Advanced tools for Visualizing, Measuring and Managing Intangibles

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Introduction and problem description

In the last years it showed up that the instruments of the economists do not have the desired precision. The author would like to point out possibilities with this paper, how with new aspects and instruments white fields of the economic map can be mapped and new business options become possible.

Structure of contents

As the economy changes and develops

Since beginning of the manufacturers revolution in the 18th Century the economy expanded from Low Tech conditions to High Tech conditions. That means in other words that not only the resources for the creation of wealth but also the results are of less and less tangible and more and more of intangible consistency. The more intelligent goods are, the more “gray matter” is necessary for its development and production.

Development of economic assets

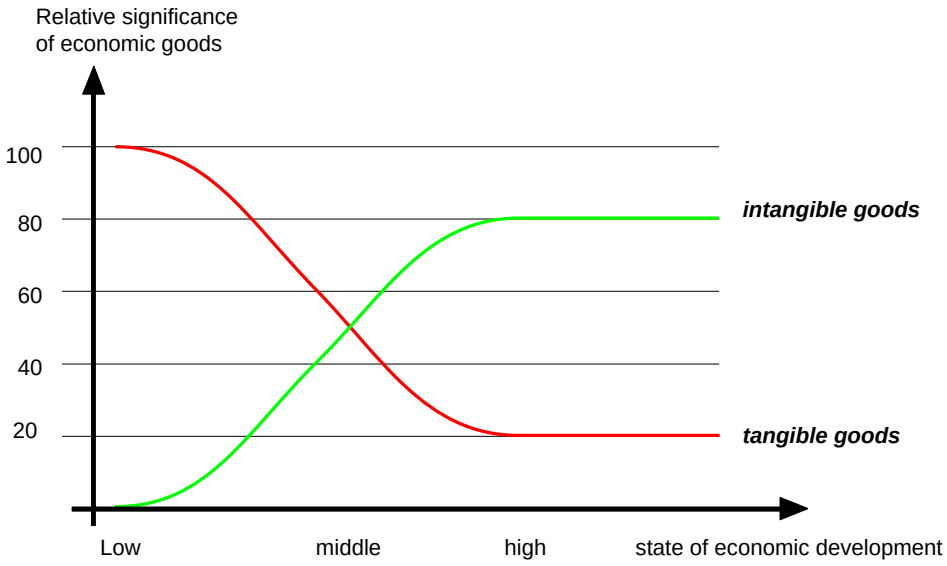


Figure 1

But not only the kind of the goods, also the form of the offerings changed during the development of the Low to the High Tech economics. While in Low Tech areas humans still predominantly concern themselves with the supply of material products, this is much replaced now by service orientation and further on enhanced by license businesses.

Development of Business Offerings

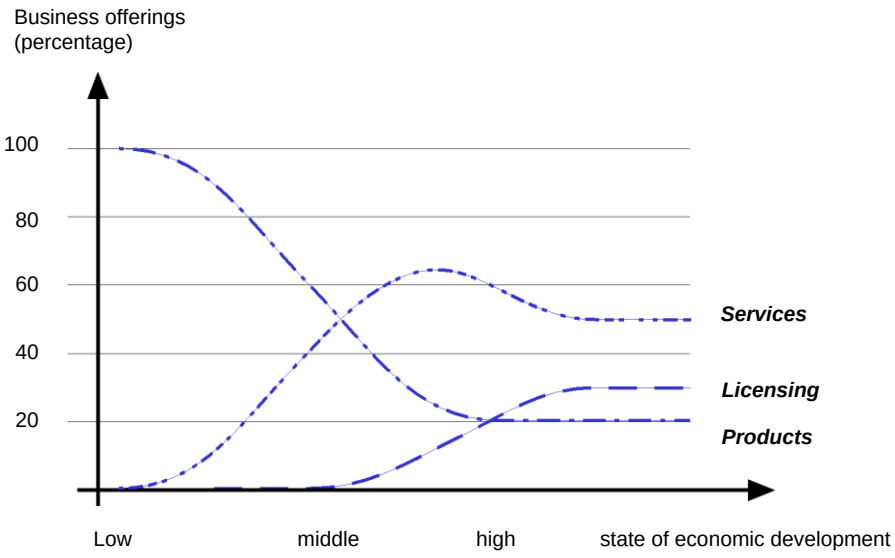


Figure 2

Models, tools, products for explaining the economy

The development of products

Outgoing from a need and a solution, products normally expand themselves in curves, which shows a „S-Shape “. With a higher maturity of the advancements of solutions further advancements can only be achieved at increasing expenses. One says that solutions come into a “saturation“ and that an advancement on the same old bases is no longer worthwhile itself.

If thus certain solutions come into the saturation - or if they cannot be used because of changed requirements any longer - the time has come for a new solution with a new or enhanced base. The product life cycle of the old solution comes to end and a new generation will take place.

Product life cycles can last a very long time. The Volkswagen beetle was produced approximately 50 years. Then it was substituted by the Volkswagen Golf, which is now already several times revised and on its own S-Curve.
Such S-Curve developments can be found within all developments in the technological, organizational and also within the social environment.
Peter F. Drucker gave some good examples in his book “Innovation”. He describes impressively the cause for “disruptive innovations” – the change from red to green S-Curve – that lies often in a gap of “what is” and “what should be”. A gap of what we experience in real live and what theory offers as an explanation (a MindSet) of that.

Economic theory as a product

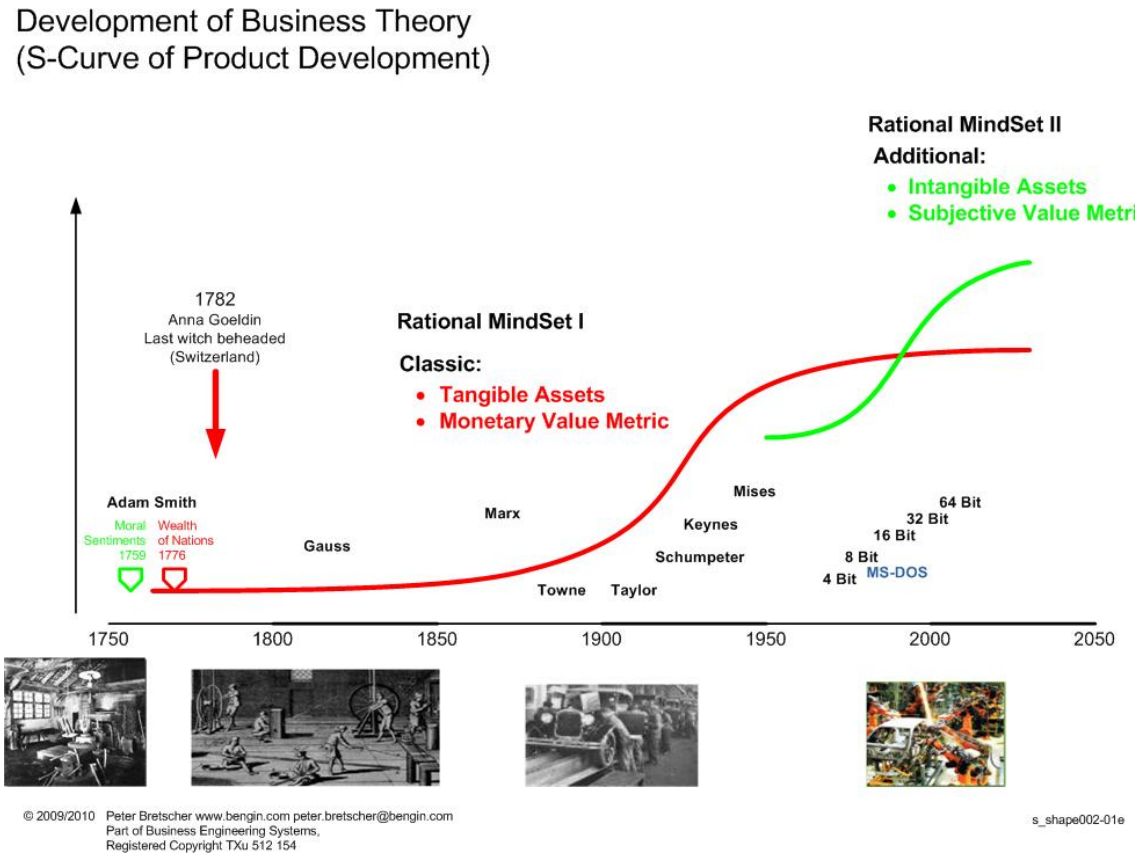


Figure 3

Economics take a special position under all the teachings, because their statements have direct and indirect an effect on thinking, reasoning and acting of high-level personnel in politics and economics.
The effect is direct because high-level personnel must acquire itself the knowledge of the “business theory” as the basic literacy to express the insights and views under peers and beyond.
The effect is indirect because in the course of the time six specialized areas have been developed, in which individual aspects of the economy are worked out and adjusted by specialists.

The six specialized areas:
1. The political economy, which has primarily “the well-being issue“ of nations as priorities; 2. The business economics, in which the considerations is intensively aligned to the enterprise; 3. The teachings to the management, as management has to use the economic theory in practice; 4. The accounting, in which together with the financial bookkeeping also an accounting framework was developed, which accounts the costs according to various criteria; 5. The juridical system, in which among other things it is defined, when an enterprise goes bankrupt and 6. The chartered accountants, who audit the enterprise and verify that the records are made according to the rules.

Albeit in these specialized areas continuously adjustments take place. But there is in nearly all cases a constant development on the same bases. The development within these priority areas also has a S-Shape at the last stage and lacks the structure for integrating intangibles and an enhanced metric for considering the subjectivity of the valuation process.
Even there is some minor progress in the specified areas of the professionals. Real advantages have their origin mostly in the area No 3 (teachings to the management), where most of the conflict between teachings and their application in practice accrue.
A special problem during the disruptive innovation process of economic MindSet is that a change has to be “scientifically correct”. Even proved in several cases, that scientifically agreed meanings are leading to a dead end (see N. Taleb, Black Swan). Specialists in all six areas have to be convinced to enhance their paradigm if one cannot wait until they die. This would be the natural solution that several masterminds in the science field see as the only solution for a progress.

Because the use of outpaced economic MindSets has negative impact to our real world living we should in all six areas proactively develop an enhanced economic reasoning system that fits the needs for a sustainable growth of economy.

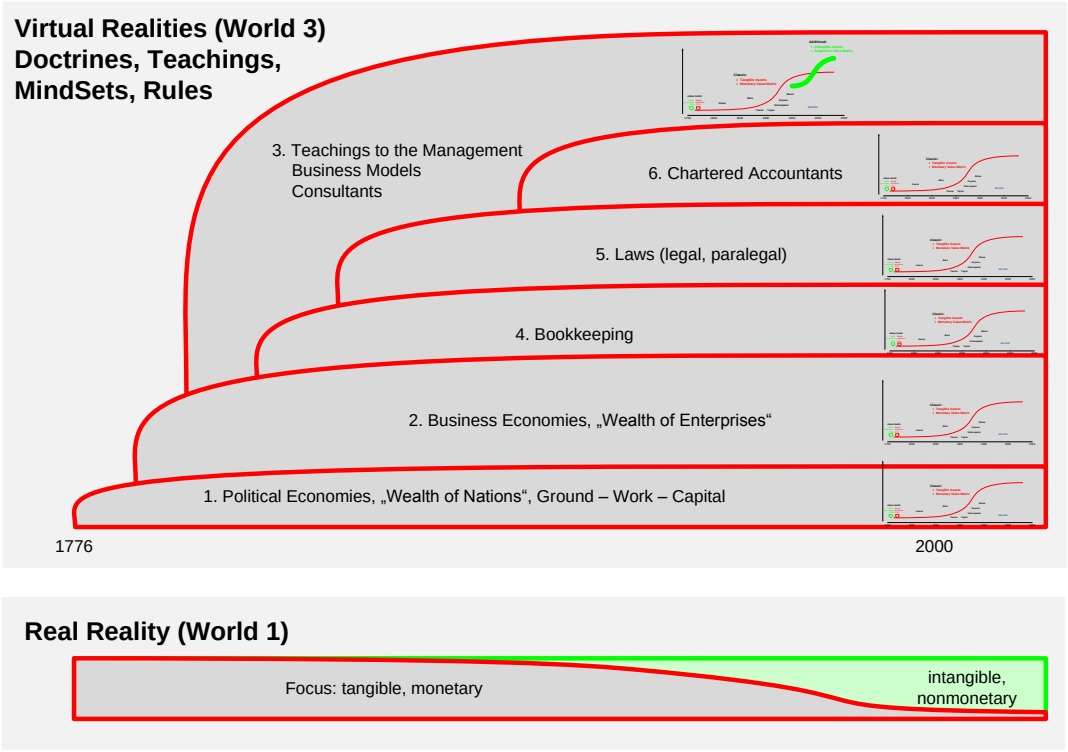


Figure 4

Two outpaced paradigms

From the many postulates and assumptions in the classical economic theory „the developers of the models at that time“ would probably re-specify two paradigms with highest priority.

1. The paradigm “land, labor, capital“ would most probably be substituted by a framework that is based on tangible and intangible objects as resources.

2. A further paradigm, i.e. the value paradigm, was likewise defined that value has to be measured in “objective” and tangible monetary units. This paradigm should be replaced by an improved metric system that enables to integrate the aspect that a valuation process has a subjective base.

Both paradigm expansions are a condition for a revised model, that corresponds better with the today's and future requirements for structuring and quantifying the real economy.

While the expansion of the first paradigm is easy to understand and brings no mathematical difficulties, the expansion of the well known monetary yardstick by a subjective value measure is already somewhat more difficult for experienced economists to accept. Many of them will probably go through all phases of a paradigm shift, which Thomas Kuhn described 1962 in its book “The Structure of Scientific Revolution“.
On the part of mathematics the instruments are available to calculate in two and more dimensions. This both in the form of the complex numbers and by the use of the wider used vectors. Vectors and complex numbers made it possible in the history of the natural sciences already several times to improve insufficient illustration instruments and declaration models. For example to the scientifically accepted declaration of the alternating current, color, the force, the power and so on.

The effects on the existing economic literature are “marginal in principle”.
In the book „Theory of Value“ (1959, Gerard Debreu, Nobel laureate, Yale University Press) for example specified on page 62 „The expenditure… must clearly be at most equal to the wealth of the customer, a real number.“. This restriction on a linear measuring system should be written new in the language of the mathematicians expressed: „The expenditure… must clearly be at most equal to the wealth of the customer, a complex number.“.
The effects on the organization of economics and company might be however large and positive.

Objects, Attributes, Value-Measures

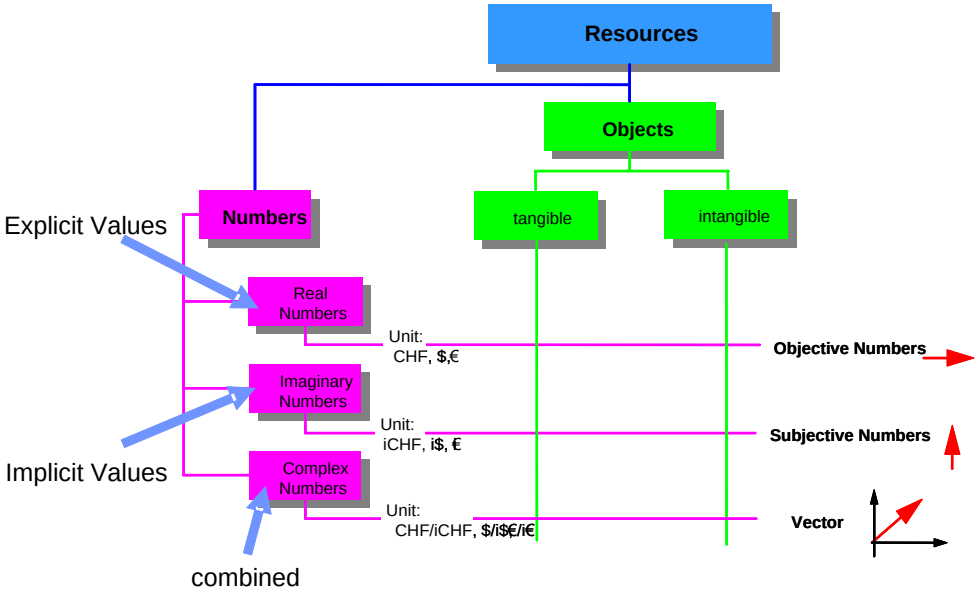


Figure 5

The Vector

The vector is a mathematical vehicle, with which it is possible to make arithmetic exercises not only on a linear axe but also in two and multidimensional space. There are two kind of vectors. The graphical vector that is more than 2000 years old – it was used to compound velocities – and the numerical vector that is used about 150 years mainly from physicists and engineers.
Academics of natural science often had to revise their basic assumption to re-design the classic explanation models in order to better match and explain the phenomenon that they perceived in real reality. Often they have used formulas that include vector elements in numerical or graphical forms. Examples can be: Forces with strength and direction, velocity with strength and direction, acceleration with strength and direction, colours with “red”, “green” and “blue” as components. Even a volume – for clear description – consists of three dimensions (length x width x high). The description of a volume in one number alone is only useful for specific reasons.

Single 2D-Vector

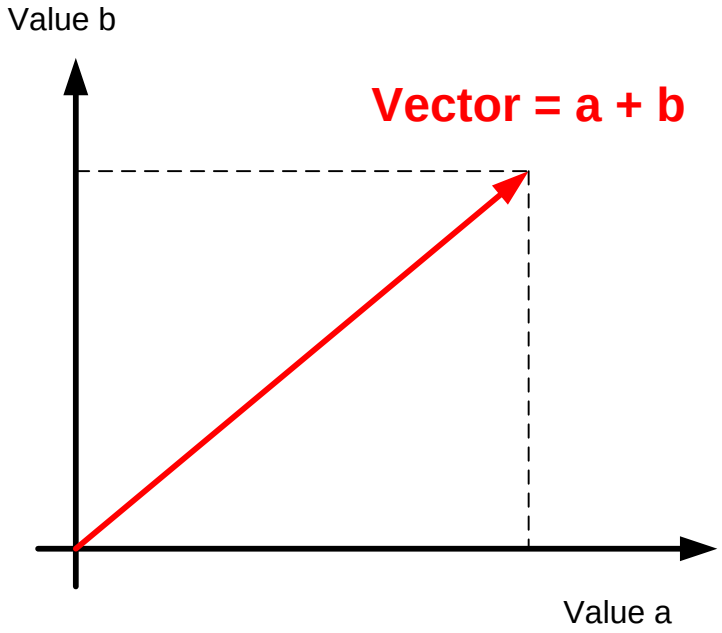


Figure 6

With vectors it is possible to visualize two (ore more) any desired indicators representing characteristics of a physical or an economic object. All that is necessary is a number and a unit. Any unit for indicator is allowed, coming from any natural or social science. The eye that looks at a vector instantly catches and realizes that the two values “Value a” and “Value b” (in Figure 6) each have an impact to the total value of that object.

In practice it has been showed that one should differentiate between two types of vectors.

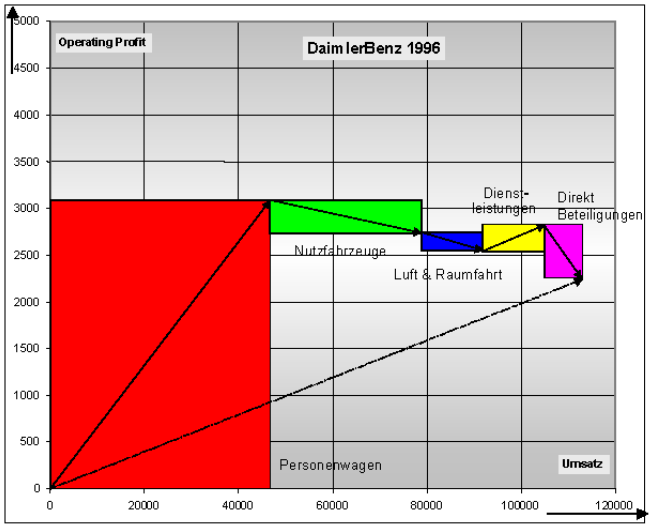
“Vector 1” is used for any combination of any axes with any subjective or objective unit or metric. Its purpose is to show (in a 2D vector) two any desired property or indicator of an object, be it monetary or nonmonetary, be it subjective or “objective”. Examples: Turnover, profit, production costs, development costs, disease days, storage space, turn-around time. See Figure 7 and Figure 8.
“Vektor 2” then is – in analogy to the complex number – used for the definition and combined calculation of “explicit” and “implicit” value indicators. See Figure 9

Figure 7 shows five Business units with the numbers for “turnover” (horizontal axis) and “operating profit” (vertical axes).The information that otherwise only experienced professionals could interpret from the numbers on the left side can now be viewed, shared and communicated in a far better way then with numbers alone.

DaimlerBenz 1996

(Quelle: DaimlerBenz Geschäftsbericht 1997)

Zahlen 1996	Umsatz	Operating Profit
Personenwagen	46652	3090
Nutzfahrzeuge	32152	-354
Luft & Raumfahrt	13053	-196
Dienstleistungen	13143	288
Direkt geführte Beteil.	8014	-585
Element6	0	0
Element7	0	0
Element8	0	0
Element9	0	0
Element10	0	0
Summe	113014	2243



Die strichlierte Linie zeigt das durchschnittliche Verhältnis von "Operating Profit" zum "Umsatz".
Flachere Vektoren zeigen eine unterdurchschnittliche und steilere Vektoren eine überdurchschnittliche Performance.

Figure 7

The picture shows two characteristic numbers operating profit and turnover of Daimler Benz with the five business fields in the year 1996. Contrary to the usual numbers in the left field is immediately evident in the vector representation, which range contributed as much above average (or negatively) to business success. At the same time one loses not in the numbers but keeps themselves the overview of the substantial.
Figure 8 shows then a sample that has subjective indicators at the vertical axis and R&D expenditures for different properties of a car on the horizontal axis. Needless to say, that the subjective indicators could derive fro a view of a customer, a salesman, a designer, the management and so on.

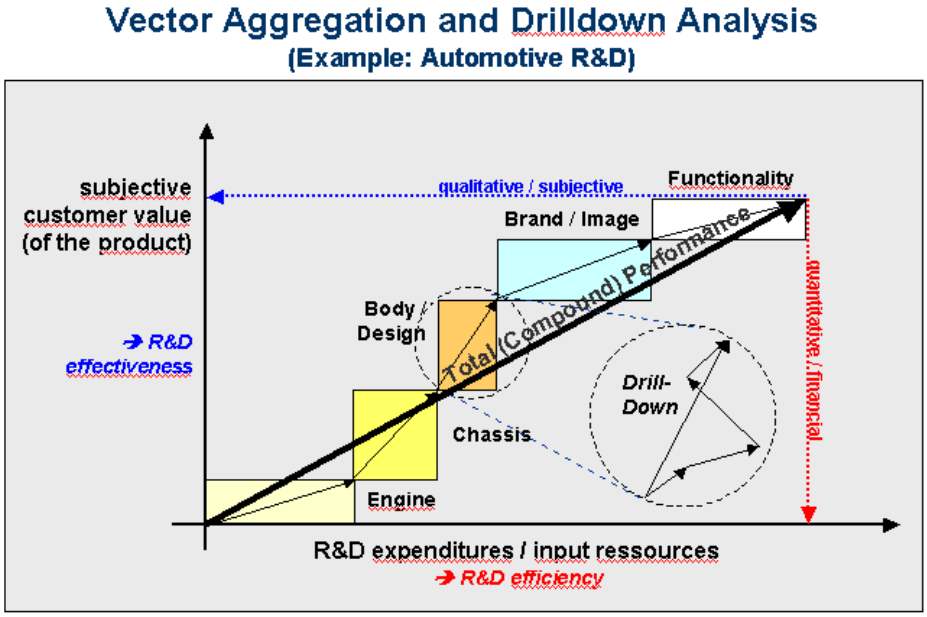


Figure 8

A step beyond the insights and information that can be gained by using “Vector 1” is using the vector principle as a possibility to establish an objective metric system for subjective values.

This subjective value, called intrinsic or implicit value in Figure 9, is based on two monetary indicators as (for example if people buy a share of an enterprise) book value and price of a share of an enterprise. The intrinsic value that the share has for the buyer is the square root of the share price squared minus the book value squared. The mathematical principle that links the monetary (price) axis with the axis for the subjective (intrinsic) value is given by the rule of Pythagoras.
This principle allows to introduce a logic for an objective metric for determining a subjective value in any trading process.

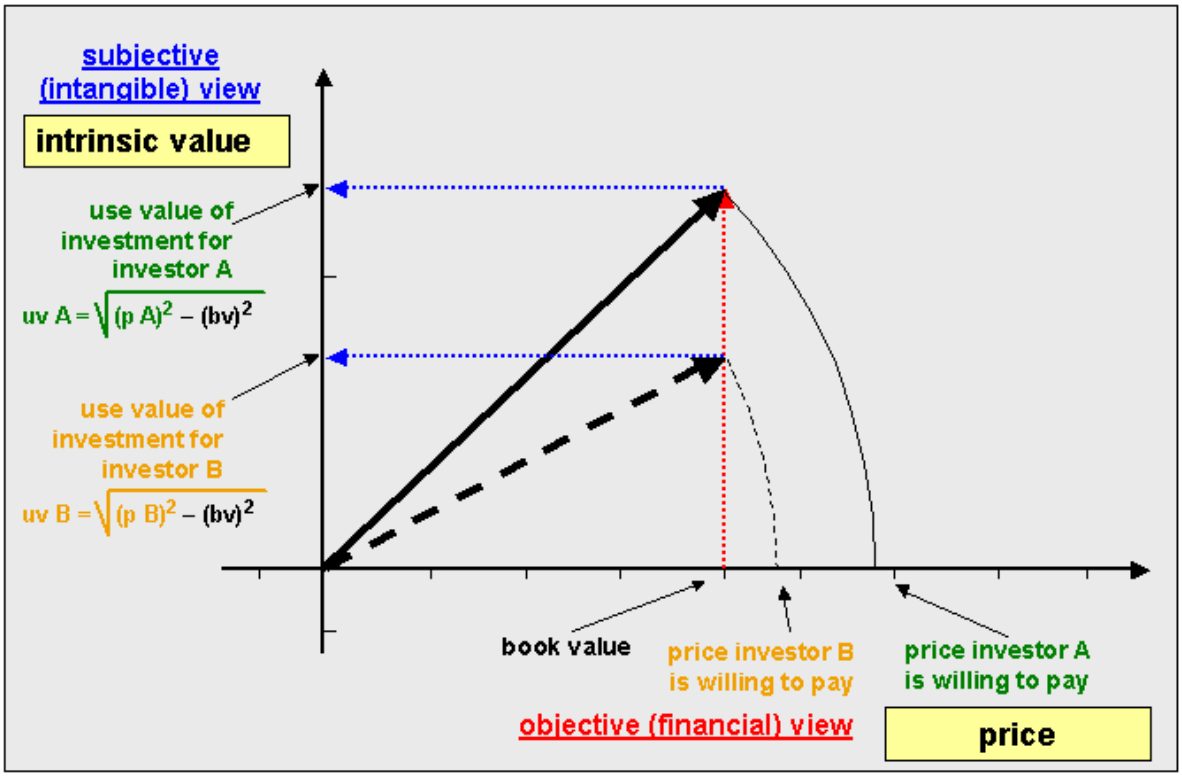


Figure 9

As already specified above, the possibilities to show examples are so tremendous, in particular if one takes the development of the Behavioral Economics into account, that it does not make sense to blow up this paper with additional examples.

For that reason a specific website will be set up for additional information.
Link: http://www.bengin.net/dresden/

Enhancing the two paradigms and thinking in vector terms is not only an academic exercise. It has some serious impact to the design of enterprises and business in so far that it enables to map and quantify the intangibles in addition to the well known classis valuation principle in monetary units. That kind of value map opens the way for a more sustainable reasoning in the decision process in industry and politics. At least they could if they would.

Outlook

With the expansion of classical balance by an immaterial balance and the monetary value metric by subjective indicators the options for a lasting development of politics and economics rise substantially. What until now was missed is now on the map and will have a positive impact.

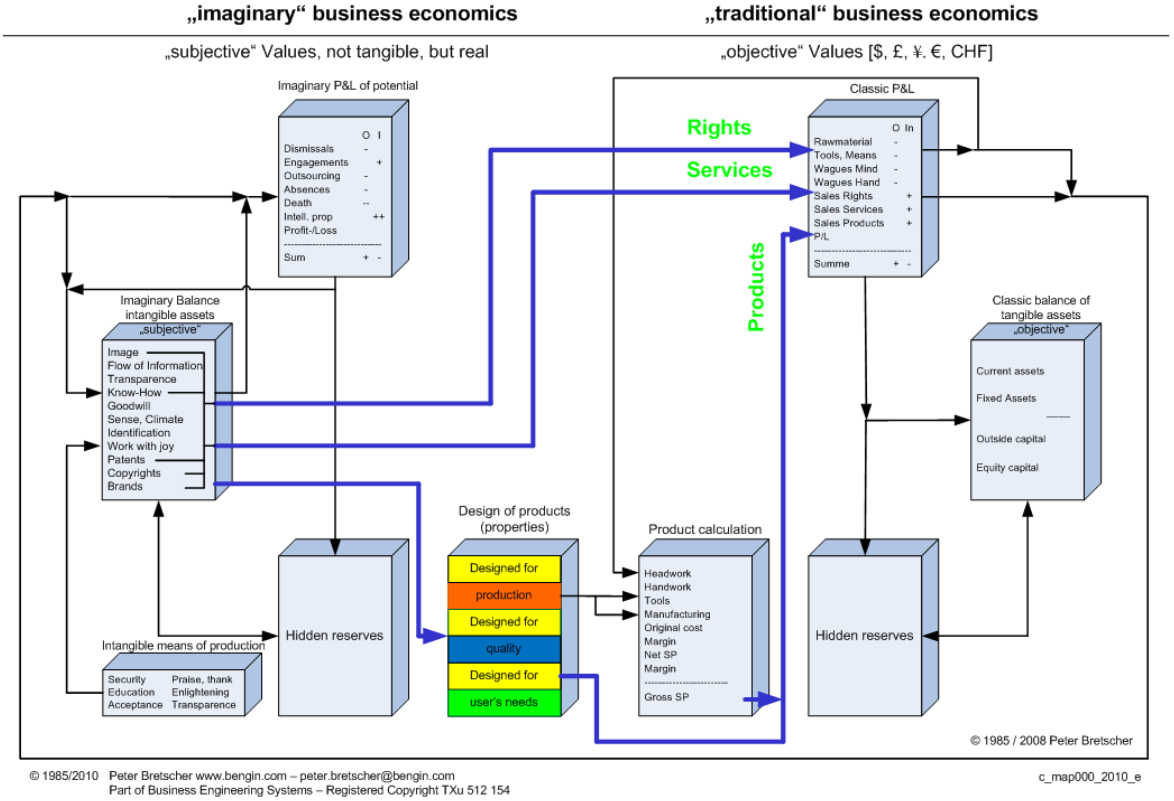


Figure 10

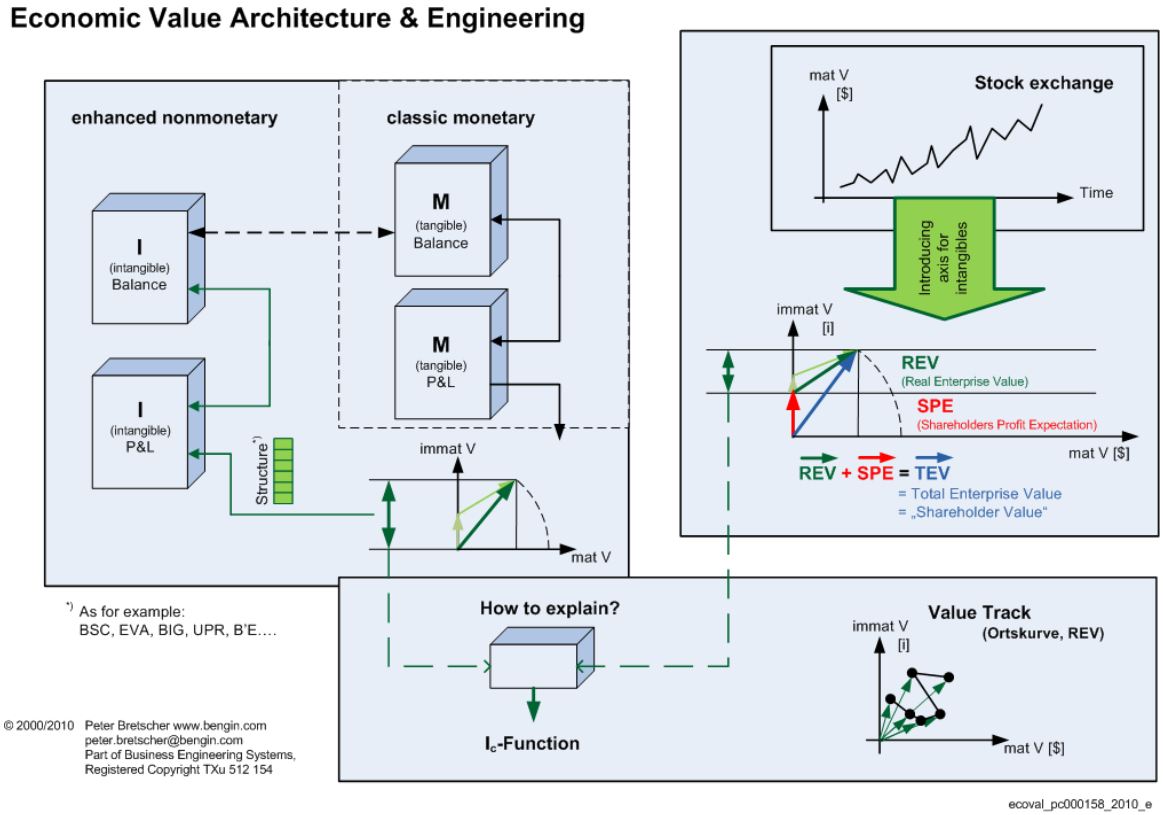


Figure 11

Persons, organizations and literature

Persons:

Dan Ariely:	http://web.mit.edu/ariely/www/MIT/
Nassim Nicholas Taleb:	http://www.fooledbyrandomness.com/
Gary Hamel:	http://www.garyhamel.com/
Gunnar Heinsohn:	http://de.wikipedia.org/wiki/Gunnar_Heinsohn
Don Tapscott:	www.ngenera.com

Organizations:

European Commission: Beyond Union of Police http://www.beyond-gdp.eu
Post-Autistic Economics Network: http://www.paecon.net

Resuming literature:

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