

# Applying Memes in Foresight

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## INTRODUCTION

The concept *memes* stands for ideas or beliefs that are transmitted from one person or group of people to another. It originates with the British biologist Richard Dawkins, who, in his book *The Selfish Gene*, developed the theory that our times see not only a genetic evolution but also a memetic evolution taking place: the evolution of culture.<sup>1</sup> Culture spreads by means of memes, a meme being the “physical” representation of information, a self-multiplying unit of cultural evolution, just as a gene forms the unit of biological evolution. One example of memes would be world religion.<sup>2</sup> In world religions that are transmitted from one generation to the next, small adjustments are constantly made. Sometimes, great mutations occur, as they did, for instance, during the Reformation.

The concept *meme* bears relationship to the notion of *flow*, conceived by psychologist Mihaly Csikszentmihalyi, who has studied human interaction.<sup>3</sup> Csikszentmihalyi views *flow* as an experience that gives people the feeling that they are in contact with the world around them and thus gives meaning to the things they do. Sometimes a remarkable event causes people to become inspired to undertake certain activities; sometimes it is ambitions, religious experiences, or new insights that stimulate them. According to Belgian sociologist Gust de Meyer, this connection points to the importance of weak links

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within network relations. Weak links may be very weak, for instance, where the collective unconscious (Carl Jung) is at stake, the web of archaic psychological connections between people that we are not aware of.

In his April-May 2010 *World Future Review* article about the use of memes in strategic planning, Tim Mack dissociates himself from Nassim Taleb, who, in his book *The Black Swan* and in other recent publications, argues that predictions are only meaningful if they are based on observations that keep constantly recurring in the same manner.<sup>4</sup> Taleb characterizes the use of scenarios as a “sucker’s game.” Taleb’s view is reminiscent of René Descartes, the French philosopher (1596-1650) who made an urgent appeal to reason rather than to our senses, which after all may deceive us. He posited that human observation is so unreliable that reality as observed by humans needs to be called into doubt. What can be called into doubt should be rejected. But what cannot be called into doubt, in his view, is the very fact that he doubts. Descartes came to the conclusion that no one can make me doubt that I exist when I think. When I doubt, ponder, and consider—in short, when I think—I cannot doubt my existence. This basic idea is usually expressed through the statement: “I think, therefore I am,” or in Latin: *Cogito, ergo sum*. Descartes brought about a revolution with his thinking. Science and technology were given full attention, and man was allowed to rule these. This so-called Enlightenment went hand in hand with a great belief in progress. All of a sudden, reality around us became controllable. This meant a turning point in the ways of thought of those times.

But those times have now changed. These days, man has seemingly lost his directing role again. The world has become so complex that, in the eyes of many, the idea of a manageable world has burst like a bubble. We often think that we are being driven along, lacking all course, by forces that nobody can control. Then, thoughts of apocalyptic scenes are quick to arise. But not everyone will concur. According to French futurist Joël de Rosnay (1937- ), for one, the future

belongs with those human communities that enter into a symbiosis with their natural artefacts.<sup>5</sup> He foresees the integration between the natural and the artificial, between art and technology, and between cultures and civilizations. Our systems, machines, and organisms warrant a hectic world that offers man every opportunity to contribute individually to the future of this world. The ascendancy of these systems, as observed by de Rosnay, recalls Adam Smith, who in his own time, when big institutions hardly, if at all, controlled the economy, was full of praise for the invisible hand ordering the market. It can be expected that the invisible hand in the anarchy of the future also improves the quality of life on earth in one way or another. So it is very likely that memes are at the basis of a new order.

This paper first relies on some underexposed characteristics of some trends and then allots to the phenomenon of memes a function within the process of foresight. It also makes out a case that, in practice, a collection of memes can frequently be described in terms of a *power law*. This implies not only that there are stronger and weaker memes, but also that the amount of stronger and weaker memes is connected. This gives rise to the perspective of a strategic-planning process in which memes deepen the strategic process.

## ANALYSIS OF STRATEGIC INFORMATION

### **Power Law**

It is often thought that many of the phenomena around us show a normal distribution. We are familiar with the bell curve, which illustrates that the mean is an important figure in a great many subjects and that deviations are distributed in systematic fashion around this mean. Great deviations are rare; small deviations are normal. This is true, for instance, for biomedical data: someone's height, age, weight. Yet it is meanwhile becoming increasingly clear that in many cases normal distribution does not apply. Authors such as Philip Ball (*Critical Mass*),<sup>6</sup> Chris Anderson (*The Long Tail*),<sup>7</sup> and Nassim Taleb

(*The Black Swan*) have written extensively about this phenomenon. In these authors' view, the real world in many cases turns out to be nonlinear. It is, moreover, complex and system-based. The latter is important since often a set pattern is seen to exist between the frequency and the magnitude of certain phenomena. This pattern is called *power law*. Examples of this are the 20/80 rule in trade, where often 20% of the products accounts for 80% of the turnover. We find similar patterns in the popularity of artists, in the size of cities, in the frequency and magnitude of earthquakes, and in the size of the groups of protein in the human genome. In economics, we have found that the distribution of income and wealth are power laws.

In 1963, French mathematician Benoit Mandelbrot studied the fluctuations in the price of cotton at the Chicago Mercantile Exchange, and he found that the fluctuations in this commodity market did not show the normal distribution that a market that functions completely arbitrarily would be expected to show; rather, he observed a behavior in the great deflections that showed the deviations to occur in a systematic manner. The frequency distribution of these fluctuations proved to have the form of the power law. In his book *The Social Atom*, English scientist Mark Buchanan points to the consequences of this discovery for the functioning of financial markets,<sup>8</sup> whereby he lays particular emphasis on the debacle of the LTCM hedge fund in 1998, a fund that was managed by, among others, two Nobel Prize winners—Myron Scholes and Robert C. Merton. These scientists had been awarded the prize for models that assumed that power laws play no role in the capital market. During the first years since its launch in 1994, LTCM did very well, but towards the end of 1998 things went wrong. LTCM could no longer meet its obligations.

The then-current analysis of the underlying cause pointed to the Russian ruble crisis as being at the root of the debacle. Buchanan contends, however, that, even if the Russian ruble had not run into problems, another cause—i.e., human behavior itself—would have spelled ruin for LTCM. He maintains that people act on the basis of

simple rules and adapt constantly if this means they can benefit from this. This observation has far-reaching consequences when brought to bear on great numbers of people reacting to each other—that is to say, when memes play a role in the behavior of people dealing on the financial market. The theorem of efficient markets as posited in the models of Scholes and Merton needs to be replaced with the theorem of the interacting, adaptive agents. Now that the financial market has proved to be a behavior-dependent market, the violent fluctuations in price that occur are no longer unpredictable market inefficiencies, according to the so-called efficient-market models. When his book appeared in 2006, Buchanan could hardly suspect that two years later precisely this would cause a crisis to come about in the financial system, startling the world and leading to a worldwide recession.

### **Exponential Development**

Besides power laws, exponential developments also play an important role in foresight. Two of the best-known futurologists of the previous century, Herman Kahn and Anthony Wiener, published their study *The Year 2000* in 1967 in which they carefully sketched the world as we know it. For one thing, they predicted the use of computers for all commercial and financial information transmission, electronic cash dispensers, and modern ways of forecasting the weather and fighting crime. As early as 1967, Kahn and Wiener foresaw that the use of the personal computer would be more widespread and easier to learn than playing bridge or driving a car.

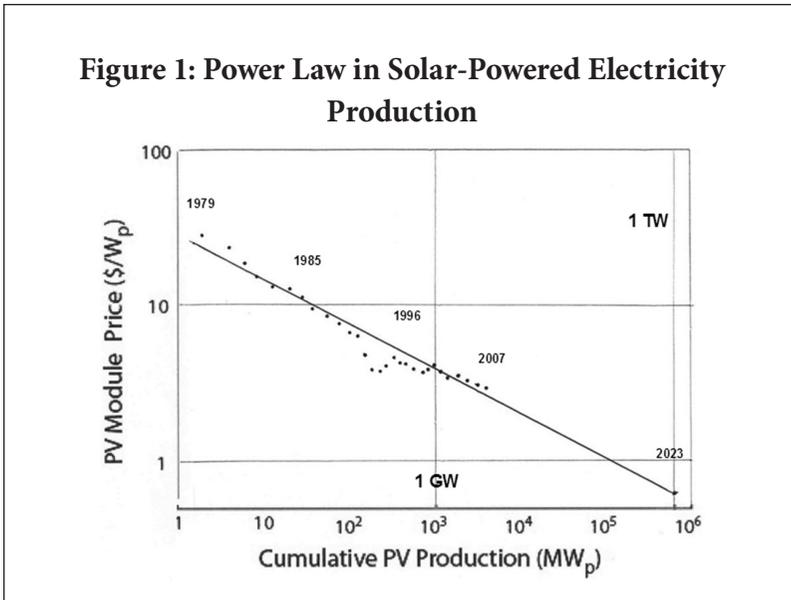
In 2002, Richard E. Albright published a report describing the expert assessment of Kahn and Wiener's forecasts for the year 2000. The expert team reached the following conclusion: Predictions in communications and computers have been much better than in any of the other areas. Two key drivers of the greater accuracy of predictions in communications and computers stand out. First, sustained trends in enabling technologies for communications and computers were apparent in the 1960s and have continued to the present, allow-

ing futurists to extrapolate capability and cost trends with a high degree of accuracy. Performance capability has grown exponentially, enabling ever more sophisticated applications of technology. Second, the scale of investment required for innovation with enabling technologies of communications and computers was driven down by the declining costs of the enabling technologies. This allowed contributions by many people, working in industry, academia, and independently, to advance the field. Many small decisions and technology innovations resulted, and relatively few massive infrastructure changes were required for successful innovation (going beyond invention). The activities of many innovators enabled fast and sustained industry learning.<sup>9</sup>

The exponential growth of genetic knowledge is anecdotal. The Human Genome Project that was started up in 1988 had mapped out a mere 1% of the human genome in 1995. Some skeptics then withdrew from the project. To their mind, insufficient progress had been made, although the study was at that moment right on schedule following the exponential growth curve, which here meant that, for the next seven years to come, the size of the mapped genome would double every year. The milestone of 100% was reached in 2003, two years ahead of the initial planning. People thinking along linear lines will expect a performance level of 50% at the time when the project is halfway.

For some time now, a similar debate has been raging about the question of whether a power law is likewise observable in the production of solar energy. The Solar Power Laboratory of Arizona State University has calculated that such a connection did indeed exist for the production of solar energy in the United States between 1979 and 2007.<sup>10</sup> Figure 1 suggests for the United States that in 2023 the price of solar energy will be a mere fraction of the price that is now usually paid for solar energy. In that same year, the United States' entire electricity production will be solar-powered.

Such a representation of matters evokes strong associations with Moore's law, which has dominated developments in ICT over the past



decades. Moore's law posits as a guideline that every 18 months the computer chip will perform twice as much at the same cost. Figure 1 is based on the assumption that solar energy production will double every two years, a figure that is also mentioned in the analyses of futurologist Ray Kurweil. From the graph it can also be deduced that the price of solar energy will be halved every two to three years, which corresponds with a yearly drop in price by 30%–40%. For its part, the European Photovoltaic Industry Association (EPIA) had the consultancy firm A.T. Kearney map out the global development of electricity production using solar cells.<sup>11</sup>

The outcome is a striking resemblance with the figures from the Solar Power Laboratory of Arizona State University. Anyone including this power law model in his or her forecasting will observe that the energy market will change from a market of scarcity to one of surplus trade in the next decades, just as has happened in the telecom market. People who consider investing in fossil energy production should take this into account. Chances are that the power law will also manifest itself in the years to come. The Chinese market already

accounts for 50% of solar panel production. China may well be expected to continue stimulating the global production of solar energy, which will result in a continued drop in the price of this kind of electricity.

### The Power Law of Memes

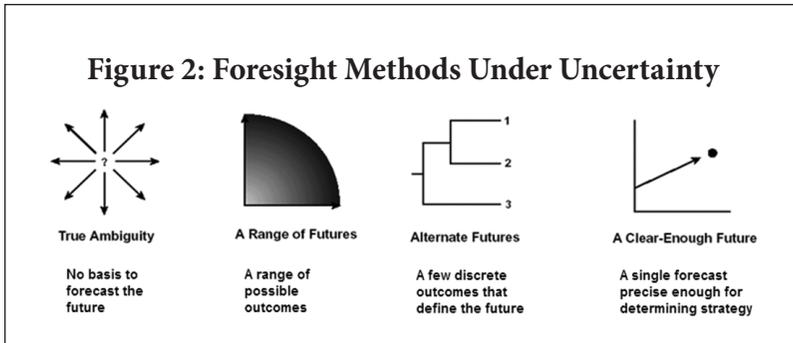
If Richard Dawkins is right in thinking that memes show a resemblance with genes, then the power law model must also inhere in memes. For a little background on genetics, it should be understood that new genes can arise from mutations, which are random in nature. Furthermore, entire genes can also be duplicated. If a gene is duplicated, and then mutated, we get two genes that perform similar, yet slightly different functions. This can happen multiple times, giving us a “family” of genes. Each member of a gene family is a slightly different copy of another member of the family. The key point here is that each gene in our DNA is not necessarily completely unique. Instead, we also have clusters of genes that perform similar but slightly different functions. For example, hemoglobin—the protein that carries oxygen in our blood—is encoded for by a family of genes that all evolved from the same gene. The fascinating aspect of this is that evolution of gene families can be made to fit a power law model.<sup>12</sup> This poses the question of not only in what way memes develop, but in particular which memes are important and which are not. This question is of relevance to their application in foresight.

## SCENARIOS

### Single Forecast

When searching for the best way in which to carry out forecasts, the question comes up of which method to adopt.

The *True Ambiguity* model is hardly attractive in a strategic process that takes memes into account. After all, if the planners work on the assumption that a strategic process may develop in almost any con-



ceivable direction, the dialogue among those directly involved will be of a very rational, distant nature. Strategic planners cannot be expected to feel strongly about subjects that belong to very diverse worlds.

The *Range of Futures* model is used, for instance, in situations where an organization is forced to steer a different course, and those who are directly involved have as yet no idea which direction they should go. The restriction then lies in the fact that in such a situation the organization often takes the available competences of those involved as its starting point.

The *Alternative Futures* model is frequently applied. A case in point would be the scenarios adopted by Shell as they were published by the company.<sup>13</sup> The accompanying notes explaining the method used state that, when choosing from different future scenarios, it is advisable to take into account those uncertainties that are important in foresight. In this vein, various pathways are being explored in today's world that are to lead to the world of tomorrow. As with the other models, planners are faced with the question of how they should deal with information that hardly, if at all, connects with the planners' mental world (mental maps). For instance, the strategists of the shipping companies who 100 years ago were confronted with an emergent aviation could not conceive of aeroplanes ever competing with the big ocean liners of the time. In the first half of the last century, no shipowner bought an aeroplane. New companies were set up for aviation, businesses that without exception were obsessed with transport by air. Or, to put it in a popular way: In the world of shipowners

no memes existed that had anything to do with aviation. Shipowners unintentionally left passenger transport to other companies.

Where a planning process involves breakthrough innovations, the *Clear-Enough Future* model would be the most obvious choice. American psychologist Keith Sawyer has established that many creative processes do not come about in private isolation. He found that many writers build their plays, novels, and poems bit by bit, then try these out on other people in order to finalize their composition much later. And this method is not alien to scientists, either. Charles Darwin took 13 years to finally distill and formulate a complete theory of evolution from all his observations. After many contacts with others, he gradually succeeded in shaping the idea until it finally reached completion.<sup>14</sup>

It is the more striking that a new product is usually not given a friendly reception. The early adopters may praise the product to the skies, but most other people view the attention showered upon it as a waste of time. Thomas Edison, who introduced the electric lamp in 1878, was told by his contemporaries, “good enough for our transatlantic friends but unworthy of the attention of practical or scientific men” (British Parliamentary Committee, referring to Edison’s light bulb, 1878); “Such startling announcements as these should be deprecated as being unworthy of science and mischievous to its true progress” (William Siemens, on Edison’s light bulb, 1880); and “Everyone acquainted with the subject will recognize it as a conspicuous failure” (Henry Morton, president of the Stevens Institute of Technology, on Edison’s light bulb, 1880). Overcoming this resistance requires the presence of an appealing prospect. Edison, for one, thus said in 1879, referring to his lamp, “We will make electric light so cheap that only the rich will burn candles.” The success of Moore’s law is in part due to the unambiguous future that the companies directly involved opted for. It has often been remarked in this respect that it, in fact, is a self-fulfilling prophecy that for years has determined the strategy of the main companies in the semiconductor sector. The method of the single

forecast proved to be an effective one.

As a direct consequence of this method, uncertainties will find expression in multiple transition paths. Companies within the semiconductor industry are known to have at times mapped out a transition path themselves to outperform the transition path that they had jointly agreed upon within the semiconductor industry.<sup>15</sup>

### **Strategic Space**

An important part of strategic planning concerns filling the Strategic Space. This vehicle is understood to comprise all information that planners consider relevant. This includes information about internal as well as external actors, facts and figures that are deemed important, and trends that have been observed. Many popular scenario methods note that the Strategic Space should be filled by means of two identifying driving forces processing sufficient uncertainty. On the basis of this, a coordinate system is formed, with the two driving forces constituting the horizontal and vertical axes respectively. Next, the information filling the Strategic Space is put in the coordinate system's four quadrants. In cases that take memes into account, it is not necessary to structure the Strategic Space in advance. After all, other subjects brought up by those directly involved may also be relevant.

Every time the subjects in the Strategic Space are discussed, each piece of information acquires a certain weight. One subject is felt to be much more important than another. Put more strongly: Often, a limited number of subjects is considered dominant, while at the same time much information is of minor importance. Thus, the Strategic Space frequently proves to be a collection of memes obeying the power law.

### **Scenario Plots**

It is possible to describe the power law of the Strategic Space accurately. To this end, every participant in the planning process is asked to rank the subjects in the Strategic Space according to the relevance he or she personally attaches to each subject. The ranking is called *the relevance*

*ladder*. In this manner, a set of *relevance ladders* is created that can be analyzed statistically. Practical experience has shown that with the use of factor analysis as a rule several clusters of subjects can be identified. For each cluster it is indicated which subjects are felt to be the most important and on which themes opinions differ. Such a cluster is a prelude to a Scenario Plot, which thus comes about in statistical analysis.

### Case: Energy

#### Plot 1: Focus on Innovations in Sustainable Energy

Table 1 shows that the participants opting for Plot 1 attach great importance to the opportunities that present themselves in the field of sustainable energy. Local sourcing and the construction of smart grids are marked as most relevant, while great importance is similarly attached to the speed with which these developments are taking place (power law). Interest in the production of sustainable energy is reinforced by the geopolitical energy problems, and the fact that the Netherlands has a great deal of knowledge in this field is greatly valued.

The list of subjects comprises 31 items in total. The table shows the most important items. The figures -3 up to 3 appearing in the table reflect the degree of relevance that the participants in the respective visions allotted to the subjects: -3 = not relevant, -2 = hardly relevant, -1 = somewhat relevant, 0 = of average relevance, 1 = quite relevant, 2 = very relevant, 3 = extremely relevant

#### Plot 2: Focus on Energy Shortage as a Problem

In this plot, the participants have a big stake in nuclear energy and in electrifying mobility. The seriousness of the climate problem receives a great deal of attention, whereby the solution to the energy problem is not in the first place expected to come from the oil companies. Further, it is found that in this plot there is but little interest in the technological possibilities in the field of sustainable energy. Solar energy receives hardly any attention. On the other hand, an active

role of the energy-producing end user is found to be important.

The statistical analysis shows that two significant plots have been found that are not mutually correlated.

There is also interesting information on those who participated in the study.

The value of the scores in Table 4 lies between -1 and +1. A high positive score indicates that the participant's view corresponds to a large extent with the plot concerned. A strong negative correlation

**Table 1: Overview of the (Statistically) Significant Relevant Subjects Forming Plot 1**

**Plot 1: Focus on Innovations in Sustainable Energy**

	<b>Plot 1</b>	<b>Plot 2</b>
22. The energy producing company and the consumer are becoming more and more powerful	3	1
27. Saving energy is a strategic objective	3	-1
30. More and more energy communities are springing up	3	2
13. The topicality of Moore's law casts a shadow over the energy market	2	-1
11. (Regional) authorities should be committed to furthering the construction of smart grids for the benefit of energy-producing companies and consumers	2	-3
25. Consumers will start to produce their own energy	2	0
5. Cradle-to-cradle at local level is the best starting point from which to shape a sustainable energy policy	2	0
26. The geopolitical consequences of the energy shortage are underrated	1	3
7. The Netherlands have a great deal of theoretical knowledge regarding sustainable energy	1	-3

**Table 2: Overview of the Relevant Subjects  
Forming Plot 2**

**Plot 2: Focus on Energy Shortage as a  
Problem**

	<b>Plot 2</b>	<b>Plot 1</b>
16. A second nuclear power plant at Borssele would be attractive to the Netherlands	3	-1
3. Electric transport is the only option in a sustainable city	3	-2
26. The geopolitical consequences of the energy shortage are underrated	3	1
30. More and more energy communities are springing up	2	3
19. Oil-producing companies in fact focus primarily on the production of fossil fuels	2	0
2. Houses and offices are much more pleasant to live and work in with heat and cold storage systems and other sustainable energy applications	2	-2
1. People are worried about the rise in sea levels and climate change	2	1
22. The energy-producing company and the consumer are becoming more and more powerful	1	3
23. Energy-producing companies have too great an interest in fossil energy to play a leading role in the exploitation of local energy networks	1	1

indicates that a participant judges the subject important but holds an opposite view with regard to its relevance.

The table shows that a number marked X indicates a statistically significant score. This implies that 8 out of the 13 participants are solidly assigned to Plot 1. Also, the vision of four participants fits in with Plot 2. One person only shows no preference that can be assigned to either Plot 1 or Plot 2.

The case shows that the transfer of information among the par-

**Table 3: Correlation between the Two Plots**

Plot	1	2
1	1.0000	-0.0587
2	-0.0587	1.0000

ticipants has led to a certain prioritizing of subjects, whereby there are ever a few subjects that are regarded as extremely relevant by many members of the group and many subjects that are of no importance for the strategic-planning process. Put differently: The most important memes are those that have the highest statistical significance in the Scenario Plots. In this manner, the approach as suggested by Tim Mack is operationalized in practice.

**Table 4: Positioning of the Participants in Relation to the Two Plots**

Participant	Plot 1	Plot 2
1	0.7160X	-0.2315
2	0.5774X	-0.1494
3	0.3295	0.4622X
4	0.4833X	0.1840
5	0.3505	0.4011
6	0.1249	0.6956X
7	0.5972X	-0.3483
8	0.6714X	0.1232
9	0.7371X	0.0630
10	0.7259X	0.0578
11	0.4194	-0.4234X
12	0.2144	-0.7061X
13	0.5428X	0.2751

The correlation between the clusters of subjects is of importance to the subsequent planning process. If the clusters are closely connected, then the vision of the future can be said to be mutually shared and carried, albeit with different nuances. In the example of energy production, the clusters are not correlated and, for this reason, both need to be worked out. Here, it is preferable to split the strategic team and to have the transition path explored by those members who feel most affinity for the plot in question.

### **Implementation**

The final stage of the planning process concerns the fleshing out of the intended activities in operational terms. This fleshing out is likewise best done by those who are directly involved, preferably by those who can be brought in should the intended activities be implemented.

During this stage, the size of the intended activities and their timing will be important areas of attention. In the planning process, the coincidental availability of certain people or groups should never be made a starting point. Recruitment of the necessary manpower should preferably be done internally and externally. The question of whether those involved feel any affinity for the plot that was chosen can be answered by having the persons under consideration fill in the *relevancy ladder* that was described above. In this way, the extent can be determined to which the newcomers show the same pattern of memes. And with this, the homogeneity of the new organization can be gauged.

### **CONCLUSION**

The turbulent developments in the world in which we live make heavy demands on our ability to anticipate, to create, and to manage change. More and more often, we are faced with situations that have not arisen before. Anyone looking into the future will soon notice that the list of uncertainties is a long one. Those who lose themselves in this will easily reach the conclusion that predicting the future is pointless. Yet, whoever seeks will also find a list of so-called certainties about the

future. Whoever focuses on that will, to his or her own surprise, arrive at a great number of observations that are in fact inevitable developments and that should not be absent from any planning process.

In general, it can be said that demographic developments can be predicted accurately. And in technology, too, important long-term trends have been observed whose extrapolation need not be doubted. Information and communication technology, genetics, nanotechnology, and robotics (artificial intelligence) have for many years shown robust trends that have the character of self-fulfilling prophecies, resulting in large numbers of people in many places of the world working on the same subjects and continually coming up with results.

American futurist R. Buckminster Fuller warned that self-fulfilling prophecies may lead to too fierce a one-sidedness. His is the famous statement: "We are prisoners of our own metaphors, metaphorically speaking." Anyone who realizes this will opt for so-called eclectic planning. That entails the linking up of elements from different domains. This can be done in a systematic way by designating relevant areas of attention, but also through association of thoughts and narratives: out-of-the-box thinking, as it is called in strategic planning. Thus, the uncertainty in the planning process is reduced, but on the other hand, there are hardly any of the memes that play such an important role in self-fulfilling prophecies. The above described method, called Futures Fit, overcomes this drawback, as those who are engaged in the strategic-planning process not only create memes in an eclectic planning process, but also validate these and apply them operationally in the scenarios that show the way towards the implementation trajectory.

## NOTES

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