The Signification Process of the Future Sign

Osmo Kuusi
VATT
Finland

Elina Hiltunen
What's Next Consulting Oy
Finland

Abstract

Weak signals have aroused increasing interest among futurists in recent years. The dilemma caused by their varying definitions led Hiltunen (2008) to introduce the concept of 'future sign', which is based on Peirce's semiotic model of the sign. Hiltunen's conceptual framework is developed further in this paper. The focus of the analysis shifts from single future signs to the signification processes in which the future signs are perceived, interpreted and produced. The idea is that every future-oriented signification process is based on some issue on the agenda. It is a process of learning and acting, focused on the solving of problems related to the issue in question.

Keywords: weak signal, future sign, signification process, semiotics, CLA, change

Introduction

Weak signals have aroused increasing interest among futurists in recent years (see e.g., Ansoff (1975, 1980, 1982, 1984, 1985), Webb (1987), Coffman (1997 a-e), Blanco & Lesca (1997), Harris & Zeisler (2002), Day & Schoemaker (2005), Mendonça et al. (2004), van der Heijden (1997), Brabandere (2005), Salmon (2000), Saul (2006), Metsämuuronen (1999), Mannermaa (1999 a, b, 2000, 2004), Hiltunen (2000 a, b, 2001, 2005 a, b), Kuusi et al. (2007), Nikander (2002), Moijanen (2003), Ilmola & Kuusi (2006), Uskali (2005), Brummer (2005), Kuosa (2005). Weak signals are considered essential in terms of anticipating future changes, but there is no common understanding

about their definition. Often the following concepts have been used as synonyms: *seeds of change, emerging issues, strategy signals, early-warning signals and wild cards* (see, for example: Molitor (2003), Dator (1996, 2005), Nikander (2002), Mannermaa (1999) & Petersen (1999)).

A key feature of the weak signal is that it has rival interpretations (see, for example iKonw project http://wiwe.iknowfutures.eu/). With a new interpretation a sign with a commonly accepted interpretation may take a new role as weak signal. This type of construction of new weak signals seems to be a key aspect of Causal Layered Analysis (CLA) (Inayatullah, 2004). According to Sohail Inayatullah, CLA consists of four levels: the litany, social causes, discourse/worldview, and myth/metaphor. The first level is the litany – the official unquestioned view of reality. The second level is the social causation level, the systemic perspective. The data of the litany is explained and questioned at this second level. The third level is the discourse/worldview. Deeper, unconsciously held ideological, worldview and discursive assumptions are unpacked at this level. As well, how different stakeholders construct the litany and system is explored. The fourth level is the myth/metaphor, the unconscious emotive dimensions of the issue. The challenge is to conduct research that moves up and down these layers of analysis and thus is inclusive of different ways of knowing. Doing this allows for the creation of authentic alternative futures and integrated transformation.

This article discusses weak signals from the perspective of semiotics. From the perspective of semiotics, CLA represents a promising way to interpret futures related (weak) signals. In this article, we connect the discussion concerning futures-related signals to the conceptual frameworks of two classics of semiotics: Charles Peirce and Jacob von Uexküll. They made their basic contributions to semiotics more than one hundred years ago. We suggest one theoretical interpretation of futures-related signals. However, there are surely different interpretations of futures-related signals based on different worldviews e.g. of the materialist, the poststructuralist or a student of mythology.

We start our discussion from Hiltunen's (2008) concept *future sign*, which is based on Peirce's (1868) semiotic model of the sign. This triadic model consists of the *representant (also called representamen)*, the *interpretant* and the *object*. The representant stands for the form the sign takes (not necessarily material, but perceivable); the interpretant is equivalent not to the interpreter but rather to the sense made by the sign; and the object is that to which the sign refers.[1] According to Hiltunen (2008), the future sign includes three dimensions: issue, signal and interpretation. These dimensions and their correspondences to Peirce's sign are illustrated in Figure 1 (Hiltunen, 2008).
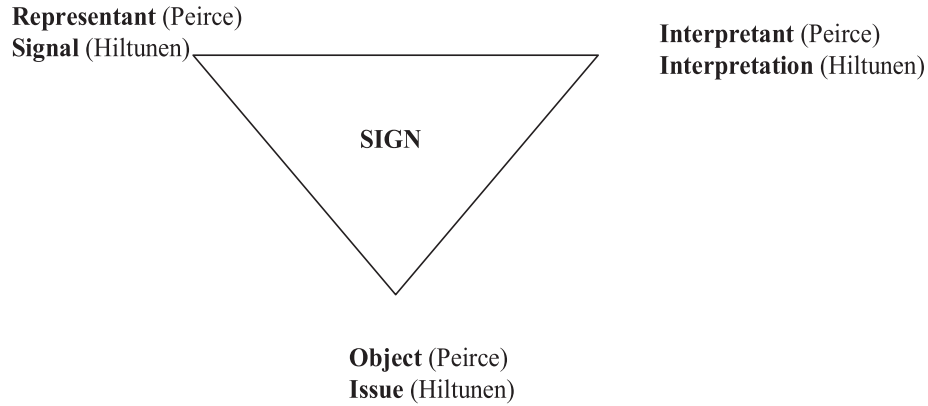
Representant (Peirce)
Signal (Hiltunen)

Interpretant (Peirce)
Interpretation (Hiltunen)

SIGN

Object (Peirce)
Issue (Hiltunen)

Figure 1. Peirce's triadic model of a sign and Hiltunen's (2008) future sign.

Peirce focused his attention on single signs. For example, when we see a traffic sign on the street we perceive what Peirce calls the representant. This perceived aspect of a traffic sign would be its physical form, in other words a colorful piece of metal with three angles. We make sense of the sign's meaning (interpretant according to Peirce). Our interpretation connects the traffic sign (representant) with its object (e.g., a dangerous bend in the road).

While Hiltunen uses the analogy of Peirce's triadic sign in the future sign, she goes a little further in her thinking. She has presented a three-dimensional sign (see Figure 2.) to help in describing its development from weak to strong, for example.

The three-dimensional sign also incorporates many signals (representants according to Peirce) and issues (objects according to Peirce).
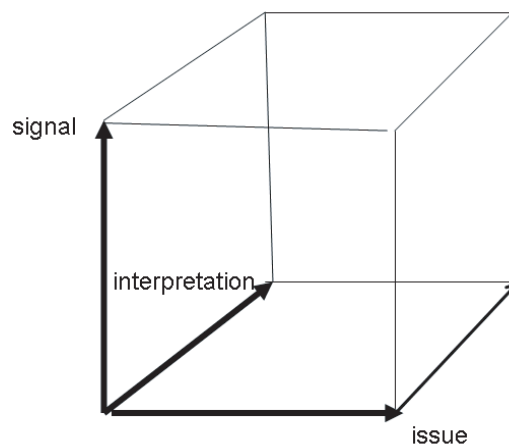
signal

interpretation

issue

Figure 2. Hiltunen's (2008) three-dimensional future sign.

While Hiltunen calls her model (Figure 2) a sign, the authors rather refer to it in this article as a *signification process* in order to emphasize its potential in terms of explaining the dynamic characteristics of the sign. The aim of this article is to go more deeply into the future-oriented signification process by drawing on Tarasti's (2000) concepts of endosign and exosign that base on ideas by Jacob von Uexküll (1993). According to Tarasti, exosigns belong to the empirical reality and are observable by anyone. On the other hand, endosigns belong to the subjective universes or individual realities.

The Future-Oriented Signification Process

The signification process in this article means *the emergence and development of issues and signals/exosigns connected to them, interpreting them (transferring exosigns to endosigns), recreating (secondary) exosigns for communication, and acting based on the signs and on the issues.* It is a complex process with many interconnections. Figure 3 showcases a signification process and the main interconnections/interactions in it.
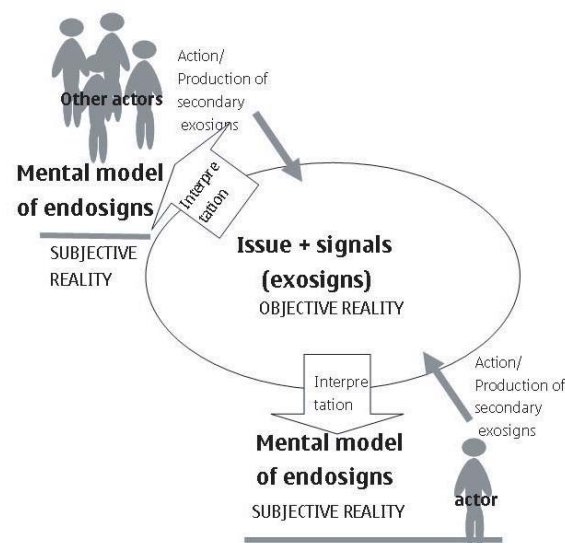

Figure 3. The signification process with its interconnections and interactions

The concepts used in the signification model are discussed in more detail later. This section gives a short overview and philosophical interpretation of the whole process and presents two illustrative examples.

Our ontological assumption is premised on an objective reality that exists even if there are no actors that perceive it. The signification process starts with the emergence of an issue, which is represented by signals, i.e. (primary) exosigns (from now on in this article we will call signals exosigns). One might ask what comes first the issue or its exosigns. We consider that the question does not make sense if one accepts our

ontological assumption. The ontological assumption postulates that both aspects, the issue and its first exosigns, are present in the objective reality when an issue emerges. There is a long causal chain behind any urgent issue. A recent example of this is a "twitter revolution" in the Arabic world, spring 2011: signal/exosigns were the twitter feed, while at the same time the twitter feed was one form of revolution (the issue). Because the issue is defined (see the next paragraph) as a phenomenon that for good reasons needs action now or in the future, we can say that an issue emerges just when these (e.g. causal) good reasons are present.

According to our assumption, the existence of an issue does not depend on it being perceived. We consider that it is important to make a distinction between the real process of the development of an issue and perceptions related to it based on conceptual systems. This makes conceptually clear distinctions between the emergence of an issue, its development and its perceived relevance. We connect the emergence of an issue to the possibility of the issue to develop as so urgent that actions are needed by some actors. Those actors would face regrets if they do not express proper actions in time (the consistency criterion introduced by Kuusi, 1999).

Based on the definition, an issue can emerge even if nobody realizes its relevance. An actor can notice early exosigns related to the issue or just late ones. In the early stage of its development, an issue can be so unclear that one might not perceive or accept any exosign related to it. For example, in its early stage global warming was so insignificant that it was impossible to measure it in an indisputable way. If one did not accept the causal link between the amount of CO_2 and global warming it was easy to have the opinion that climate change is not a relevant issue. Because its emergence is connected to the possibility, *ex ante* precautionary actions are, however, reasonable even if the possibilities of the issue will not realize (e.g. an asteroid does not hit the globe after all).

If one does not accept our ontological assumption like the Austrian physicist and philosopher Ernst Mach (1892), another interpretation is possible. One can consistently consider that there are first exosigns and issues emerge based on interpretations of them. A recent proponent of that type of interpretation is Kristian Bankov (2008). In his article *A Sociosemiotic Model* he asks, if there are truths without human beings: "What would the situation be without the entity (*e.g. human being*) [our addition italicized] that accounts for the movements of celestial bodies? We simply do not know because what we are doing now is discursive projection or construction of possible worlds with claims for truthfulness. But this truth will die along with the last of the humans, and this will not depend on the course of things (Earth and Sun)..."

Like the concept of truthfulness, the concept of issue is surely not in use if there is no being with an advanced conceptual system. However, when an asteroid is approaching the globe something that might be called "the issue" also concerns beings with inadequate conceptual systems (bacteria, fishes etc.).

According to our interpretation, the issue itself usually develops temporally and creates further primary exosigns. Based on perceived exosigns, the actor makes interpretations. In the interpretation phase, exosigns turn into endosigns of the actor's mental model based on his or her language and other conceptual systems. Depending on the interpretation, the actor makes his/her decision to act on the issue, i.e. tries directly

to affect it. The actor typically sends new exosigns (called secondary exosigns) to other actors and thereby tries to make them act on the issue.

In semiotics, a discussed theme has been auto-communication, where an actor sends messages (or secondary exosigns) to herself or himself (Lotman (1990), Broms & Gahmberg (1983), Kuusi (1984), Morsing (2006). The development of one's subjective world seems to greatly depend on self-made exosigns as well as exosigns produced by other actors. Besides proper understanding of the objective connection between primary exosigns and the issue, the effective way to handle the issue depends on the impacts of secondary exosigns. Secondary exosigns are highly important e.g. for common strategies of actors concerning the issue.

The conclusion of the ontological and epistemic discussion is that one should not confuse the existence and the perceived relevance of an issue. What is subjective matter is the perceived relevance of the issue, not its existence. Some issues are made by people. Even those issues have an objective aspect. The issues emerge based on secondary exosigns produced by their creators.

Using above discussed concepts, two practical examples of signification processes are presented below.

ASTEROID APPROACHING THE EARTH
In the early development phase of the issue, some astronomer perceives a small spot of light. This is the first perceived primary exosign of the issue. The first perception of the issue might happen later e.g. when the astronomer informs the Harvard Minor Planet Center. In the Center, researchers make an interpretation that there is a PHA (Potentially Hazardous Asteroid). As the asteroid comes nearer, there are more informative primary exosigns. If neither primary exosigns of the asteroid are perceived nor interpreters do see any risk related to the asteroid, the perceived relevance of the issue is near zero. The ignorance might, however, be a big mistake if the asteroid is on target to hit the earth.

Apart from the primary exosigns of the issue, involved actors produce secondary exosigns. The observer and researchers of the Harvard Minor Planet Center write articles in newspapers, thereby transforming their endosigns to secondary exosigns that are visible to many. Those who have read the articles might write further articles. Thus the number of secondary exosigns that are based on endosigns (interpretations of people) might also increase step by step.

The exosigns and endosigns of the issue might result in action that has an impact on its perceived (and objective) relevance. Some action, e.g., a hydrogen-bomb explosion on the asteroid, might resolve the issue and make it irrelevant.

A DANGEROUS BEND IN THE ROAD
A bend in the road is potentially a place where traffic accidents occur or dangerous situations arise. People construct a mental model connecting the accident with the issue, i.e. the dangerous bend. This process results in a secondary exosign: the traffic sign that warns about the bend. Drivers are able to anticipate the issue based on that secondary exosign, and it becomes less relevant (less dangerous) because of it.

Key Concepts of the Future-Oriented Signification Process

The following sections cover the key concepts related to the signification process. The concepts and sections related to them are presented in Table 1.

Table 1. *The key concepts of the future-oriented signification process and concepts related to it.*

Key concepts	Types of concept	Related concepts
Actor (section 3.1)	Person Community Humankind Other learning beings	Interpreter Influencer Stakeholder Senses Learning capacity Memory Mental model
Issue (section 3.3)	Natural/ Social Masterable/Dominating/Strongly dominating Urgent/ Not urgent	Emergence Relevance (perceived and true) Life cycle Agenda Achievement level Interest variable Adaptation
Exosign (i.e. signal) (section 3.2)	Primary Secondary	Production Hype Censorship Manipulation Dissemination Theory formation
Interpretation (section 3.4)		Interpreter Senses Learning capacity Mental model Code (decoding)
Endosign (section 3.2, section 3.4)		Memory and its capacity Mental model

Actors in the signification process

We will use the definition of an actor given by Kuusi (1999). In order to be an actor a being has to be able at least at some stage of his/her/its life
- to learn based on his/her/its senses
- to keep the results of his/her/its learning in the memory and
- to influence the development of issues based on his/her/its interests.

Actors (e.g., a single human being, a small community, humankind) are in key positions in the signification process.[2] They may be involved in such a process in three ways, which are not mutually exclusive: as an interpreter, an influencer and/or a stakeholder. The interpreter constructs endosigns concerning the issue in his/her mind. The

endosigns in the memory function as a conceptual system that we call the actor's mental model. The influencer tries and is able to have an effect on the development of the issue, and the issue can have a positive or negative impact on the stakeholder.

Primary exosigns of natural issues do not depend on the perception and interpretation of any actor, and without an interpretation of them there is no signification process. Social issues concern interaction between actors and are mostly based on messages (or secondary exosigns) sent by them. An actor might have an impact on an issue or on its primary exosign without an interpretation. For example, someone might step on an exceptionally rare plant without perceiving it. As an influencer, an actor might act directly on an issue or she/he might transmit related secondary exosigns to other actors. An influencer might also destroy exosigns if he/she does not like others to receive them.

An actor may also be a passive stakeholder of an issue without giving any personal interpretation of it. Being a stakeholder means that one is affected by the developing issue.
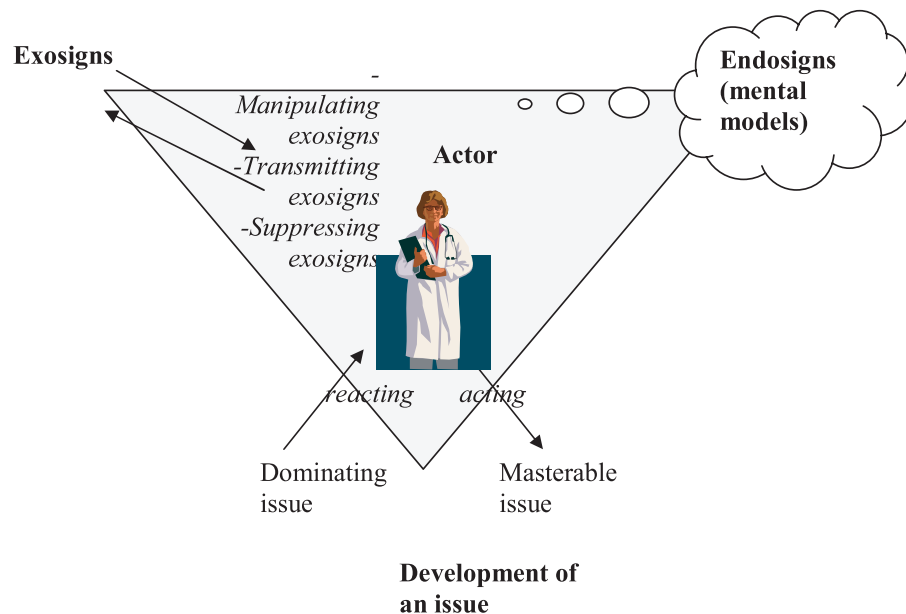

Exosigns

Manipulating exosigns
-*Transmitting exosigns*
-*Suppressing exosigns*

Actor

Endosigns (mental models)

reacting   *acting*

Dominating issue

Masterable issue

Development of an issue

Figure 4. An actor in the signification process.

Exosigns and endosigns

Tarasti's (2000) distinction between endogenic and exogenic, between the inner and outer aspects of sign processes, reorganizes the knowledge offered by classical semiotics.

A hundred years ago Jacob von Uexküll (1993), an Estonian biologist and physician, made a distinction between *Umwelt* and *Umgebung*. Umwelt refers to the subjective phenomenal world of an organism, the world of the "self", while Umgebung

refers to the organism's actual physical environment. According to Uexküll "Exosemiotic sign processes transform the objective environment into subjective universes or individual realities. They require endosemiotic processes which build up the... 'counter worlds' or 'inner worlds' in the animal or human body"

Exogenic signs belong to the empirical reality, and are observable by anyone. The following question is paramount here: On the basis of external facts, how to make correct reasoning about what is internal? The extreme behaviorists hold that everything is in outer behavior and should be read therein. According to the Stimulus-Response (S-R) model of behavior an external stimulus (S) is followed by an external response (R). The problem is that the same external stimulus might produce very different kinds of external responses based on different internal processes.

Modern cognitive psychology has rejected the research program of the behaviorists. The best explanatory model now is the connectionism model. Connectionism means the statistics-based adjustment of 'weights' and the excitation or inhibition of neurons coordinated by so-called dynamic core (Edelman & Tonini, 2000). The dynamic core can be seen as the physical counterpart of the mental model and consciousness of the brain. An international team of researchers informed in summer 2008 that they have created the first complete high-resolution map of how millions of neural fibers in the human cerebral cortex – the outer layer of the brain responsible for higher level thinking – connect and communicate. They have identified a single network core, or hub, that integrates both brain hemispheres (Hagmann et al. 2008).

The dynamic core – which is now more than a hypothesis - is the coordinator of the activities in the brain. It has three basic functions according to Edelman and Tonini (2000). First, the dynamic core constantly gives rise to new patterns in succession and thus is dynamically unstable. Second, the dynamic core provides a reference pole that dynamically modulates the microscopic cellular interactions and locally constrains their behaviors. Finally, the dynamic core works very quickly, in a time frame of 100 to 300 msec. A person needs that time to reach a conscious conclusion.

Though it is important to understand the neurological background of mental models, their representations in spoken or written languages seem to be more important. Tarasti (2000, pp.43-45) gives many examples of behavior that does not make sense without explaining secondary exosigns. Without explanations, a prayer is an empty gesture and a statesman's acts are not legitimate.

In addition to primary exosigns there are secondary exosigns, which have already gone through a signification process once or more often (i.e. turned into endosigns). In practice, secondary exosigns include newspaper articles or newsflashes concerning an issue. In some cases their number may too high in the light of the true relevance of the issue. A case in point would be when the media takes up some emerging issue as its favorite and write about it excessively compared to its relevance. This could be called *hype*. In the opposite case an emerging issue might be very relevant but most of the exosigns are suppressed. This is called *censorship*.

In practice, it is often difficult to conclude when a signification process ends and a new one starts. This concerns especially the use of secondary exosigns. The secondary exosigns produced for some signification process are often used and developed further in other, later signification processes. As practitioners of the Causal Layered Analysis

(CLA), e.g. Shapiro (2004), have stressed it is highly important to understand the genealogy of signs; Or to use the concepts in this article, it is important to understand the many signification processes in which secondary exosigns and related endosigns have developed. According to Inayatullah (2004) genealogy provides the history for how certain discourses, ideologies, and worldviews have become dominant. Distance allows one to move away from the strength, the hegemony of litany and systemic levels of reality. Alternative pasts and futures open up the future, especially useful at worldview levels. And, reordering knowledge allows new possibilities of transformation, by challenging the known and the unknown – indeed, asking us to explore what we don't know we don't know.

The issue and related concepts in the signification process

The third main aspect of the signification process is the issue. Tarasti (2000) does not discuss this, and focuses only on the interaction between exosigns and endosigns on the general level.

The on-line dictionary MSN Encarta gives several definitions for the word *issue*. In the context of this article there are two that are the most suitable: an issue is the "*subject of concern: something for discussion or of general concern*", or the "*main subject: the central or most important topic in a discussion or debate*".[3] Its most important feature is its *potential relevance to the perceiver*. If the event/object does not have potential relevance to an actor (perceiver) then it does not qualify as an issue. Following this feature, we connect the emergence of an issue to the possibility that at some point the issue will be so urgent that actions are needed by some actors. An asteroid in space is not an issue for an average person, but "an asteroid is approaching the earth (and it might destroy my town)" is an issue that has potential relevance to an average interpreter. Here it is important to separate two possible ways of seeing the relevance of the issue. Perceived relevance is how relevant the interpreter thinks the issue is, while true relevance is its objective relevance to the stakeholders. A criterion for objective irrelevance is that the actor does not *ex post* regret her or his ignorance of the issue (Kuusi, 1999).

It is important to understand the lifecycle of an issue, i.e. how an event or series of events rises to the agenda and drops off it. An event or a series of events turns into an issue when it becomes relevant to someone. On the other hand, when it is "resolved" or loses its significance it drops off the agenda.

In this context it is necessary to introduce the concept of the *achievement level* related to an issue: An issue drops off the agenda or is no longer urgent when the achievement level has been reached. It could be seen as the necessary element of any action and futures-related learning process, as Kuusi (1974, 1999) suggested in his General Theory of Consistency. The achievement level can be measured in terms of *interest variable(s)*, which are related to the measuring of the issue. For example, the interest variables for "the rise of the water level" are centimeters, while for the issue of global warming they are degrees Celsius or Fahrenheit.

Furthermore, an issue might drop off the agenda following unsuccessful attempts to reach the achievement level: such attempts result in a lower achievement level. One often has to accept the present situation or even something worse later. This means

that the actor *adapts to* the new level. The adaptation may also go in the other direction: one has achieved something and wants more.

There are some human activities in which the role of the achievement level and adaptation are especially evident and important. Success in sport depends very much on reaching the proper achievement level: not too low or too high. The ranking among all relevant players is the clear interest variable. High levels of cognitive engagement and task persistence in the face of difficulty depend on the proper achievement level and adaptation to it.

Below is an example of the achievement level and of the interest variable of a community issue:

The water level of the river starts to rise and there is a threat that water will flood the houses in the town (an issue comes onto the agenda). The achievement level here is that the water will not flood the houses. The interest variable is the level of the water (e.g., in centimeters). When the proper value in the interest variable is achieved, the issue drops off the agenda. The adaptation can happen e.g. in the building of a dam to protect the town.

Different types of issues

The key aspect of an issue *concerns to whom it is relevant, i.e. who are its stakeholders*. An issue may be relevant only to one actor (a non-infectious disease) or to the population at large (an epidemic). Related to this is the role of the *influencer* who is able to have an impact on the issue. For some issues only one person can make a difference, while for others it needs a wider population in order for it to be dropped off the agenda.

The nature of issues leads to three further classifications. The first of these is related to the social aspect of the issue discussed e.g. by Molitor (2003). *Natural issues* include events in nature such as a rise in the water level, the warming of the climate, and asteroid activity. The laws of nature, or the manipulation of natural objects based on these laws, are the driving forces here. The emergence and development of other issues depend on the interpretations of actors and not on the laws of nature. They are called social issues. They are based on the interpretations of people. For example, capital punishment as an issue in the USA is based mostly on what people think (their values), although its execution is based on the laws of nature.

The second categorization is discussed in the classical work of Bernard de Jouvenel (1967). For a given actor the future is divided into *dominating and masterable* parts. The actor can manipulate a masterable future or issue but not a dominating future or issue. De Jouvenel (1967) stresses an important point: "In human affairs the future is often dominating as far as I am concerned, but is masterable by a more powerful actor, an actor from a different level": the example he gave was environmental pollution in Paris. An issue may also be *strongly dominating* (he did not mention this) if no human being or group of human beings is able to have a relevant impact on its realization or development. Following this definition, no social issue is strongly dominating.

The urgency of the issue indicates how much reaction time there is (see Ansoff (1984, p.367) & Nikander (2002)). All of the previously mentioned qualities - to

whom the issue is relevant, the actor and the urgency - are related to time. For example, as time passes a masterable issue can turn into a dominating or strongly dominating one if nothing is done within a certain time. Similarly, an issue that concerns only one or a few persons may start to affect many if nothing is done with it. Table 2 gives examples of issues and various ways of categorizing them. It can thus be seen that the possibility of affecting any one issue (such as capital punishment) varies depending on the actor.

A relevant urgency related distinction that is not visible in the table 2 concerns the *Mediocristan* and *Extremistan* phenomena discussed by Nassim Taleb (2007). The urgency aspect is not so important in the case of Mediocristan issues that develop gradually in predictable way (e.g. conforming to the bell curve). The urgency aspect is very important in the case of Extremistan issues where the impact of Black Swans is decisive. One can prepare for Black Swans or wild cards monitoring early warning weak signals.

Table 2. *Ways of categorizing an issue. (Actor impact = The chance of affecting)*

Issue	The nature of the issue		The chance of affect			Actor			Stakeholder			Urgency		
	natural	social	masterable	dominating	strongly dominating	person	community	humankind	person	community	humankind	no	medium	urgent
the rise of the water level in a river	X		X				X		X	X			X	X
climate change brought about by the greenhouse effect	X			X		X	X		X	X	X		X	
climate change brought about by the greenhouse effect	X		X					X	X	X	X		X	
capital punishment		X	X				X		X	X			X	
capital punishment		X		X		X			X					X

The interpretation process and the related dissemination of exosigns

Interpretation is an activity in which endosigns are formulated in the mind of the actor based on the exosigns of the issue. A possible step is to produce further (secondary) exosigns for other actors in order to obtain their feedback or try to make them act on the issue. This *dissemination* of exosigns is highly important for the managing of the issue, especially if it is dominating. Figure 5 illustrates the dissemination of exosigns and their turning into endosigns in the signification process.
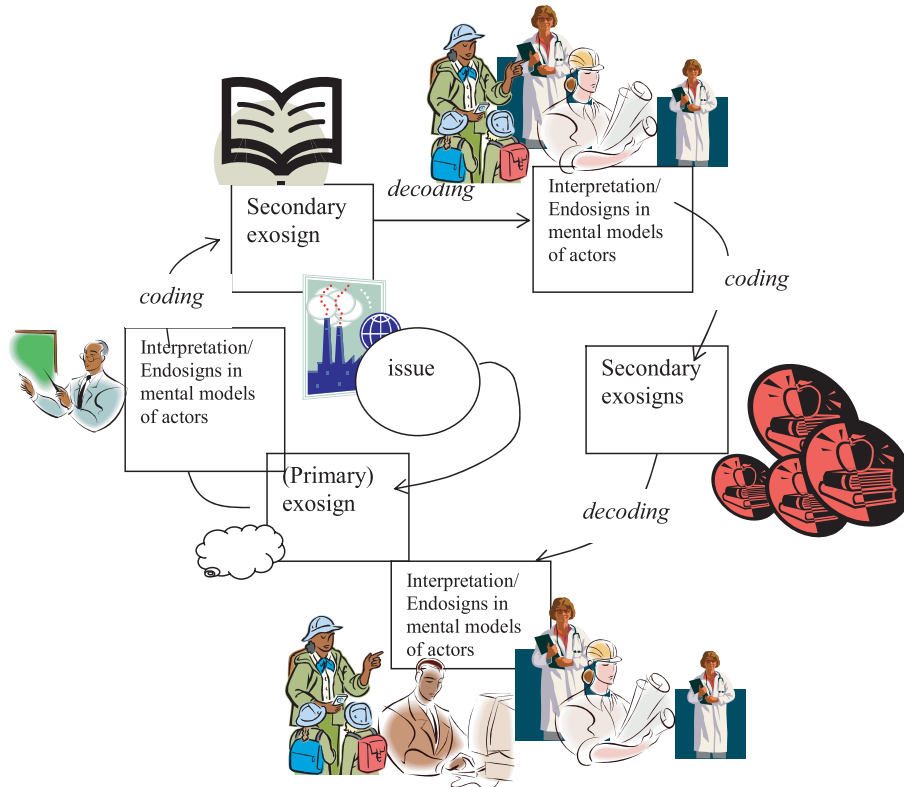
Figure 5. An example of the dissemination of exosigns in the signification process

The future-oriented signification process is mainly started by the issue, of which the exosign is a perceivable form. In the case of a natural issue, it is the primary exosign. In the case of a social issue it may also be the secondary exosign. The activating exosign typically starts this process. Even if exosigns are perceivable to us, the underlying issue might be totally new. *Theory formulation* is needed if we are to understand the issue correctly: the theory facilitates understanding of the causal relationships between the issue and the related exosigns. When we understand the theory we may understand other exosigns appearing because of the issue, and anticipate the appearance of more exosigns. A practical example of theory formulation is the interpretation of the greenhouse effect. Exosigns such as the rise in temperatures and the rising sea levels are the perceivable signals. Further examination has revealed the same issue, the greenhouse effect, behind both of them (e.g. IPCC, 2007). Based on the more developed theory we can expect new exosigns to appear because of the greenhouse effect.

There are three alternatives for observing and connecting an issue and its related exosigns. In the first case neither are perceivable to observers. It is thus impossible to make any realistic assumptions about the issue because there are no perceivable exosigns. However, wild guesses are, of course, available: we might assume that there is alien life in the universe though we are not able to prove it.

In the second caseSecondly exosigns of an issue are perceivable but the issue itself is not. From the exosigns it is possible to start to formulate a theory about the relationship between the issue and the signals, which in this case may be symptoms of the issue. For example, if you hear a knocking noise when you are driving a car it is an exosign of something out of the ordinary. The driver may start to think about what is causing the noise. Later it might come out that his wife had left another set of car keys in the other door lock and they are rattling against the surface of the door. (This is not impossible: it really happened to the second author of this article.)

In the third case it is possible to test the connection between the issue and its exosigns: it is possible, for example, to show that greenhouse gases in the atmosphere result in higher temperatures. Figure 6 illustrates the different ways of observing the issue and exosigns in the light of theory formulation.
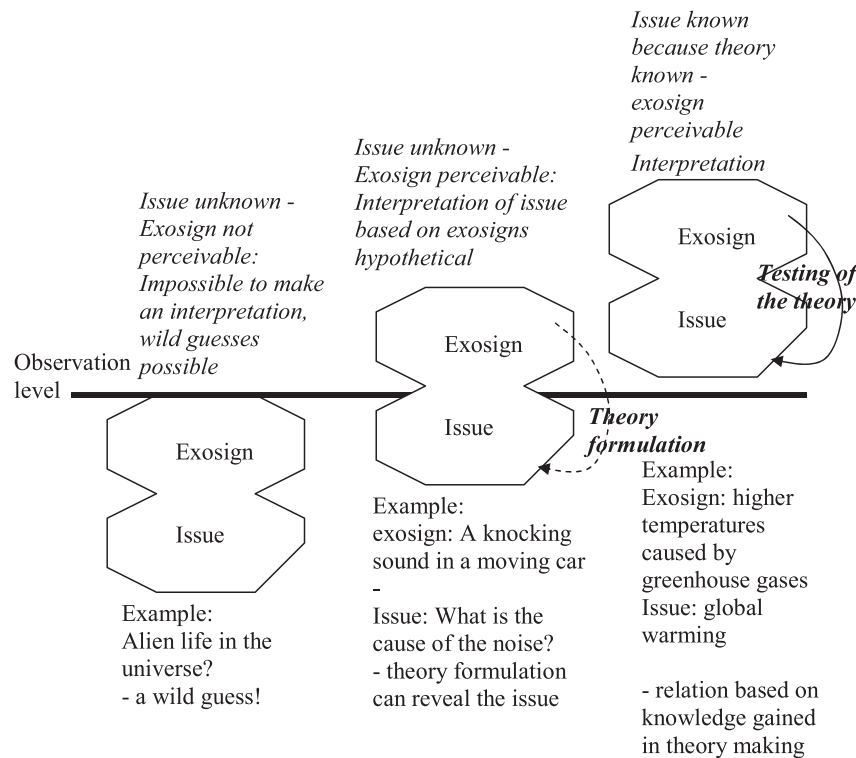

Figure 6. Signals/Exosigns and issues (the objective dimension), and ways of observing them

Sometimes an actor purposefully misunderstands the signal (primary exosign or secondary exosign) and deliberately transmits a misleading secondary exosign. In practice, a wrong signal (exosign) could be a piece of news in a magazine that is deliberately misinterpreting the truth about the issue. In the case of natural phenomena

this might lead to delayed response, and in case of social issues wrong signals may even change them.

Discussion

The purpose of this article has been to provide a consistent conceptual framework for the analysis of future-oriented signs. With this in mind we suggest a modification to Charles Peirce's classic interpretation of the sign: the object of the future-oriented sign is an issue (see Hiltunen, 2008).

The key feature of the weak signal is that it has rival interpretations. With a new interpretation even a sign with a commonly accepted interpretation can take the role of a weak signal. Based on the new interpretation of a sign, a new issue might emerge. In the field of the futures studies many, in particular the developers of the Causal Layered Analysis (CLA) (Inayatullah 2004), have extensively discussed the implications of various interpretations of signs and the genealogy of signs for the purpose of anticipation. According to the developer of CLA (Inayatullah, 2004), alternative pasts and futures open up the future, especially useful at worldview levels. And, reordering knowledge allows new possibilities of transformation, by challenging the known and the unknown – indeed, asking us to explore what we don't know we don't know.

In this article, we have introduced the concept of the signification process. It gives a theoretical interpretation of the futures related signals using the concepts of two classics of the semiotics: Charles Peirce and Jacob von Uexküll. Though we do not discuss closely the different interpretations of the futures related signals based on different worldviews, we consider that the developers of the CLA can benefit from our theoretical framework.

The signification process is based on interacting primary exosigns, endosigns and secondary exosigns that give information concerning an emerging issue. The signification process ends when the issue drops off the agenda. Relevant new signification processes typically challenges litany – the official unquestioned view of reality. Because of unconsciously held ideological, worldview based assumptions (endosigns) it might take a long time before even a highly relevant emerging issue is generally noticed and taken into account in actions.

In summary, our conceptual framework is suitable both for the anticipation of future developments based on recent signals and for the geneology of past developments. In policy processes, weak signals anticipate the agenda setting. Kingdon defines a governmental agenda as a list of subjects or problems to which government officials and those close to them are paying serious attention. Thus, an agenda-setting process narrows the list of conceivable subjects within any given domain (e.g., health policy). Kingdom's examples taken from the history of the USA are the New Deal, the Great Society and the Reagan revolution.

Weak signals anticipate that "the policy window" of an issue might open. Sometimes weak signals – e.g. wild cards - anticipate dramatic changes in the agenda. It is important to realize that there are two basic kinds of developments that can change the agenda: stronger primary exosigns and new interpretations of earlier primary or secondary exosigns. For example, the first unsuccessful attack by Al Qaida

against the World Trade Center in 1993 was a clear early warning, but was not a signal strong enough to get terrorism as an issue on a strong enough political agenda in the USA (that would have averted the September 11th attacks).

Correspondence

Osmo Kuusi
VATT, Arkadiankatu 7 00100 Helsinki, Finland
Email: osmo.kuusi@vatt.fi

Elina Hiltunen
What's Next Consulting Oy, Espoo, Finland
Email: whatsnext@luukku.com

Notes

1. From Chandler, Internet source, see reference list.
2. An actor is not necessarily a human being or a community of human beings: it could also be an intelligent machine or an intelligent animal. In order to simplify the discussion, however, the examples given are either single human beings or communities of human beings.
3. From: Internet source, retrieved November 11, 2006: http://encarta.msn.com/dictionary_/ issue.html.

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