
Reflective responsibility for risk: a critical view of software and information systems development risk management

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Abstract: Most ethical theories are based on the assumption that the results of actions are known and are part of the ethical evaluation of moral behaviour. This leads to fundamental problems of the ethical evaluation of future states because the future is by definition unknown. Risks as known uncertainties that result from human action often have morally relevant consequences but they defy easy classification in moral philosophy. As a general idea of how the ethical problems of risk can be addressed, this paper suggests the concept of reflective responsibility. Reflective responsibility is based on the overarching commonalities of all responsibility ascriptions as being open, teleological, and close to action. The concept of reflective responsibility is applied to risk management in software and information systems development. The paper will conclude that successful responsibility ascriptions in risk management are only possible if the socially constructed nature of risk is taken into consideration.

Keywords: ethics; information systems; morality; reflective responsibility; risk; software development.

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1 Introduction

Morality can be defined as the rules and norms that guide our individual and collective behaviour. Moral issues have to do with good and bad, with doing or not doing something, with individuals' rights and obligations. Ethics then is the theory of morality. Ethics can try to describe morality, to justify it, and to clarify and discuss different methods and theories of moral justifications. Moral issues pervade our daily life, they are involved in most

decisions, albeit usually on a subconscious level. Whenever conventional morality fails us, when we no longer know intuitively what the good is in a given situation, then we need ethics.

Philosophical ethics has a long history that cannot be recounted here. A central problem of ethics is that it often requires information that is hard or impossible to get. Arguably all ethical theories need some indication of the state of affairs to facilitate a judgment on the ethical quality of an action. While this is most obvious in the case of consequentialist ethical theories, such as utilitarianism, it is equally true for less obvious candidates, such as deontology or virtue ethics. Even a true Kantian often needs to know what the consequences of an action are in order to assess whether the universal adherence to a maxim is self-contradictory or not. An Aristotelian virtue ethicist similarly needs to know the facts in order to see whether an action is virtuous.

This is where the concept of risk enters the picture. Knowing all of the facts is often a serious problem of definition and measurement. The utilitarian would have to be able to define what exactly utility is and how it can be measured and compared. While this may be an insurmountable challenge, there is the possibly even more fundamental problem that many of the facts that are relevant for prescriptive ethics are not yet known, that they are in the future. When we do something we can never be completely sure of what the results will be, we can only estimate them with differing degrees of certainty. This estimation of future states is closely linked with the concept of risk. Risks describe future states that are of moral relevance but that are neither certain or impossible. Risk thus poses an additional challenge to ethics due to the fact that it describes possible states of affair, which are important for ethical judgments, but which may or may not come true. This is a problem that ethical theory has not been able to address satisfactorily.

The first part of this introduction described the greater philosophical setting of this paper. The question of how or whether ethics can deal with uncertainty and risk is open to debate and given its complexity is far beyond what this paper can address. The paper will thus concentrate on a smaller, more manageable aspect of the problem, on the question of risk management in software and information systems (IS) development and the assumptions that can be found there. In order to avoid some of the philosophical problems of ethics and morality the paper will concentrate on the concept of responsibility. Responsibility will be defined as the social construct of ascribing an object to a subject. Responsibility encompasses moral issues, requires ethical reflection, but is not an expression of a particular ethical theory. Another advantage is that responsibility is a normative term that project managers are generally willing to accept as referring to them and their tasks. Responsibility, as an expression of an ethically reflected morality, faces similar problems as other forms of ethics, namely the question of uncertainty of future events. However, reflective responsibility, a concept that I will introduce in the body of the text, allows for an optimal, albeit still imperfect treatment of the uncertainty of future events. This treatment of future events requires the realisation that the future objects of responsibility, the risks that project managers face in software development, are part of the overall social construction of responsibility.

This is where the idea of reflective responsibility collides with the literature and practice of project and risk management. The paper will refer to literature on risk management in software and IS development and argue that it is built on the implicit assumption that risks are objectively given. This misperception of risks renders the hope of being able to address ethical and moral questions through responsibility discourses

obsolete, because it negates the necessity for these discourses. The paper will thus argue that, in order to facilitate a satisfactory treatment of moral (and other) aspects of future events in software development, a reconceptualisation of risk is necessary.

2 Responsibility

What is responsibility and why is it a useful concept for addressing the ethical problems associated with risk? The first question would require a definition of responsibility which is difficult to give because, like most widely used terms, it is used in with varying meanings. It can stand for causality, for moral allegations, it can be used as a term of praise or to condemn people. In order to get a grasp of the term that allows its useful discussion, a good starting point is a look at the etymology. The term 'responsibility' can be deduced from 'response', it can thus mean 'liability to answer' (French, 1979, p.210; Lewis, 1972, p.124f). Responsibility is thus dependent on communication. Who answers to whom and why? In most theories of responsibility, the subject answers to the authority because of the object. Or, to put it differently, responsibility is the social construct of an ascription of an object to a subject before an authority. A look at the most clearly established example of responsibility, namely legal responsibility, should clarify what this means. The subject, the one who is responsible, is the accused. The object is what he is accused of. The authority, finally, is the judge, who determines the acceptability of the accusation (ascription) and who sets the sanctions.

There is a lot more to be said about responsibility which cannot be elaborated in the confines of this paper (for a more detailed discussion of the concept see Bayertz, 1995; Fischer, 1999; French, 1992; Lenk, 1993; May and Hoffman, 1991; Neuberg, 1997; Paul et al., 1999). Responsibility includes other dimensions and aspects, such as a normative background or a temporal direction. Responsibility can refer to different settings of ascription, such as moral responsibility, legal, or role responsibility. Traditionally, responsibility is seen to be determined in a top-down hierarchical approach, which brings us to the next question, why it is an interesting concept for this paper.

This paper will concentrate on the way normative (that is moral and ethical) problems are dealt with in software engineering and information systems development. These activities usually take place in commercial organisations within stable hierarchical structures. Software development is usually done in the form of projects which are overseen by project managers who, among other things, take care of risks. There are several reasons why responsibility is a promising concept to use in addressing normative questions of risk. Responsibility is, firstly, a suitable choice because it is a generally accepted term within commercial environments. Programmers will readily admit that they are responsible for delivering the code on time just as project managers will accept responsibility for the overall success of the project. Secondly, the term allows the simultaneous discussion of normative questions and questions of facts in the project. It facilitates the ascription of objects to subjects in an open manner which aims at the improvement of the situation of everybody involved.

Having said this, a caveat has to follow immediately. Responsibility in hierarchical organisations is usually structured top-down and this can lead to severe problems that jeopardise the success of the ascription. The type of responsibility that is prevalent in companies is role responsibility and this is often understood to be clearly structured. The

project manager is responsible for the success of the project, the CIO for the entire information infrastructure and use, the cleaner for the cleanliness of the bathrooms. While this works satisfactorily in well-established areas, it can become problematic. There are a number of potential problems that responsibility ascriptions of this type run into. These problems can be ordered according to the dimension they refer to. The two most important groups of problems are those that refer to the subject and the object. Problems of the subject are generally that the subject can no longer live up to the expectations a subject is usually implied to fulfil. These include power, knowledge, the ability to affect causal chains, personal qualities and some more. Briefly, the problem is that the subject of responsibility is usually not capable of determining the effects of a decision, does not have the power to affect the outcome, or for some other reason is not in control of the consequences. At the same time the object poses problems. Among them we have the problem of cumulative effects, which individually are unproblematic but collectively pose problems. Also, there are side effects, which are hard to attribute to subjects. Finally, and this gets us back to the heart of this paper, there is the problem of the uncertainty of objects. How can responsibility be ascribed for future states of affair that are not certain to be realised?

Elsewhere (Stahl, 2004), I have introduced the concept of reflective responsibility as an answer to these problems. Reflective responsibility is based on the idea that responsibility ascriptions should be an expression of responsibility, that means that they should live up to the standards of responsibility, which are openness, affinity to action and consequentialism. That means that responsibility ascriptions should be open (in terms of input and outcome), should have manifest results, and should further the good life of the parties involved. In practice, this should be imagined as a sort of stakeholder discourse in which not only the ascription of subject to object is defined, but which is open to all pertinent questions. That means that during a reflective ascription of responsibility subjects can be constituted (such as collective subjects), objects can be defined, or the moral rules and their ethical justification can be clarified. This allows a non-deterministic ascription of responsibility and thus a treatment of uncertainty and risk. However, it requires a social constructionist conceptualisation of reality, including risky objects, which is the heart of the problem in software development risk management. Before we come to this application of responsibility it is thus necessary to review the nature of risk.

3 Risk

The main argument of this paper is that software development risk management has problems addressing normative issues of risk because of a misconception of the notion of risk. It will be argued that software development risk management works with an objectivist or positivist account of risk, which holds that risks are objectively given and can be clearly identified and properly managed. It will be argued that this is a flawed approach because risk is in fact a social construction. The acceptance of the social construction account of risk allows for responsibility ascriptions that cover not only the factual 'objective' part of risks but at the same time the soft, the moral and ethical aspects. In order to be able to make this argument convincing, we will now have to discuss the nature of risk and show that the objectivist understanding is misleading.

Etymologically, risk can be deduced from the Greek 'riza', which means root or basis, or to Arabic 'risc', which stands for divinely given, fate, or livelihood. This indicates that risks describe a mixture of positive facts and dangers, a horizon in which we are always already immersed. On the other hand there is the Latin / Italian root of 'risco' which stands for sailing around cliffs. This indicates that risks refer to human actions, to the attempt to avoid dangers which could have been avoided (cf. Hubig, 1995; Pietschmann, 1992). While the concept of risk is relatively new as a philosophical and scientific term, the underlying experience of not knowing what the future holds has been a fundamental topic of philosophy since its inception. This fact has often been discussed under the heading of 'contingency' (Makropoulos, 1997). Unlike related experiences of contingency, such as danger or uncertainty, risk is usually defined as being dependent on human action (Thompson, 1985). It is in many cases difficult to ascertain whether something depends on humans or not and we often see a retrospective shift from danger to risk (Luhmann, 1990). Despite the problems of definition, this is important for us because if risks depend on human action then they can acquire moral importance. If the actions of humans affect other humans' rights or obligations, we enter the realm of morality and consequently of responsibility ascriptions. Risks are therefore strong contenders for the position of responsibility objects. If risks are results of human actions and affect human beings then we easily come to the question: who is responsible for the risk?

In order to render the idea of risk manageable one often finds the definition of risk as the product of probability and damage. A slightly wider definition, based on Frank Knight's seminal theory of risk is 'that one should speak of circumstances of risk when all the alternative outcomes and their probabilities are known.' (Hausman and McPherson, 1996, p.30) This allows the use of mathematical and scientific methods when dealing with risks. It also conforms to our everyday understanding of risk in that a risk becomes bigger when the probability of its happening grows as well as when the damage that it would produce grows. While this mathematical description of risk is thus a reflection of the phenomenology of risk, it contains the problem of objectivism or positivism. Positivism here means the ontological doctrine that reality is as it is independent of the observer. A positivist believes in objectively given realities, and in our case that means that risks are defined by their probability and by the damage they could produce. Both are seen as objective scientific entities. Related to the ontology of positivism is a fondness of quantitative methods, for applying the methods of natural science to (arguably) social matters such as risks (Giddens, 1984).

We are now at the heart of the matter of this paper. The central question is: are risks objective entities or are they changeable social constructions? The mathematical expression of risk in the 'risk formula': $\text{Risk} = \text{probability} \times \text{damage}$ seems to indicate that we are looking at an objective entity. Similarly, our social approach to risk also suggests that risk is an objective being that can be dealt with as other objective beings, namely in a scientific and objective way. The best example of this are insurances which are probably our most important tool for managing risk and which seem to be the epitome of detached economic rationality. It has been argued, however, that both aspects of the risk formula are, in fact, not objective entities but rather unstable social constructs. The probability of a risk as well as the damage it entails can be seen as depending on the observer. Consequentially, insurances have been demonstrated to be based on prejudices and narratives rather than on quantities and numbers (Glenn, 2003a).

The main reason why risk cannot be objective, even for someone who subscribes to a positivist worldview, is that, by definition, risks are future occurrences and these are impossible to know. Even if we allow for the objectivity of data regarding past risks (and this is contentious in itself), meaning that we know the exact occurrences of damages that have happened, this does not help us with future risks. Knowing the frequency and distribution of past risks would allow us to determine what 'objective' risks were like for past agents. Given a large enough sample one can argue that these risks will continue to exist, which is the basis of the business model of insurances. Unfortunately we have known since Hume that there is no way of deducing future occurrences from past ones. The fact that an individual's probability to die was x for the last few years does not mean that it will remain x next year.

Apart from the problem of determining objective probability there is the fact that when we make decisions we do not do this on the basis of objective numbers but of 'subjective probabilities' which can be called 'degrees of belief' (Hausman and McPherson, 1996, p.225). These subjective probabilities are not forms of knowledge but calculable hypotheses about possible worlds (Priddat, 1996).

One can thus argue that probabilities are not objective but are developed and used in a social process of ascription. I may believe that the probability of the risk of a disease is high or low, companies see low probabilities of profit risks, countries assess probabilities of winning wars. None of these are objective, they are constructed and serve certain purposes. These purposes have, as the three examples show, strong ethical repercussions. Individual disease, organisational bankruptcy, national war are expressions of the ethical importance of risk. Not only are the risks themselves ethically charged but also the way we deal with them. Specifically, the assumption of an objective risk, which, after what has been said so far, would seem like an ideology rather than an objective reality, is of high ethical importance. The institutions we create to deal with risk are not neutral but in a large part determine our personal freedom and possible activities. Insurances, for example, determine whether we can buy a house or drive a car. By pretending that risks are objective, they end possible discourses about distribution, justice, or freedom and hide behind the supposed objectivity of scientific methods (Glenn, 2003b).

Just as probabilities are not objective, the damages associated with risks are not objective either. The problem with objective damage is that the idea implies a measurability and a quantifiability of risks which is illusory (Kaufmann, 1995). How are we supposed to measure damages? The easiest and most widely used method is by monetarising them. We express the damage in terms of the money needed to rectify it. For some risks that may be possible and in some instances it may work on a larger scale. Life insurances are an example of this, where the damage for the insurance is the amount of money they have to pay. However, when I smoke and thereby risk a heart attack, then that risk is not quantifiable for me, for the obvious reason that money is irrelevant when I am dead. Also, on a larger scale, money does not cover damages. A nuclear power plant that explodes near a large city produces financial damages, but these are at best an approximation of the damages that the inhabitants face. Again, damages can best be understood as social constructs that are ascribed to certain types of action and are best understood in terms of the social role they play.

Another indication that risk is not objective is the role of risk perception in the study of risk (cf. Slovic, 1999). If risk were objective then risk perception would be an individual psychological problem and best looked after by psychologists and educators with the aim

of aligning perception and reality of risk (Bonß, 1995; Lübbe, 1998). While some researchers may take this view, most would admit that risk perception is an important part of risk research, independent of its objectivity, because it determines the practical consequences of risks. This leads us back to the relationship of ethics and risks and the role of risks in society. Risks as possible and man-made dangers are ethical problems because they affect how we can live our life, what we can and should do. They are thus central to ethics but also to politics as they tend to leave the individual realm and enter the public as soon as the creators of risks are no longer the ones facing the positive and negative consequences. In our complex modern societies it is often impossible to see which risks one faces, where they originate, and how one can address them. This is what Beck (1986) called the 'risk society', where, on the one hand, objective measures like life expectancy indicate that risk is at an all-time low, but at the same time citizens feel threatened by all sorts of risks.

This is where we return to the concept of responsibility. Responsibility has the purpose of ascribing objects to subjects with the aim of improving the good life (Kaufmann, 1992). During the ascription, the dimensions of responsibility, including the subject and the object are socially constructed. That means that risks can play the role of objects. Only through the ascription do they then become 'real' or 'objective'. This refers to ethical as well as political processes. The purpose of the ascription is to enhance the shared view of the good life by imputing sanctions to subjects on the basis of objects. For example, the political process might decide that risks related to consumption of goods should be minimised before consumption starts and therefore define producers as the subject, and the risk of consuming their goods as the object. In order to achieve the goal, producers can be held legally liable for the damages associated with the consumption of their goods.

Further examples of this sort of responsibility ascription are easily imagined. The point of this discussion was to indicate how the concept of responsibility can be used to address ethical (and other) problems associated with risk. Responsibility can be used to impute sanctions to the consequences of risky actions but this requires the recognition that risks are social constructs. One could of course ascribe responsibility for objective risks, which often happens as we will see later on, but the price of this is that the ascription loses one of its most central advantages, namely its flexibility and openness. The constructionist approach to responsibility for risks allows the simultaneous identification of risks, the discussion of the relevant norms and the constitution of a subject, be it individual or collective, that will take care of it. This means that risks are negotiated and evaluated during the ascription, which would not be possible when risks are seen as objective. This leads us to risk management in software development where the argument will be made that one central implicit assumption is that risks are objective and which therefore runs the risk of neglecting important aspects of risk, chief among them ethical and moral issues.

4 Risk management in software engineering and information systems development

In this section, I will apply the theoretical foundations of risk and responsibility laid earlier to the field of software engineering and information systems development. I will argue that project and risk management are specific ways of ascribing responsibility and that they are used to address problems of risk in information systems. The problem with the

way this is conventionally done is that it is built on an objectivist conception of risk. This precludes that the full strengths of responsibility are taken advantage of and jeopardises the success of projects, partly because the moral and ethical aspects are systematically ignored.

4.1 Risk management

The development of software and information systems is usually described as risky. 'Users are not sure of their needs, new technology is risky, business requirements change, and implementation is full of surprises.' (Earl, 1996, p.29) There is a high rate of failure of information systems (Wilson and Howcraft, 2002) which can also be seen as an indicator of risk. One can draw a direct line from management of projects to their failure (Currie, 2000), which means that management is deeply involved in the creation or solution of risks. Software and information systems are usually developed as projects and consequently overseen by project managers. These project managers are often seen to be the main players with regards to the risks of the projects. Depending on the size of the project, the project manager can simultaneously be the risk manager or there may be others who are engaged specifically in managing risk.

These risks that project or risk managers are interested in are usually described in technical or economic terms. We need to be aware, however, that they have a moral and an ethical side. When a system turns out to be a failure then this may be caused by technicalities and it may cost money. But it will also mean that certain aspects of organisations are changed, people can lose their jobs, some members of organisations will be promoted, others demoted. All of this has a moral side to it as people's rights and obligations are affected and the way they live their life is changed. Furthermore, in many cases moral issues, albeit often hidden, are at the heart of risks. Systems failure can be caused by technology. More often than that, however, it is caused by organisational problems, by lack of user acceptance, by bad systems requirements engineering etc. These are again processes that include questions of taking people serious and respecting their autonomy, with our conceptualisation of humans and with established mores within an organisation.

Risk management is the way managers try to manoeuvre in 'complex and uncertain environments to avoid a major loss.' (Lyytinen et al., 1998, p.245) Risk management is typically depicted as a process consisting of three steps: identification, assessment, and dealing with risk (Smith et al., 2001). The approach to risk within this process is somewhat ambiguous. On the one hand, risk management appears to be an economically rational practice, based on decision sciences (Lyytinen et al., 1998). At the same time, managers seem to realise that this rational approach requires the quantification of non-quantifiable entities and the reality of risk management therefore looks different. Real-life risk management concentrates on potential losses and tries to avoid them early on. We therefore find in the centre of attention of the literature on risk management the attempt to help managers with the first of the three steps, with the identification of risks. This is usually done by developing a list of risk items or risk factors (cf. Keil et al., 1998; Schmidt et al., 2001; Smith et al., 2001). These risk factors are usually determined through some sort of expert knowledge or Delphi Study.

The aspect of this approach to risk management which is of importance for the argument in this paper is that risk is seen or implied to be objective. The underlying idea

is that managers encounter risks that are there independent of them and that the task of risk management is to find these given risks as early as possible and to subsequently eliminate them. Only this objectivist view of risk can explain the hope voiced by the authors of these studies that they will be able to “identify *all* [emphasis in the original] of the risks involved,” (Smith et al., 2001, p.9) or that they can aim to “develop an authoritative list of risk factors.” (*ibid.*, p.10)

4.2 Responsibility for risks

On the one hand, risk management seems to be based on the assumption of an objective risk and on the resulting adoption of mathematical and scientific methods of dealing with risks. On the other hand there are aspects of the risk management literature that indicate that the authors are sceptical regarding the ability of these scientific methods to successfully overcome risks. Most of the authors on software and IS risk management come to conclusions that look conspicuously similar to the idea of reflective responsibility.

One aspect of this is that Keil et al. (1998, 2002) suggest that different stakeholders should be included in the management of project risks. They point out that risk management is more likely to be successful when multiple stakeholders play a role in risk management but they fail to explain why, if risks are objectively given, the participation of more people should be beneficial. Possible explanations for this might be that stakeholder participation maximises the available knowledge base or avoids misunderstandings caused by cultural differences, diverging views of problems etc. (Metcalf and Lynch, 2003) While this type of reasoning for stakeholder participation may be understandable to a certain degree in the case of objective risks, it nevertheless indicates that the objectivity of risks is not always given.

The cited experts on risk management not only seem to be unsure whether the objectivist definition of risk is tenable. They also embrace some of the ideas of reflective responsibility with arguments similar to the ones developed above. Smith et al., for example, suggest that:

“Effective risk management involves taking a holistic approach to risk, developing a risk management policy, establishing clear accountabilities and responsibilities, balancing risk exposure against controls, being open about risks to reduce conflict and information hiding, enforcing risk management practices, and learning what works and doesn’t from past experience.” (Smith et al., 2001, p.3)

This reflects the basic idea of reflective responsibility that ascriptions need to encompass the construction of subject and object as well as procedures for the imputation of sanctions. Again, this might be defended from an objectivist viewpoint that sees risks as given, but it is more plausible if risks are not given but depend on the perceptions of the agents involved in projects.

One reason why the experts on risk come up with constructionist methods for addressing what they earlier held to be an objective entity may be that the objectivist view of risks seems to fail on at least one basic account. If risks were given and could be identified objectively then it seems reasonable to assume that different researchers doing research on the same subject should come to the same conclusions. That means that the lists of risk factors mentioned earlier should converge and eventually there should be just one authoritative list, which risk managers could use and possibly adapt to their specific

projects. However, the risk factors of the different authors do not converge. While there is some overlap and some risk factors seem to play a role in most of them (e.g. lack of top management support), the importance of risks differs and many factors only appear on some lists. It thus becomes obvious that the risks one determines depend on who one asks. And as we know from the risk perception literature, risks that one is exposed to always appear greater than risks one produces. Users, for example, emphasise risks emanating from management, whereas managers stress user risks.

The other point where the objectivist view of risk and risk management fails is the claim to completeness of the identification of risk factors. If risks were objectively given then there is no good reason to believe that they could not be discovered. While this might take time and exceed the capacities of a single researcher or group, one could believably argue that it should be possible to compile a complete list of risks. This claim is invalidated by the fact that information systems have been around for over 50 years, and despite decades of attempts to find all risks and to manage them, the failure rate is still huge. This is a strong indicator that there are risks that cannot be identified *a priori*. This leads us back to the nature of risk as an expression of contingency, the fact that we cannot know the future no matter what. If we accept this, then the idea that there can be complete lists of objective risks becomes untenable. The result of this is that software and IS risk management scholars change their strategy and promote processes and approaches that embrace constructionist ideas such as a consensual discursive approach (Smith et al., 1998). Where they do this, however, they do it without giving up the implicit claim to objectivity of risks.

5 Conclusion: the ethics of risks management and managing the risk of ethics

This paper started out by arguing that responsibility is a useful concept for addressing ethical and moral issues as well as problems of uncertainty that ethical theories traditionally find hard to deal with. It was suggested that the concept of reflective responsibility could overcome at least some of the problems of traditional responsibility ascriptions. Reflective responsibility is thus a method which would allow us to address the ethical and moral problems of risk. This is only possible, however, if one concedes that the object of responsibility, in our case risk, is no more and no less than the result of a social process of ascription. With this theoretical background the paper proceeded to discuss the current approach to risk management in software and information systems development. It was argued that the traditional three steps of risk management in this area, identification, evaluation and elimination of risks, are based on the assumption of the objectivity of risk. This objectivist assumption is firstly not suitable to describe risks and it secondly produces problem with regard to responsibility.

What is the value of this discussion? It shows a theoretical (and consequently practical) shortcoming of risk management in software and information systems development. If project managers want to take responsibility for risk then they should follow the ideas outlined in the discussion on responsibility. That means they should realise that responsibility is a matter of ascription, not of 'objective reality'. Consequently they should realise that risks are matters of ascription, too, and that it is not possible to identify all risks of a project in advance and from a detached managerial position. In order

to ascribe responsibility for risk a responsibility discourse should be initiated that would allow all of the involved stakeholders to voice their opinions. This discourse would encompass the discovery and ascription of risks, the constitution or identification of responsible subjects and the definition of the sanctions or rewards related to the handling of the risks. The discourse would be fallible but as an ongoing process it would allow for the best possible results.

What does all of this have to do with ethics and morality? Moral questions have to do with questions of good and bad, with the problem of what to do or what not to do. They are in practice not distinguishable from the actions that agents commit in organisational practice. When a software development system fails then this may at first sight be mostly a business problem but it entails moral problems, e.g. because people are fired, business processes collapse, resources are wasted, etc. Life in the organisational or business realm is based on morality and thus requires ethical considerations.

For the participants of a software or information systems development project we can identify several relationships between ethics and risk. First, there is the ethics of risk, the fact that risks are results of human actions that can be disadvantageous to some, that limit some people's rights, obligations, their ability to live a good life. It was suggested that reflective responsibility is a suitable way of dealing with this aspect because it allows an early indication of what risks there are and it maximises the knowledge basis of risks and of their ethical evaluation. Apart from this obvious issue, that is probably in the centre of attention of the special issue, there is, secondly, also the aspect of ethics as risk. This means that moral and ethical questions can be seen as risk factors that can threaten the viability of a development project. These ethical issues that can turn into risks can be overall ethical problems, such as overseen privacy concerns or ignored intellectual property questions but they can also be specific to the project, e.g. when the project manager does not treat his employees with the respect they deserve from an ethical point of view. Again, the idea of reflective responsibility is geared to address these questions. During the discursive ascription of responsibility for risks, it is of no relevance whether risks are of an ethical, a technical, a business or any other nature. Ethics can be incorporated as a risk factor among others. Given that ethical standards and resulting sanctions are negotiated during the ascription, not even the ethical evaluation of moral questions is a fundamental problem.

At first sight the theory of reflective responsibility thus looks like the perfect solution to the difficult relationship of risk and ethics. However, there are of course drawbacks and limitations. There is the question of applicability of these ideas. Reflective responsibility for risk was here discussed in the context of software and information systems development. While I guess that risk management works similarly in other areas and that the idea thus could be broadened to risk management in general, this would require more research.

With regards to the idea of reflective responsibility itself, the difficulty is that it is a theoretical concept whose practical realisation would prove complex. During the ascription process many questions would have to be addressed. Among them there is the question of who are object and subject, what exactly is their relationship, what are recognised moral norms, how are they justified by ethics, who can impute sanctions and how are they enforced? The big disadvantage of such an enterprise is that it requires serious determination, and produces financial and other costs. I have tried to argue that it is the best possible approach but, still, I would have to concede that there is no guarantee that it will work. Reflective ascriptions of responsibility are fallible.

And finally, possibly the most serious problem of all, reflective responsibility for risks would require a rethinking of the role of managers. In traditional risk management, the risk manager or project manager retains control or delegates it according to his or her preferences. At the same time he or she will be held 'responsible', meaning that in the case of a problem caused by risks, will be sanctioned. Reflective responsibility is a much more bottom-up approach that is based on the assumption that all participants in discourses are equal and should be treated equally. The point of discourses is for the best argument to win, disregarding traditional power differences. A manager following this sort of idea would therefore have to give up a considerable amount of control. While this in itself might be difficult for many managers, an added problem is that the hierarchical responsibility structures are not likely to change quickly. That means that managers might still be held individually responsible by their superiors even though they followed the democratic ideal of reflective responsibility.

The choice to adopt the theory of reflective responsibility to address the ethics of risks is therefore not necessarily one following from individual utility maximisation of the project risk manager. It requires a wider perspective than economic rationality and can best be explained in terms of its inherent ethical qualities. Reflective responsibility is an expression of respect for participants in risky projects. It takes the ethical aspects of risk seriously and recognises that these cannot be evaluated sufficiently from a detached perspective. Adopting the idea of reflective responsibility is thus an expression of responsibility and therefore an ethically justified moral act. It therefore offers a perspective for risk managers who not only want to eliminate the risk of ethics and avoid sanctions for ethical problems but who want to act morally.

References

- Bayertz, K. (1995) 'Eine kurze Geschichte der Herkunft der Verantwortung', in K. Bayertz (Ed) *Verantwortung: Prinzip oder Problem?*, Darmstadt: Wissenschaftliche Buchgesellschaft, pp.3–71
- Beck, U. (1986) *Risikogesellschaft. Auf dem Weg in Eine Andere Moderne*, Frankfurt: Suhrkamp.
- Bonß, W. (1995) *Vom Risiko. Unsicherheit und Ungewißheit in der Moderne*, Hamburg: Hamburger.
- Currie, W. (2000) *The Global Information Society*, Chichester, John Wiley & Sons.
- Earl, M.J. (1996) 'The risks of outsourcing IT', *Sloan Management Review*, Vol. 37, No. 1, pp.26–32.
- Fischer, J.M. (1999) 'Recent work on moral responsibility', *Ethics*, Vol. 110, No. 1, pp.93–139.
- French, P.A. (1979) 'The corporation as a moral person', *American Philosophical Quarterly*, Vol. 16, No. 3, pp.207–215.
- French, P.A. (1992) *Responsibility Matters*, Lawrence, Kansas: University Press of Kansas.
- Giddens, A. (1984) *The Constitution of Society – Outline of the Theory of Structuration*, Cambridge: Polity Press.
- Glenn, B.J. (2003a) 'Postmodernism: the basis of insurance', *Risk Management and Insurance Review*, Vol. 6, No. 2, pp.131–143.
- Glenn, B.J. (2003b) 'Risk, insurance, and the changing nature of mutual obligation', *Law & Social Inquiry*, Vol. 28, No. 1, pp.295–314.

- Hausman, D.M. and McPherson, M.S. (1996) *Economic Analysis and Moral Philosophy*, Cambridge: Cambridge University Press.
- Hubig, C. (1995) 'Verantwortung und hochtechnologie', in K. Bayertz (Ed), *Verantwortung: Prinzip oder Problem?*, Darmstadt: Wissenschaftliche Buchgesellschaft, pp.98–139.
- Kaufmann, F-X. (1992) *Der Ruf nach Verantwortung*, Herder: Freiburg im Breisgau.
- Kaufmann, F-X. (1995) 'Risiko, verantwortung und gesellschaftliche komplexität', in Bayertz (Ed) *Verantwortung: Prinzip oder Problem?*, Darmstadt: Wissenschaftliche Buchgesellschaft, pp.72–97.
- Keil, M., Cule, P.E., Lyytinen, K. and Schmidt, R.C. (1998) 'A framework for identifying software project risks', *Communications of the ACM*, Vol. 41, No. 11, pp.76–83.
- Keil, M., Tiwana, A. and Bush, A. (2002) 'Reconciling user and project manager perceptions of IT project risk: a Delphi study', *Information Systems Journal*, Vol. 12, pp.103–119.
- Lübbe, W. (1998) *Verantwortung in Komplexen Kulturellen Prozessen*, Freiburg/München: Verlag Karl Alber.
- Lenk, H. (1993) 'Über Verantwortungsbegriffe und das verantwortungsproblem in der technik', in H. Lenk and G. Ropohl (Eds) *Technik und Ethik*, 2nd edition, Stuttgart: Philipp Reclamjun, pp.112–148.
- Lewis, H.D. (1972) 'The non-moral notion of collective responsibility', in P. French (Ed) *Individual and Collective Responsibility – Massacre at My Lai*, Cambridge, MA: Schenkman Publishing Company, pp.116–144.
- Luhmann, N. (1990) *Paradigm Lost: Über die ethische Reflexion der Moral*, Frankfurt: Suhrkamp.
- Lyytinen, K., Mathiassen, L. and Ropponen, J. (1998) 'Attention shaping and software risk – a categorical analysis of four classical risk management approaches', *Information Systems Research*, Vol. 9, No. 3, pp.233–255.
- Makropoulos, M. (1997) *Modernität und Kontingenz*, München: Wilhelm Fink Verlag.
- May, L. and Hoffman, S. (Eds) (1991) *Collective Responsibility: Five Decades of Debate in Theoretical and Applied Ethics*, Savage, Maryland: Rowman & Littlefield Publishers Inc.
- Metcalf, M. and Lynch, M. (2003) 'Arguing for information systems project definition', in E. Wynn, E. Whitley, M.D. Myers and J. DeGross (Eds) *Global and Organizational Discourse about Information Technology*, Dordrecht: Kluwer Academic Publishers, pp.295–321.
- Neuberg, M. (Ed) (1997) *La Responsabilité – Questions Philosophiques*, Paris: Presses Universitaires de France.
- Paul, E.F., Miller, F.D. and Paul, J. (Eds) (1999) *Responsibility*, Cambridge: Cambridge University Press.
- Pietschmann, P. (1992) 'Zusammenschau, reflexion und interpretation', in K. Giel and R. Breuninger (Eds) *Risiko – Bausteine zur Philosophie – Band 6, Interdisziplinäre Schriftenreihe des Humboldt-Studienzentrums Universität Ulm*, Ulm: Humboldt Studienzentrum Universität Ulm, p.192ff.
- Priddat, B.P. (1996) 'Risiko, ungewißheit und neues: epistemologische probleme ökonomischer entscheidungsbildung', in G. Banse (Ed) *Risikoforschung zwischen Disziplinarität und Interdisziplinarität – Von der Illusion der Sicherheit zum Umgang mit Unsicherheit*, Berlin: Sigma Rainer Bohn Verlag.
- Schmidt, R., Lyytinen, K., Keil, M. and Cule, P. (2001) 'Identifying software project risks: an international delphi study', *Journal of Management Information Systems*, Vol. 17, No. 4, pp.5–36.
- Slovic, P. (1999) 'Comment: are trivial risks the greatest risks of all?', *Journal of Risk Research*, Vol. 2, No. 4, pp.281–288.
- Smith, H.A., McKeen, J.D and Staples, D.S. (2001) 'Risk management in information systems: problems and potentials', *Communications of the Association for Information Systems*, Vol. 7.

- Stahl, B.C. (2004) *Responsible Management of Information Systems*, Hershey et al.: Idea Group Publishing.
- Thompson, P.B. (1985) 'Risking or being willing: hamlet and the DC-10', *The Journal of Value Inquiry*, Vol. 19, pp.301–310.
- Wilson, M. and Howcraft, D. (2002) 'Re-conceptualising failure: social shaping meets IS research', *European Journal of Information Systems*, Vol. 11, pp.236–250.