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LOOKING AT RISK

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Forord

Bakgrunnen for denne rapporten er et essay skrevet i forbindelse med deltagelse på Oslo Summer School ved Universitetet i Oslo i august 2005. Kursets tittel var "Risk and Technology: Public perception and social assessment". Foreleser var professor Brian Wynne fra Lancaster University, England. Formålet med kurset var å se nærmere på hvordan ulike dimensjoner av vitenskap og teknologi blir forstått og representert i debatt, konflikt og beslutningssituasjoner. Spesielt vektlagt ble risiko ved innføring av ny teknologi. Risiko ble også belyst mer generelt med hensyn representasjon og kommunikasjon. Rapporten inngår i doktorgradsprosjektet Risikoanalyse, - aksept og – styring. Rapporten vil være med å danne grunnlaget for en vitenskapelig artikkel over samme tema.

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CONCERNING RISK

BY

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OSLO SUMMER SCHOOL COURSE, "TECHNOLOGY AND RISK"

(DRAFT)

Introduction

The technological development has brought progress and prosperity for many, but it hasn't come free of charge. For example, gene technology has a vast potential for solving problems related to medicine and agricultural production. But an implementation of the gene technology is leaving doors open for possible unknown and unwanted effects, perhaps with an equally large potential for creating new problems as for solving old ones. This presents a dilemma; to what extent should we utilise new technologies given that we don't have all the answers concerning possible outcomes of different modes of implementation?

There have been many conflicts and disputes concerning the implementation of new technologies or possible long-term effects of existing technologies over the last decades. There are ongoing controversies over gene technology, nuclear power and storage of nuclear power waste, causes for climatic changes etc. More locally confined cases such as the Brent-Spar dispute, the mad cow disease and possible oil exploration in the Barents Sea have also been frequent visitors in the media.

There is at least one common denominator for all these different conflicts; there are uncertainties concerning the possible outcome of the activities in question. Therefore, it's reasonable to state that the conflicts are about risk. The dilemma presented above is also reflecting one of the core issues of the risk concept; there are uncertainty concerning the outcome of activities, and this I will elaborate on in this essay.

Ulrich Beck (1992) has described society of today as the risk society. The technological development has lead to a globalisation of dangers that no one can hide from or pay to escape. Destitution is hierarchic, smog is democratic Beck states, and he has gone as far as promoting risk as the explanatory paradigm of the 21st century. Bernstein (1996) takes a slightly different viewpoint by claiming that one of the characteristics of modern society is the mastery of risk.

The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk: the notion that the future is more than a whim of the gods and that men and women are not passive before nature.

Bringing out Beck and Bernstein's statements exemplifies another central characteristic of risk; risk includes possibilities for both gains and losses.¹

Slovic (1998) notes that the many conflicts over risk may result from laypeople and experts having different perceptions of risk. Experts often treating risk as an objective, real risk "out there", that can be estimated and measured. Laypeople on the other hand, treating risk subjectively, as a "tool" for coping with the dangers and uncertainties of life.

What is risk than? A seemingly simple question, but according to the extensive literature on the topic, a concept with many different interpretations. Finding a common denominator for risk seems impossible. Markowitz (see Renn 1991) puts it this way:

All these risk strategies (for conceptualising risks and risk communication) cannot deny the fact that, although the growing risks of societal development have been the central focus of modern society, there is no approach in sight that could integrate the variety of definitions and concepts and offer a common conceptual denominator.

An observation is that risk is a complex concept that harbours many different interpretations. The interpretations are linked to different disciplines, such as engineering, economics and sociology. Within these disciplines themselves, there are also ongoing disputes over what risk is. The different interpretations or perspectives are based on different elements, one of which is the interpretation and understandings of the nature of risk it self: what is risk? One line of thought sees risk as an objective property of the world, where risk is something that can be measured and estimated. Risk is seen as "something out-there", something real. This view can be described as a positivistic approach to risk, found typically in engineering applications (Shrader-Frechette 1991, Rosa 1998, Aven 2003). In this case risk is seen as an ontological reality, where risk can be measured and estimated as any other observable phenomenon. Another line of thought considers risk to be a subjective reflection concerning the future, expressing uncertainty concerning dangers, hazards and threats. This view can be described as how laypersons or the public perceives risk (Shrader-Frechette 1991, Rosa 1998, Douglas and Wildavsky 1982). In this line of thinking risk is often connected to a constructivist or relativist understanding of the world, where risk is not seen as an ontological reality but more an epistemological question.

One purpose of this essay is to discuss these two main "ideas" concerning risk using a somewhat philosophical perspective by looking into the ontology and epistemology of risk. This is interesting because the conflicts and disputes referred to above, in many ways reflects and problematise different interpretations of risk where one boundary can be drawn between interpreting risk as an ontological reality on one hand, and viewing risk as a purely epistemological question on the other. But equally important is risk it self, what is risk? Therefore the second purpose of this essay is presenting a fundamental (devoid of rationalities) interpretation of risk that may shed some light on the grounds for the mentioned disputes and conflicts.

¹ I do not say that Beck is only negative and Bernstein only positive to risk. This is just used to exemplify a point concerning risk.

Lines of thought.²

On one hand we have the idea that risk is an objective property of the world, objective in the meaning; not being dependent on our minds for existence. Risk is considered something existing “out there”, an ontological reality. Interpreting risk as an objective property of the world is found in the positivistic tradition, and is often connected to engineering applications. Risk analyses, as we know them today originates for a large part from the engineering discipline. Within this framework risk is seen as something “out there” that can be measured and estimated according to a distinct set of rules and methods.

On the other hand we have the view of risk being a subjective expression of uncertainty about the future, where risk is seen as a construct or a “tool” which we use to be able to cope with dangers and uncertainties, subjective denoting something that is dependent of our minds for its existence. Our insights concerned with interpreting risk this way comes for a large part from sociology and psychology, where numerous studies has been undertaken trying to explain public and individual perception of risk. Much of the early work indicated that public concerns about different risks could not be explained by ignorance or irrationality. Later research has shown that sensitivity to technical, social and physiological properties of hazards that are not well covered by technical risk assessments can be related to public perception of risk (Slovic 1998).

Rosa (1998) has described two different perspectives concerning the interpretation of risk, one being the positivistic paradigm and the other named the constructivist paradigm. The constructivist paradigm consisting of cultural theory and social constructivism, and has according to Rosa (ibid) an inclination towards relativism. Shrader-Frechette (1991) has used the terms cultural relativists and naïve positivists describing the same division of the rationality spectrum concerning risk interpretation. The point is than that the two principally different lines of thought, concerning risk as an ontological reality or not, can roughly be placed each in its respective paradigm, where positivism includes an objective, real risk notion, and relativism includes interpreting risk not as an ontological reality, but more an epistemological question.

When separating the two lines of thought, risk as ontological realism or not, and putting them into respectively positivism and relativism I use the term roughly because there is a distinction between how we assess or “measure” risk and how we fundamentally perceive risk. We can say that we fundamentally perceive risk in an objective or subjective fashion, but the first does not necessarily imply measuring risk according to a positivistic framework or vice versa. Its also important to stress that in doing the division between positivism and relativism, objectivity and subjectivity I am not saying that positivism equals objectivity and

² The presentation of constructivism and positivism in this essay is mainly through second hand sources which is especially aimed at describing conflicts involving technological risks of some kind. This presentation has therefore a focus on certain characteristics of the two philosophies, thus leaving out important features describing the totality of the philosophies.

vice versa, this division is for one: just reflecting the common terminology (see Shrader-Frechette and Rosa) describing different risk interpretations, and second: reflecting how the two different sides, relating to the described conflicts and disputes traditionally have described each other.

Why does it matter if risk exists “out there”, or if risk is real or not? According to Rosa (1998) not making an ontological and epistemological distinction of risk can lead to several problems. As Rosa (ibid) has pointed out; a lack of such a distinction can lead to reductionism, philosophical and ethical problems, which in turn makes a philosophical purée or a fact-value mix up that comes close to what George Moore (1903)³ termed “making the naturalistic fallacy”.

Before describing the two lines of thought, I’ll give a very short introduction to the terms ontology and epistemology. Ontology is a branch of meta-physics that studies being and existence and basic categories there of. It’s about what exists and the nature of its existence and the nature of existence in it self. What is the quality and conditions for existence? Concerning risk, ontological questions would be; what is risk, how does risk exist, what is the nature of risk? Epistemology refers to our acquisition of knowledge, the knowledge of what exists. What are the type, origin and scope of our knowledge? Epistemological questions concerning risk would be of the type; how can we know or get knowledge about risk? In other words a boundary can be drawn between *what is*, and the *knowledge* concerning *what is*.⁴

Positivistic perception of risk.

According to the positivistic philosophy (logical positivism⁵) there are only two sources of knowledge: empirical experience and logic reasoning. Statements were interpreted as meaningful only if they could be verified. Statements could only be verified in two ways, either by empirical experience (including scientific theories) or by analytic “truths” (statements which are true or false by definition). Although thoroughly criticised by Popper⁶ and others, a more or less positivistic approach has become the norm in many areas of modern science and development, including the area of engineering. Engineering is also the area where the first systematic risk analyses were introduced, including reliability analyses on technical systems. To start with the analyses were limited to relatively small and simple technical systems. Probability calculus combined with statistical data was used to “forecast” the future behaviour of the system in relation to failure of different components. The basic

3 Moore G.E. in *Principia Ethica* (1903)

4 It is possible (as Quine does) to talk about the ontology of epistemology, what is knowledge, and also the epistemology of ontology (as Smith does), the knowledge of *what is*.

5 A philosophy of science that originated in Vienna in the 1920s, including philosophers as Carnap, Neurath, Schlick and Ayer.

6 Karl Popper, a well known critic of Logical Positivism, published the book, *Logik der Forschung* (Eng.:*The Logic of Scientific Discovery*) in 1934, where the falsification criterion was introduced.

idea was that given the systems knowledge and historical data of the system, the future could be predicted. The goal was of course to optimise the operability of the system as in minimizing down time. This was achieved through estimating optimum replacement intervals for the different components, thus securing maximum operability of the system.

This way of forecasting the future was (and is) intuitively very appealing. And the development has been leading to applying risk analyses to increasingly complex systems, also including human interaction. The possibilities for larger and more complex calculations have also developed, increasing proportionally with the development of computer technology. Development of new and more advanced procedures and methods for risk analyses has also run parallel to increasing the scope of risk analyses.

The mathematical calculations and modeling in classical risk analyses can be fairly complicated, even for relatively small technical systems. This obstacle is often overcome through the use of computer technology and the accompanied possibilities for large computations and simulations. Introducing more complex systems, including human interaction can complicate the computation in such a degree that the calculations become insurmountable. As the inclusion of factors increase the uncertainty of the result of the analyses also increase depending of how the factors are connected and how the calculation is performed. If you have a series of factors, one affecting the next, you can say that the uncertainty accumulates throughout the calculation. Therefore a limited number of factors are preferable, thus excluding possible important factors. A very common technique used in this type of risk assessment is simplification through the use of models. Simplification through modelling is introduced to make it easier to point out important features of the system under analyses. Thus not implicating factors considered less important. Often factors not sufficiently described by data are excluded because lack of data makes it impossible to quantify the impact of the factor in the analyses. Another problem is that the models themselves introduce uncertainty. Per definition they are simplifications of how the world really works, and thus introduce uncertainty.

Risk and uncertainty are almost used as synonyms in much of the literature on risk. Uncertainty exists on different levels and has different meanings. One can say that uncertainty exist on an overall level because we don't know the outcomes of a particular activity. Usually we see the term uncertainty expressing this meaning. More explicit, risk analysts use the term uncertainty in relation to the different parameters and probabilities used in the risk analyses. The uncertainties related to the different probabilities and parameters pose problems in a classical engineering approach to risk analyses. The point is; there are good procedures to handle uncertainties using this approach. If you ask an analyst using a classical engineering approach in risk analyses about the uncertainties in the estimates, he/she will have great problems giving a straight answer. Often a factor of ten is indicated, meaning that the true risk could be either a factor 10 above or below the estimated value (Aven 2003).

Looking to a much-used definition of risk, risk equaling the probability of the event multiplied by the possible consequences of the event, there are different ways of estimating the probabilities in question. Most common is a statistical or relative frequency approach, which is connected to historical data of some kind; often accident and incident data are used. The main idea in this line of thought is that history (the statistical data) can be used to project what the future might bring, but using historical data to forecast the future is not a

straightforward exercise. First, there can be problems related to representativeness, accuracy and multitude of the data themselves. Second and perhaps the most important problem is the assumption that the system will remain in more or less the same state in the future as it has been in the past. If a projection of historical data shall be plausible, this has to be true to a certain degree. In other words you need to assume a somehow static world without development and changes. This procedure is necessarily only utilising known factors, leaving no slack for unknown factors that might exist out there that might contribute to an increased risk.

In addition, the mentioned definition does not distinguish between low probability events with severe consequences and vice versa. An event with low probability but with severe consequences is thus given the same risk value as a high probability event with minor consequences. This can of course be misleading when comparing different risks measured under this type of definition.

Another problem with historical data is that they are all about averages, as in deaths per year or accident per 100 000 departures; they cannot give information which is concerned with individuals and nor can it indicate a narrow time frame for the occurrence of an accident. If a probability of 1 in 17000 is indicated as the probability for a large nuclear accident, the probability does not exclude the possibility for an accident happening tomorrow, but it is indicated that it is not very likely. And what about new technologies that doesn't come with historical data, how can risk be measured in those instances using a positivistic approach?

Another characteristic of a positivistic line of thought is the notion of an objective, "real" risk "out there" that can be estimated or measured. Within this framework the real risk, let's say for a component failure, is seen as the proportion of an infinite population of similar components failing within a defined timeframe (Aven 2003). The idea is that data pertaining to one component or a group of components can describe every other similar component. This is describing what is called the relative frequency approach. Risk in this context is seen as an ontological reality because the failure rate is considered the true rate for similar components, thus the risk exists as a number denoting an objective chance for failure.

The internal logic in a positivistic approach presupposes that given adequate data the risk can be estimated with a reasonable certainty. This includes a notion that the world can only be interpreted and understood through empirical experience and logic reasoning. This type of logic is in sharp contrast to a more relativistic line of thought, which I will describe in the next paragraphs.

Interpretations and explanations of public perception of risk.

Turning to the other main line of thought leads us to the notion that risk is a subjective measure or interpretation of a situation constituting a danger or hazard, reflecting the uncertainty of the future. Perceiving risk this way is often linked to cultural theory and constructivism; how the public or laypersons perceive risk. (See Krimsky and Golding 1992, Shrader-Frechette 1991, Douglas and Wildavsky 1982, Slovic, Fischhoff and Liechtenstein 1981, Perrow 1984). First I will look at the generalisation of public perception of risk in terms of relativism and constructivism (Shrader-Frechette and Rosa). Second I will look in to how people perceive risks depending on characteristics relating to the source of the risk (Slovic et

al. and Perrow). The latter is indicating how people perceive a risk “out there”, and the former is relating to a generalisation over how individuals and groups form and express an understanding risk.

Constructivism holds that risks are the dangers that societies define as troublesome. Following that, since the identification of risk is entirely a social process, risk does not exist objectively, but is more a cultural phenomenon. Within the culture, structural patterns form the ways individuals and groups are thinking. The two most important features of the structure are group interaction and social networks (grid), these two constituting the group/grid axes that can characterise prototypical individual’s views on risk. Risk is seen in relation to the context the individual or group is contained within, and from premises in the context and/or norms in the group, risk is given specific meanings, and emitted as the groups shared opinion. This opinion can be seen as a construct in the sense that it’s been formed by social interaction, and without this social interaction the expression of risk would not exist. In a constructivist line of thinking, one can say that risk is “constructed” socially in this way through a process spanning from observation of hazard to expression of opinion. The construct of risk is thus reflecting the groups’ attitude towards the risk in question.

Constructivist approaches to risk has been criticised by many, and I will not go into details here. I think that the admirable notion that all knowledge of risk is equally good or important is also the Achilles' heel; If risk is reduced to a field of even players, than the only remaining factor will be power, and assessments of risk are thus rendered useless.

How are people judging or assessing risks? The assessment of risk seems to be linked to the characteristics of the risk source. The characteristics seem to have a psychological influence, which in turn leads to that certain characteristic gives specific ways of judging risk. There are especially two distinct factors pertaining to the characteristics of the risk source that seems to be important in this respect; it’s the factor of dread and the factor of unknown. The dread risk factor include the following characteristics (Perrow 1984)⁷:

- Lack of control over the activity in question.
- Fatal consequences if there were a mishap.
- High catastrophic potential.
- Reactions of dread.
- Inequitable distribution of risks and benefit.

The risks labelled unknown risks included factors like:

- Unknown.
- Unobservable.
- New, and delayed in their manifestation.

People tend to judge risks in relation to the sources catastrophic potential as opposed to historical data of accidents and incidents (Perrow 1984). This can indicate that people perceives risk as a danger “out there”. Risk, in this connection can therefore be seen equal to a

⁷ Perrow is here referring to: Slovic, Fischhoff and Lichtenstein, ”Perceived risk: Psychological factors and social implications.” Proceedings of the Royal Society of London, A376, 1981.

threat or a hazard. Risk can thus express fear and dread as described by Perrow (1984), but perhaps more precise, lay persons risk judgement can be seen as a mechanism for understanding and coping with the dangers and the uncertainties of life (Slovic, 1998). Drottz-Sjoberg (1991) has pointed out that risk awareness and risk minimizing promotes survival, and therefore presumably risk perception (and assessment), in its human form, is a natural exercise of ancient origin. This also indicates that threats and hazards have a natural focus in peoples mind when talking about and judging risks. It can also partly explain why public risk assessments often have a focus only on the negative elements of the risk at hand.

Alongside cultural theory these perspectives has been used to describe public perception and assessment of risk. In this tradition risk is interpreted in a subjective way, expressing how groups and society are relating to different risks. Judging risk in this way gives everyone the right to “define” what he or she means by risk and the risk at hand. The problem than being that any judgement is as good as the other. The result is setting factual information aside, and discarding science and a scientific approach to risk. Another consideration is; if all judgments are deemed equal, doesn't that leave increased opportunities for the ones possessing power to get their judgment most visible?

Much of the risk literature also sees the concept of risk as equal to a threat of some kind. Why is that? Besides the obvious threat that some risks pose, like possible physical harm, there might be a more profound way that risks influence us. Many commonly used definitions terms risk as a danger or a threat. A threat can be perceived as a possibly destabilising factor to the situation at hand, and given that the situation at hand is under control as in stable and predictable, a proposed change is introducing uncertainty, that destabilises the predictability of life as it is right now. An assessment of the risk is thus provoked, and given that most people are fundamentally conservative (don't want changes, especially if there is a possibility of a negative outcome due to the change), risk is therefore perceived as a threat, a treat implying change and possible exposure to danger of some kind.

What is risk?

Looking at positivism and public perception of risk, we see different shortcomings that may lead to conflict and disputes. Instead of looking at the different rationalities it might be more useful to go to the core of the matter. What is risk, and what characteristics of risk can we deduce that might give insights to the ongoing conflicts and disputes over risk?

I stated earlier that the dilemma that new technology poses comes very close to the core meaning of risk; uncertainty about the possible outcomes of an activity. New technologies can lead to development, as history has shown us. From the making of fire, via the steam engine and through the promises of the nuclear-technology, technology has been a proponent for development. Weather the development always has been a good thing one can certainly debate. But none the less, progress and the technological development we have seen so far implies that risk is developments companion. This because development almost always includes not knowing all the possible outcomes that for example new technology can bring. What does this imply? It implies that in order to gain something (progress and development) one has to be willing to experience some damage or set backs due to unforeseen events. This is what taking a risk is all about, being willing to expose something (someone) to a possible

danger in order to achieve something. I use the term danger in this relation to denote the possibility of a negative outcome. Given that progress is something that we want, this implies that risk is also something wanted, at least by some of us, and that risk is a possibility of achieving something more, compared to not taking the risk at all.

But how does one take a risk? As stated earlier risk implies danger and exposure to danger. Not a “blind” and random exposure to danger, but exposing only if something can be gained from this exposure. For example, jumping off a cliff with only a parachute on your back is implying an exposure to danger. But given that you are a base jumper, such an activity could be described by the term risk; i.e. you have to expose yourself to danger in order to gain something, the gain in this case being the adrenalin kick etc. But, if you’re not a base jumper, you will have nothing to gain by jumping off a cliff, than the term danger can be used instead of risk. Thus taking a risk implies an act of exposing. The base jumper is taking the risk voluntarily, but exposure to risk can of course also be involuntary, as for example in the case of nuclear power. Despite the fact that most of us want electricity, many of us don’t want to live near by a nuclear plant. If living nearby a nuclear plant is inevitable due to different circumstances (economical, social etc.), than living near the plant would be involuntary and could thus be labelled a danger, because there is nothing to be gained by living near the plant (you could theoretically get your supply of electric power from elsewhere). But, society as a whole might want the electric power produced by the plant, and that’s why living near a nuclear plant also may be termed a risk when viewed in a broader perspective. This because exposing a few (the ones living near the plant)⁸, leaves an advantage for the many that are in the need of electric power.

We see that drawing the line between the terms danger and risk is difficult, and it makes all the confusion in the risk literature very understandable. We also see that there is a clear distinction between danger and risk. Risk includes the possibility for gaining or achieving something danger does not. The example of living close to a nuclear plant is also indicating that the same risk can be seen differently depending on being an individual or a group or the society as a whole.

What than is the purpose for the base jumper to jump of a cliff, or more general, what is the purpose of taking a risk? The purpose for taking a risk is to try and achieve something (i.e. the adrenalin kick) not else achievable at the same cost. Base-jumping is a fairly inexpensive activity. All you need is a chute, and you must be willing to accept the risk. The risk acceptance is closely connected to the possible reward for taking the risk. We can find this principle in all kind of activity that implicit has a possible gain, weather its on the stock market, doing hot-work on an oil rig in the North-Sea, driving our car to work, taking a plain; the principle is the same; it is to achieve something not else achievable at an equal cost. By equal cost I mean that there is no other way to achieve that particular advantage that cost the same or less. On the stock market we pay a higher price for more uncertain outcomes, but the reward (the raise in points) may also be considerably higher than compared to a less uncertain

⁸ Nuclear power has of course also a potential for a more global manifestation of danger, ref, the Chernobyl accident.

option. Exploring oil from floating or fixed installations in the North Sea has been deemed safe enough, given for example that work on the installations are executed according to certain procedures, where one of them is procedures for doing hot-work. Driving a car to work is normally more risky than walking, but taking the car gets us there faster and thus presents a gain. Most of us accept the risk of taking an airplane instead of a train because it is deemed safe enough and it saves time. Risk thus implies taking the lowest cost option to achieve something, which is judged or accepted to be safe enough.

To sum up, risk is implying making a choice to expose someone or something to danger in order to achieve an advantage not else achievable at the same cost. Cost in this case could be anything from time and effort to money or other goods. If we “split” this “definition” in to its components or features we get the following list; risk is comprised of:

- An act of exposing.
- Someone or something being exposed.
- A possibility for a manifestation of the danger.
- A possibility for a manifestation of what we want to achieve.
- Possible consequences for the expose.
- Possible consequences for the exposed.
- Uncertainty of outcomes, pertaining to the points above referring to possibilities.
- A timeframe from exposure to possible manifestation.
- Some level of acceptance.

Looking at the features above we see that referring to the manifestation of an outcome(3 and 4) or the consequences (5 and 6), they all exist only as possibilities. This implies that risk is “existing” only as the *possibility* for *something* happening. When a manifestation of danger or achievement has occurred. i.e. in the instance of this *something* actually happening, risk is no longer “existing” per se. This implies that risk can only exist as an expression of a possible future event. Thus risk cannot exist as an ontological reality, but just “exist” in an epistemological sense.

If this (the above interpretation) is risk, it unveils a lot of difficult issues and possible grounds for conflicts. First there can be different groups of society involved, where someone is exposing and someone is being exposed. This leaves obvious ethical and moral questions out in the open. Who has the right to expose others? Can we accept that a small number is exposed for the greater good of the society as a whole (nuclear power)? Who makes decisions over these questions? How should such decisions be made, and on what grounds? And so on. Further, risk involves uncertainty, uncertainty over the possible outcomes of our actions; its uncertainty over the possible manifestation of the proposed advantage concerning the risk, its uncertainty over the possibility of the manifestation of the danger introduced by taking the risk, and its uncertainty over the possible consequences pending a manifestation of danger or advantage. From this we can see that risk is a fairly complicated concept, and the concept itself includes both facts and value related issues.

We can also see that different interpretations and assessments of risk emphasise different features. For example the classical engineering definition of risk, risk equals possibility of a harmful event multiplied by the (negative) consequences of the same event, has a focus only on feature 3 and 6, while a trader on the stock market might have a focus on features 3,6 and 8. Turning to public perception of risk the focus may be mainly on features number 1,2,3 and 6. Typically in the conflicts and disputes over risk related issues, the risk introducing side have a focus on the possible positive outcomes and the public having a focus on the possible negative outcomes. The risk introducing side is also often neglecting the fact that they are doing the exposure and that the public are the exposed. Thus the risk introducers are not taking a risk per se (except for perhaps reputation risks if it goes wrong), but they will certainly “cash in” on a possible gain or achievement.

Is risk as ontological realism possible?

One argument not supporting risk as an ontological reality is the argument presented above concerning risk existing just as a possibility for something happening, and in the instant this happening occurs, risk cease to exists. Risk is thus reduced to express a state of the world.

One can also argue as Aven (2003) that the whole idea of an objective measurable risk is a thought construct. Lets say you want to investigate the risk of an engine failure in a passenger airplane engine. A typically positivistic approach would be to use historical data. The probability of an engine failure is than viewed as *the long-term proportion of an infinite number of hypothetically identical engines that is observed having failures*. The problem being that this supposition does not correspond with the real world; there are of course not an infinite number of identical engines. Ergo, the relative frequency approach to risk, which lies at the heart of positivism, can be termed constructivist.

Taking these two arguments into consideration, I think it would be reasonable to state that risk cannot exist as something “out there”, thus interpreting risk as ontological realism seems difficult. Does the repelling of risk as ontological realism have any consequences? One consequence is that risk only exists in an epistemological sense, and that may indicate that how you “measure” risk is not so important as opposed to how and who makes decisions concerning risk. Risk is a concept we use to assess our different options concerning our actions in the future, and there are many different techniques to do this assessment, spanning from “purely” scientific to “purely” emotional. It seems reasonable that no technique can be deemed more “accurate” than the other, since an assessment on risk is also an assessment of values.

Are positivism and constructivism a philosophical purée?

Positivists perceive risk as an ontological reality. Risk is seen as something existing “out there”. To follow the positivist logic of how to acquire knowledge, this also implies that risk epistemologically must be treated as real, because getting empirical data on a phenomena presupposes that the phenomena is real, existing, measurable etc. So, in order to be perceived as a risk, the phenomena studied must be measurable, i.e. there has to exist data of some kind pertaining to the phenomena in question. And this is where the positivistic approach is being reductionistic (Shrader-Frechette 1991); its only relating to information concerning

phenomenon that is measurable. Thus any consideration relating to subjective elements like values, preferences, feelings etc. are peeled away, and we are left with brute “facts” only. According to Rosa (1998) positivists sometimes assume that the optimum scientific solution (i.e. maximum utility) is also the ethical solution, and thereby making naturalistic fallacy by confusing facts with what is good⁹. According to Shrader-Frechette (1991) this leads to underemphasizing values and context when judging risk.

Constructivism overemphasizes the meaning of values in risk assessment (Shrader-Frechette 1991). According to constructivist philosophy there is no distinction between knowledge of risk and existence of risk since risk is a construction resulting from social processes. This can be termed reductionistic because any scientific component that might exist is expelled, thus leaving values as the only set of components to consider when assessing risks.

If we use the given “definition “ of risk as a reference, than both constructivists and positivists leave out important features of risk, the former excluding scientific elements of knowledge and “facts” and the latter excluding values. This offers an insight to the different conflicts and disputes over risk, not only referring to different rationalities, but referring to the “problem” it self; namely risk.

Concluding statements

In this essay I have described two fundamentally different approaches concerning how risk may be perceived and how risk might be judged or measured. I have also presented an interpretation of risk that shows the complexity of risk. The risk concept embracing both factual and value related issues that cannot be dismissed by stating that the assessment being made is purely scientific. There are obviously more to risk than just numbers. On the other hand there are also more to risk than values. Risk is a complex concept with features that has a ”natural” ability to cause disputes and discussions. That makes it all the more important of being aware of what features of risk one omits when dealing with risk, to make sure that the risk interpretation it self gives no ground for controversies.

Looking at the bigger picture, interpretation and assessment of risk is a part of a more fundamental discussion over how and who should get to make decisions on risk related issues? Some authors have put forward that a democratisation of the risk assessment process it self can be an important step towards reducing the controversies related to risk, involving all the different stakeholders in a more communicative type of process where everyone in principle has an equal count. I think that democratising the assessment process might contribute to increased consensus over risk issues, but an important question we need to ask than is; do we really wish increased consensus in risk issues? Will consensus solutions secure the weaker part in a dispute over risk? And doesn’t disputes secure that broad and public debate over risk related issues. I think it would be unfavourable to limit this discussion to a risk assessment group only, because it would be a limited group concerning both resources

⁹ Moore George, 1903, in Principia Ethica

and knowledge compared to potentially engaging everyone in society. I think that looking closer at *how* decisions are made and *who* gets to make those decisions, is equally, if not more important.

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