов исполнения) и голографические. Стандартные аппликаторы представляют собой изображение фрактально-матричной схемы "АЙРЭС", с шириной топологических линий 50 мкм, на поливинилхлоридной самоклеящейся пленке размером 26,4x26,4x0,1 мм.



Исцеление и оздоровление с помощью
 Рисунков и орнаментов известно из текстов
 «Ригведы» уже примерно 4000 лет, где описано понятие «мандалы»

Интерпретация в моделях ТУ

28 ЦВЕТ ИЛИ Прочие виды	28 ДИНАМИКОС	Аналоги	Применение/назначение компонента	Изменения цвета лучей	Последействие статически находясь	Прочие параметры автомобилей	Рассчитанная клавиатура	Связь с реальным цветом или цветом
28 ДИНАМИКОС	обновитель	Устойчиво стабильно	Лечебные часы	Лечебные часы	Сказочные вещи	Часы с обновителем	Лечебные часы	Связь с реальным цветом или цветом



• Это решение можно было получить по технологии 28
 • Правда, здесь не обошлось без технологии «Инверсный ФОР», т.к. фрактальные изображения применялись в медицине. 2

Fig. 11. Fractals in medicine as prototype found by means of FOS.

Figure 12. Interpretation according to SG models (Euristics 28, Prototype for designing – "Candles with different color of flame")

7. Conclusions and sources of information

1. Current situation of engineering evolution is characterized by an increase in the number of commodities called SG (surprise goods) in this paper. The growth in the number of surprise goods (SG) is a boundary phenomenon between notions Ideality for Consumer and Ideality for Manufacturer, as well as a "border-line" phenomenon between three trends: Conductivity, Ideality and Coordination – Discoordination.
2. Practical methodology is proposed accompanied with a DB of examples, which allows to generate 36 versions of one and the same commodity within this sub-trend.
3. The methodology was worked out based on materials of actual business of specialized company "Star of Longevity" during the period 1999- 2004.
4. The use of this methodology is efficient in the case of combined application of both the Function-Oriented Search approach (FOS) [31] and MPV methodologies for identification of Main Parameter of Value [16-20,32].
5. Changing the approach to forecasting based on new terms enables one to think about creation of "engineering gerontology" – a new discipline, which does not exist yet and which would give answer to the question, "How great could be the potential number of possible sales of a new commodity".

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