

# Determining the Failure Level for Risk Analysis in an e-Commerce Interaction

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**Abstract.** Before initiating a financial e-commerce interaction over the World Wide Web, the initiating agent would like to analyze the possible Risk in interacting with an agent, to ascertain the level to which it will not achieve its desired outcomes in the interaction. By analyzing the possible risk, the initiating agent can make an informed decision of its future course of action with that agent. To determine the possible risk in an interaction, the initiating agent has to determine the probability of failure and the possible consequences of failure to its resources involved in the interaction. In this chapter as a step towards risk analysis, we propose a methodology by which the initiating agent can determine beforehand the probability of failure in interacting with an agent, to achieve its desired outcomes.

**Keywords:** Risk assessing agent, Risk assessed agent, FailureLevel and Failure scale.

## 1 Introduction

The development of the internet has provided its users with numerous mechanisms for conducting or facilitating e-commerce interactions. It has also provided its users with various functionalities which will facilitate the way e-commerce interactions are carried out. But along with the provision of the increased functionalities for facilitating e-commerce interactions, also comes the fear of loss or the fear of not achieving what is desired in an interaction. This fear of loss or not achieving what is desired is termed as 'Risk' in the interaction. The terms 'risk assessing agent' and 'risk assessed agent' defines the two agents participating in an interaction. The former refers to the one initiating the interaction, while the latter refers to the agent accepting the request. In other words, this is the agent with whom the risk assessing agent interacts with to achieve its desired outcomes. The significance of the risk assessing agent to analyze the possible risk before initiating an interaction with a risk assessed agent is substantial. The risk assessing agent, by analyzing the possible risk beforehand, could gain an idea of whether it will achieve its desired outcomes from the interaction or not. Based on this, it can safeguard its resources. Risk plays a central role in deciding whether to proceed with a transaction or not. It can broadly be defined as an attribute of decision making that reflects the variance of the possible outcomes of the interaction.

Risk & Trust complement what the risk assessing agent needs in order to make an informed decision of its future course of action with a risk assessed agent. But there is still confusion in the relationship between them. As Mayer et al [1] suggest 'it is unclear whether Risk is an antecedent or an outcome of Trust'. Different arguments can be given to this. It can be said that in an interaction risk creates an opportunity for trust, which leads to risk taking. In this case risk is an antecedent to trust. But it can also be said that when the interaction is done based on the level of trust, then there is a low amount of risk in it. In this case risk is an outcome of trust. Risk can also provide a moderating relationship between trust and the behaviour of the agent in an interaction. For example, the effect of trust on the behaviour is different when the level of risk is low and different when the risk is high. Similarly risk can have a mediating relationship on trust. For example, the existence of trust reduces the perception of risk which in turn improves the behaviour in the interaction and willingness to engage in the interaction. But it is important to understand that, although risk and trust are two terms that complement each other while making an informed decision, they express different concepts which cannot be replaced with each other. Further it is important to comprehend the difference between each concept while analyzing them. Risk analysis involves the risk assessing agent to determine beforehand the probability of failure and the subsequent possible consequences of failure to its resources in interacting with a risk assessed agent. On the other hand, trust analysis measures the belief that the risk assessing agent has in a risk assessed agent in attaining its desired outcomes, if it interacts with it. This analysis does not take into account the resources that the risk assessing agent is going to invest in the interaction. A lot of work has been done in the literature to determine and evaluate the trust in an interaction [6-14].

Risk analysis is important in the study of behaviour in e-commerce, because there is a whole body of literature based in rational economics that argues that the decision to buy is based on the risk-adjusted cost-benefit analysis [2]. Thus, it commands a central role in any discussion of e-commerce that is related to an interaction. The need to distinguish between the likelihood and magnitude of risk is important as they represent different concepts. Magnitude shows the severity of the level of risk, whereas the likelihood shows the probability of its occurrence. For example, the likelihood of selling an item on the web decreases as the cost of the product increases and vice versa. The likelihood of a negative outcome might be the same in both interactions, but the magnitude of loss will be greater in the higher cost interaction. Hence these two characteristics must be considered by the risk assessing agent while analyzing the possible risk in interacting with a risk assessed agent. Previous methods in the literature analyze risk by just considering the probability of failure of the interaction. However, in our approach apart from considering the probability of failure of the interaction, we also consider the possible consequences of failure while ascertaining the possible risk in an interaction. It should be noted that this is the first attempt in the literature to model and analyze risk by using the two aforesaid constituents in e-commerce interactions.

In this chapter, we propose a methodology to determine semantically one aspect of risk evaluation, namely determining the probability of failure of the interaction. We propose to determine the probability of failure in the interaction according to the

