Using trust and reputation in government-to-business relationships: the authorized economic operator (AEO) as an example

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Abstract

This paper regards the government-to-business (G2B) relationship as a principal/agent relationship with asymmetric information. It brings about monitoring costs for the government, bonding costs for the businesses and a residual loss for society. In the case of government regulation these costs can be seen as transaction costs, which can be minimized in a trust-based design of the regulation. We illustrate this in a case study of authorized economic operator (AEO) certification in the Netherlands. Being certified reduces Customs costs for businesses and moreover enhances their reputation of being a trustworthy trading partner. The costs of the loss of such valuable reputation act as a trigger mechanism in the repeated game of trust which is the solution to the fundamental problem of exchange of information in this G2B relationship. Hereeto it is essential that the AEO certification and its reputation effect are sufficiently valuable so that certified companies are not tempted to cheat and that there is no adverse selection where only ‘lemon’ companies become certified. That is why governments should strongly promote AEO certification in order to exploit the network externalities and make it a worldwide standard. The use of IT and risk assessments can be helpful in this institutionalizing of AEO certification.

Keywords: government regulation, implementation costs, G2B relationship, asymmetric information, trust, reputation, certification, customs.

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1 Introduction

Implementing government regulation requires coordination between the government and the business sectors. Public sector economics distinguishes various aims of regulation. One prominent aim is to repair market failure and internalise externalities. Examples of regulation are prescriptions with respect to safety and environmental standards, and provision of subsidies. Tax collection in order to finance government expenditure for the provision of public goods, or for reasons of redistribution, will also bring about a G2B relationship, where coordination is formalized in a set of laws and rules the government imposes to the business sector. The common characteristic of all of these G2B relationships is information asymmetry between the government and the business sector. Through regulation the government aims at reaching specific targets, which are optimal from the perspective of social welfare, but the business sector has more information about the effects of the regulatory measures and about how to cope with the regulation. It implies that government regulation can be considered a principal/agent problem under information asymmetry, with the government as the principal and the individual businesses as agents. Two major issues are at stake in the case of information asymmetry, namely moral hazard and adverse selection. Moral hazard occurs when an insured party as agent has an opportunity to take hidden action once an insurance contract is in effect; adverse selection is the result of asymmetric information prior to entering into a contract. Failing to distinguish between these two types of principal-agent problems may lead decision-makers to adopt policies that are ineffective or even harmful.

This paper investigates how regulatory measures can be properly designed and institutionalized so that the costs of regulation can be minimized. More specifically, our paper examines how a proper institutionalization of the mechanisms of trust and reputation can lead to a considerable reduction of the transaction (or implementation) costs of government regulation. Based on the principal/agent model, we distinguish three types of costs associated with the principal/agent character of the G2B relationship, namely monitoring costs by the government, bonding costs by the business sector and residual loss when the targets of government regulation are not fully met. Using transaction cost economics for our analysis of these implementation costs in G2B relationships allows us to focus our analysis on institutional aspects of government regulation. A further focus of the paper is to make as much use as possible of information technology (IT). It allows institutionalizing the G2B relationship as an economically feasible trust and reputation-based interaction instead of the traditional command and control-based regulation. This suggestion for trust and reputation-based G2B relationship is elaborated with the example of Authorized Economic Operator (AEO), a certificate granted by the custom authorities to trusted businesses. It may substantially reduce costs for both Customs – the principal and business sides –the agents in this case. This trust and reputation-based institutional setup of the AEO on the one hand enhances security and control with less physical checking for the Customs; on the other hand, it may reduce the administrative burden and facilitate trade for the business. In our case study we point out that the new developments in IT can be used to reduce both monitoring and bonding costs, and thereby total implementation costs of government regulation. The major feature is to set up the G2B relationship – in this case the design and implementation of the AEO certification – as a repeated game of trust where reputation is built up in such a way that the sustainability of the coordination equilibrium in the game of trust is guaranteed by the high costs of loss of reputation in relation with the gains of cheating.

The contents of the remainder of the paper are as follows. The next section elaborates how information asymmetry occurs between the government and the business sector and how government regulation can be seen as a principal/agent problem. Section 3 discusses the roles of trust and reputation as mechanisms to reduce transaction costs; and we compare two types of government regulations (control vs. trust-based) in respect of their implementation costs. Section 4 zooms in on the problems for implementation of AEO;
and we present findings of a case study for the AEO assessment in the Netherlands. Section 5 discusses policy recommendations in order to make AEO regulations which enhance the reputation effect and which minimize the principle/agent problems; more government involvement is needed for expanding the AEO concept and give it an international scope. In this way, the gains of the network externalities of the trust and reputation mechanisms can be fully grasped. Section 6 concludes.

## 2 Principal/agent problem between government and businesses: transaction cost perspectives

### 2.1 Principal/agent problem between government and businesses

A principal/agent problem arises when one or more principals engage another person/group as their agent to perform a service/action on their behalf. Performance of this service/action results in the delegation of some decision-making authority to the agent (Eisenhardt, 1989a). This delegation of responsibility by the principal and the resulting division of labour are helpful in promoting an efficient and productive economy. However, to form any kind of relationship, information sharing is essential. In an ideal world we assume information is shared equally and transparently among the parties. However in the real world, due to lack of communication channels and hidden incentives for sharing or hiding information between parties, information is normally spread in an asymmetric way, thus one party has more or better information than the other party. Typically, two issues triggered by asymmetric information can cause principal/agent problems, namely moral hazard and adverse selection (as indicated in Figure 1) [see, (Akerlof, 1970), (Spence, 1973) and (Rothschild & Stiglitz, 1976)].

![Figure 1. Principal/agent problem caused by asymmetric information](image)

*Moral hazard* refers to situations where one side of the market cannot observe the actions of the other [see e.g., (Varian, 2002)]. For this reason it is sometimes called a hidden action problem. It arises because an individual or institution in a transaction does not bear the full consequences or can hide the consequences of its actions without the counterparty knowing it, and therefore has an incentive to act inappropriately. Tax fraud can be seen as a typical moral hazard problem in G2B relationships. For example, in VAT (Value Added Tax) collection, two parties are involved: a company – the agent – who is obliged to declare VAT and pay the tax; and a tax office implement tax regulations and collects the VAT – the principal. Under the assumption of perfect information, the tax office obtains complete information and knows exactly about the company’s operation; the company reports and pays the correct amount of VAT. However, in the real world the company has better information about its own operating details than the tax office and thus may have incentives to hide and may even falsify certain information from the tax office to get tax benefits. If such an incentive is present, or the penalty of defaulting is not severe enough, the company might choose tax evasion, thereby causing a moral hazard problem. EU governments have been experiencing severe loss from various tax frauds. According to the European Commission (2006),
estimates of tax fraud range from 2% to 2.5% of GDP, which is about 200 to 250 billion Euro per year at EU level. Such tax fraud is a fitting example and can be interpreted as the moral hazard problem caused by the asymmetric information.

Another well-known example of moral hazard occurs in insurance. Here the insurance company as principal has less information than the insured – the agent – so the insured may cheat or behave less prudently than if he or she had not been insured. Insurance companies try to deal with these problems of moral hazard by specific conditions in the insurance contract such as an own risk or a premium which depends on previous claims. The problem of moral hazard also emerged in the credit crisis where banks were taking too big risks with the expectation that there would be a bailout, in the event of default.

**Adverse selection** refers to a failing market due to information asymmetries between buyers and sellers, where ‘bad’ products or customers are more likely to be selected rather than ‘good’ ones. In his seminal article on signalling problems with asymmetric information, Akerlof (1970) gives the example of the second-hand car market. This is referred to as the ‘lemons problem’. Buyers of second-hand cars – the principals - typically do not have enough expertise to know the quality of a car: whether a car is a ‘lemon’ (bad car) or a ‘peach’ (good car). As a consequence they are willing to pay an average price that lies in between the lemons and peaches. However, with such a price, the car sellers – the agents which have good information on the different quality of the cars – are not willing to sell the good cars. As a result, only bad cars will be sold: the ‘lemons’ are crowding the ‘peaches’ out and will dominate the market. In the case of insurance companies only bad risks will try to get insured when the insurance is voluntary, whereas the insurance companies will try to select only good risks when the insurance is mandatory. In the first case the insurance company is the principal and the customer the agent; in the second case the authorities that make the insurance compulsory are the principals and the insurance companies are the agents. In both cases adverse selection is prevented by special rules and regulations. In the G2B relationship, adverse selection can occur when government bodies select business partners and grant certificates, as we will see in the example of trust-based AEO certification in section 4.

### 2.2 Transaction cost perspectives

The concept of transaction cost is a central theme in the New Institutional Economics and most associated with the work of Oliver Williamson [see (O.E. Williamson, 1979, 1985, 2000) for the overview of this field of research]. Transaction cost can be defined as the friction costs that appear while pursuing the gains of trade (O.E. Williamson, 1985). Unlike production costs, which can be analogous to the cost of building and running an ‘ideal’ machine, transaction costs are those costs which are incurred by departures from perfection, such as friction. Transaction cost economics aims to find the most efficient form of governance, in a trade-off between different instruments, depending on the degree of asset specificity, uncertainty and transaction frequency (O.E. Williamson, 1985). Lack of information and information asymmetry are the major causes of transaction cost.

In the introduction we mention that the perspective of transaction cost economics will be taken as the theoretical basis for our analysis of the design of government regulation. However, in order to make this transaction costs perspective operational we should be more precise about what costs to include as costs of regulation. In order to avoid risks and failure, and in order to meet specific quality standards, firms will make costs anyhow. These are business as usual costs and should, of course, not be counted as costs of regulation. The same applies to the sheer transportation costs of passage through customs in the case of calculating the additional costs of custom regulation. Therefore a benchmark for the costs of regulation is the situation that the aims of regulation are met with business as usual costs only, for instance because the external effects are internalised automatically (Den Butter, de Graaf, & Nijsen, 2009). Here, there is a clear analogy with the traditional assumption of neo-classical theory that trade transactions are for free. In
real world transactions may bring about all kinds of transaction costs, which distort efficient allocation in the ideal general equilibrium. The same is true when government regulation is costly. Therefore we consider all costs of government regulation in excess of the benchmark of no costs or in excess of business as usual costs, as the transaction costs of government regulation.

Because of the information asymmetry, where firms have more information about the effort and costs to comply with government regulation than does the government itself, the relationship between the government and the business sector in the case of regulatory requirements can be seen as a principal/agent relationship. Here the regulatory authority (government) is the principal and the businesses which have to comply with the regulations are the agents. In doing so, our concept of transaction costs of government regulation are equivalent to the vertical transaction costs within the hierarchy of the firm, considered by Coase (1937). The principal/agent relationship allows us to distinguish three types of costs which are all part of the total transaction costs of regulation.

The first type of costs is the costs for the government itself. These are, in the principal/agent terminology, the monitoring costs. Some of these are administration or enforcing costs, but there are also additional costs which come with the design of the regulatory measures. Therefore the implementation or enforcing costs for the government are generally considerably higher than the amounts which appear in the budget (payment of subsidies, receipts of levies). The additional costs include salaries of civil servants engaged in policy preparation, implementation of regulatory measures and other monitoring activities. Monitoring costs also relate to subsidies which are not granted, and allowances for tax exemptions. Whereas the costs that appear explicitly in the budget can be seen as ‘hard’ transaction costs, the other costs can be seen as ‘soft’ transaction costs. Hard transaction costs are relatively easy to quantify and calculate, but soft transaction costs are not. They may, however, also appear in the budget, but implicitly.

The second type of costs is the bonding costs for businesses. Here all compliance costs as a consequence of the government regulation should be taken into account. They are the direct financial costs such as levies, but also capital investments and all other remaining costs incurred when meeting the obligations of laws and legislation. These compliance costs also include the costs of informing the government (sheer bonding costs, e.g., sending document, data exchange). Calculating total compliance costs can, however, be rather complicated. For instance, when firms are to meet the requirements of environmental legislation or of safety regulations, they have to make all kinds of investments in the production processes and management procedures of the firm. These costs can only be partly counted as transaction costs of government policy, as some of these investment costs would be made anyhow from the firm’s own commercial perspective. So there is a need to separate these kinds of compliance costs into external compliance costs, which are added to the transaction costs, and internal compliance costs, which are not transaction costs originating from government regulation. Of course such a split between external and internal compliance costs has, to some extent, an arbitrary character and requires a good insight into the management of the firm. There are some practical examples about how to calculate these various types of compliance costs for specific cases (Nijsen, 2008; UK Government, 2008).

The third type of costs is much more difficult to assess, namely the societal costs of the residual loss. These arise because the reaction of the agents to government regulation will never be in complete agreement with the objectives of the government. The difference is the residual loss. We include the residual loss in our concept of transaction costs, as in the benchmark with perfect allocation at no costs there would be no residual loss either. Principal/agent contracts should be designed in such a way that the total agency costs (monitoring costs, bonding costs and residual loss) are minimized. It implies that agency contracts should not focus on reducing only one particular type of costs, but there should be a good balance between all three types of costs.
The above discussion shows that the agency theory provides an adequate framework for a categorisation of the transaction costs of government regulation. Total transaction costs of government regulation consist of the netted sum of the three components. The expression ‘netted sum’ indicates that, for example, subsidies granted by the government to private agents are counted as costs for the government, but as benefits (or cost reduction) for the private agents.

3 Role of trust and reputation in G2B relationships

3.1 The fundamental problem of exchange and the game of trust

Transaction costs are associated with what Greif (2000) labels the fundamental problem of exchange. This fundamental problem is whether “one can ex ante commit to being able and willing to fulfil contractual obligations ex post”. In other words, a necessary condition for exchange is that for each partner in the exchange transaction there must be certainty that the other partner will keep its promise and deliver what has been agreed upon. Greif approaches this issue by stating that “one will not enter into a profitable exchange relationship until the other party can ex ante commit to fulfil his or her contractual obligations ex post”. Only under that condition can the exchange be mutually beneficial for both parties. 

This required security is often difficult to obtain because of a typical feature of many exchange transactions: it is sequential. It means that contracts and promises about delivery are made in advance of actual delivery and payment. This gives the party that is last to fulfil his or her obligations the opportunity to behave opportunistically and benefit at the expense of the other party. This problem becomes even worse when specific investments are required in a particular exchange relationship. In this situation there is the threat of a ‘hold-up’. Such a hold-up – which is named after a raid on a stagecoach in the Wild West – implies that the last party to meet the obligations misuses the opportunity to change the conditions of the exchange to his or her advantage. In the case of a labour contract a ‘hold-up’ may happen where a worker who has had high learning costs in order to get acquainted with the work and become productive, demands at that time a higher wage, so that his or her boss is unable to recover these learning costs. The threat of a hold-up constitutes an obstacle to entering into an exchange contract and should therefore be avoided. However, such a hold-up can only be avoided when for both parties the transaction costs associated with keeping the contract are lower than those associated with breaking the contract. As we will see, this is an essential element in setting up the trust-based relationship in the AEO certification.

The fundamental problem of exchange thus essentially boils down to avoiding the opportunistic behaviour associated with the sequential character of the exchange. In game theoretic terms the fundamental exchange problem can be understood as a form of the prisoner’s dilemma. The optimal solution in terms of welfare for both parties – the Pareto-optimal solution – implies that both sides behave cooperatively. However, each party separately thinks that it is rational not doing so, which in principle results in a non pareto-optimal outcome. According to Grief, the solution of this problem can be found in the game of trust. The key point is that the game of trust must be played within an institutional framework as the rules of the game are fixed. Given an example of legal institutionalization, if enforcement of the rules established by a legal system is guaranteed, that the parties can trust then they will be willing to play under these rules accordingly. This can be done on a formal (penalty) control basis, with the threat of penalties, fines and imprisonment to reduce the incentives for opportunistic behaviour. That is why trade institutions/ governments are needed in order to ensure that there is an optimal solution in the prisoner's dilemma, for example through the enforcement of costly penalties if a party does not comply with the contract. However, this solution is often not optimal; when enforcing and closing contracts, high costs and great information problems may occur. Especially in the case of international trade this problem is worsened by unfamiliarity with the law and/or gaps between different legal systems in different countries. A different and less formal way is on a trust (confidence) basis: the transactions take place in
(business) networks where experiences are communicated effectively with trade partners. Given this reputation mechanism in both business and social fields, opportunistic behaviour can be prevented. The members of such trusted trade networks are often from the same family, clan or region, such as still exists today in Chinese trade networks (Rauch, 2001).

The role of trust in facilitating transactions can be understood from the ideas of Greif (2000). Close to Greif’s perception, trust can be defined as a set of expectations shared by the parties involved in an exchange process (Zucker, 1986), which alleviates the fear that one’s exchange partner will act opportunistically (Bradach & Eccles, 1989; Mahoney, Huff, & Huff, 1994). There are other different understandings of trust under different context [see, (T3-Group, 2010)]. According to Jøsang et al. (2007), two common definitions of trust which can be called as reliability trust and decision trust respectively. Reliability trust can be interpreted as the reliability of something or somebody, Gambetta (2000) provides an example of how this can be formulated: trust is the subjective probability by which an individual, A, expects that another individual, B, performs a given action on which its welfare depends. This definition includes the concept of dependence on the trusted party and the reliability (probability) of the trusted party (agent), as seen by the trusting party (principal). The second definition of trust is the extent to which one party is willing to depend on something or somebody in a given situation with a feeling of relative security, even though negative consequences are possible (McKnight & Chervany, 2001). The relative vagueness of this definition is useful because it makes it more general. It explicitly and implicitly includes aspects of a broad notion of trust which are dependence on the trusted entity or party, the reliability of the trusted entity or party, utility in the sense that positive utility will result from a positive outcome and that negative utility will result from a negative outcome, and finally a certain risk attitude in the sense that the trusting party is willing to accept the situational risk resulting from the previous elements.

Greif has shown that institutions play a crucial role in solving the game of trust and satisfying the basic condition for exchange, namely to be able to commit to a trade contract. In the early Middle Ages Jewish merchants – the ‘Maghribi traders’ – were bound to keep their promises on trade agreements through family ties and other social networks, even though their deeds could only be controlled much later because of the large distances and time-consuming travel. This institutional system of using family ties was later replaced by legal systems as institutions.

In these institutional solutions to the game of trust, trust may be a substitute for extensive negotiations and drafting of contracts which can bring about a lot of transaction costs and which are, from the economic perspective, never ‘complete’. Trust can be seen as an expectation about the the future behaviour of the trading partner, where a false expectation may bring about considerable costs. When both parties trust each other, it implies that both parties expect cooperative behaviour from the other party and explicit or implicit compliance with the agreements.

In fact, in many circumstances trust between trading parties can be seen as a cooperative solution to a prisoner’s dilemma where the trigger mechanism built into the repeated game does not completely exclude cheating. So placing trust is not a free lunch, there is a risk involved. That makes agents cautious, so they gather reliable information about potential business partners (contact), carefully formulate the agreement (contract) and adequately monitor and enforce it (control). What do people indulge to accept these risks and to trust the other, or how can this risk be contaminated so trust can develop? To answer this question, we distinguish two main types of trust generating mechanisms, respectively with a formal and an informal basis.
In the case of formal trust we can for instance think of legal protection with respect to agreements between parties, where fines, or even the prospect of going to jail, can prevent opportunistic behaviour. This ‘formal trust’ is related to the rational choice concept of trust (Coleman, 1994) and extrinsic motivation (Frey & Jegen, 2001). Formal trust is closely linked to what is known by other authors as instrumental trust, rational trust, calculative trust (O. E. Williamson, 1993), self-interested trust (Lyons & Mehta, 1997), synthetic trust (Putnam, 2000), fragile trust (Lindenberg, 2000), narrow trust or egoistic trust (Nootenboom 2002) and, to some extent, system trust (Bachmann, 2001; Luhmann, 1979). All these notions of trust are related to each other, in the sense that they see this type of trust as being about the calculation of selfish interests in pecuniary terms. It expects that people take into account all financial incentives involved, use a ‘rational way of thinking’ and are not ‘hindered’ by emotions. So, if it is profitable to cheat, one will cheat without remorse. People will act trustworthy when it pays to act trustworthy. The main idea of this approach is that the trust problem can be understood as a social coordination problem. To prevent both players from ending up in the Nash equilibrium outcome of the prisoner’s dilemma (both players playing the uncooperative or untrustworthy strategy), there are two solutions.

The first is to play the game an indefinite number of times. In other words, a repeated game is needed to solve the game of trust. This allows reputation effects to emerge. Trustworthy behaviour in the past forms a valuable asset, because it enhances the chance of finding future business partners. The reputation mechanism works best when the time horizon of the players is large, when there are many potential partners, and when information about past behaviour is easily accessible to all players. This forms an important reason why trading networks exist, as they fulfil these requirements. The second solution is to change the outcomes of the game in such a way that it becomes favourable for the players to act in line with the agreement. On a bilateral level, this can be organised by promising bonuses for good compliance, or by taking ‘hostages’ which are returned when the agreement has been fulfilled. Another way to invoke trustworthiness is by using intermediaries, for example banks that issue letters of credit. The most important way of solving the trust problem is of course by relying on the judicial power to enforce legal contracts. Threats of fines and imprisonment scare agents away from untrustworthy behaviour. So, according to this second solution a kind of contract, which is hopefully self-enforcing and prevents cheating, should preclude the traders from ending up in the non-cooperative prisoner’s dilemma solution of no trade.

It should be noted that these trust mechanisms on a formal basis cannot take away all risk. In the first place, bounded rationality and incomplete information make it impossible to make all necessary calculations. Moreover, the behaviour of other people is guided by fundamental uncertainty called free will (Nootenboom, 2002). Good prior intentions can always change when unforeseen circumstances occur. It has already been noted that legal contracts can be expensive, inherently incomplete, and possibly unverifiable and subject to the particularities of the addressed legal system. On top of this, too much emphasis on formal trust might hurt informal trust. When relationships are guided by too much formal trust, based on extrinsic motivations, this can ‘crowd out’ informal trust which relies on intrinsic motivation (Benabou & Tirole, 2003; Frey & Jegen, 2001; Ostrom, 2000; Tyler, 1998).

Trust mechanisms with an informal basis cover the relational and social-cultural mechanisms that build trust. Informal trust is based on intrinsic motivations (Frey, 1993). This type of trust is closely related to the concepts of social trust, moral trust, personal or blind trust (O. E. Williamson, 1993), socially-oriented trust (Lyons & Mehta, 1997), resilient trust (Lindenberg, 2000), broad or altruistic trust (Nootenboom, 2002), generalised trust (RD Putnam, R Leonardi, & Nanetti, 1993) and social capital (Fukuyama, 1996). The advantage of informal trust mechanisms over formal trust mechanisms is that one does not have to pay to keep afloat an entire legal system with its lawmakers, lawyers, judges and police. However, building informal trust can be a very difficult and lengthy process, especially when one wants to enter a group or network of which the membership ties are based on kinship, ethnicity, religion or place of birth.
Microeconomic game experiments in laboratories suggest that these informal forms of trust are relevant to explain human behaviour in some economic situations. A common conclusion of those experiments – often shaped as social co-ordination problems – is that people are indeed inclined to behave trustingly and trustworthily (guided by norms such as reciprocity and fairness), instead of playing the ‘rational’ strategy of non-cooperation. A related informal form of trust is based on common values and norms. Being a member of the same cultural or religious society may induce people to trust and be trusted without any formal guarantee. This form of trust can primarily be found in homogenous communities with common values and norms where the ‘institutional setting’ assures that, in the case of cheating, the community will provide a costly punishment. These communities can consist of family, close friends, colleagues and members of the same profession, but also of citizens from the same village, region or country.

It is difficult to judge which one of these different types of trust has most practical relevance. First there will be a substitution effect: when the legal system is better developed, the effects of corporate reputation and social networks are less important. Furthermore, there is complementarity: without a reasonably functioning legal system, reliance on an informal form of trust may also become more costly. In most practical situations there is generally a combination of two types of trust and their relevance may differ from situation to situation. In this respect, the question also arises as to what extent both types of trust rely on rational behaviour or not. Here the distinction can be made in terms of calculative trust and moral trust. As mentioned before, formal trust can be associated with calculative trust and rational behaviour. But it may be true that reliance on informal trust can also be regarded as rational. Rationality, in this case, refers to a balancing of the benefits and costs of cheating. For instance, when it has been very costly to build up a reputation of trustworthiness, and when by cheating this reputation gets lost whereas keeping the reputation will considerably reduce future transaction costs, it becomes rational not to cheat. This is exactly the repeated game character of the institutions for informal trust where a high price has to be paid for being expelled from the family or community, or for a loss of face. This may even explain why altruism has been detected in laboratory experiments with one-shot games: the rationality for doing so may be found in an intrinsic drive to conform to social habits, or even in a fear of ‘God’.

Trust is related to various forms of transaction costs. These transaction costs both comprise the costs made in order to establish trust based on formal institutions (contract drafting costs, investment costs in knowledge of foreign law, costs of monitoring arrangements, costs of legal proceedings for non-compliance) and to transaction costs associated with informal or relational aspects of trust (building common bonds and friendships, learning foreign languages and about foreign cultures). In terms of calculative trust all of these costs made to establish trust should be recovered by the lower transaction costs brought about by the reputation of being trustworthy. It should be mentioned that this building up of trust for trade relationships brings about positive externalities. Not only do the traders themselves benefit from it in the negotiation of a transaction, but the social welfare will also increase due to the benefits of specialization and scale effects which result from the additional transactions. This emphasizes that the provision of an efficient working (international) legal system and education in foreign languages and cultures has the character of a public good and should be considered a reason for involvement of the government.

The same applies to the building of a reputation of trustworthiness in a trust-based G2B relationship. Here the reputation of trustworthiness, e.g. because of being certified by the government, can have a value of its own for the firm that receives certification. The network externality is that the reputation becomes more valuable with the increasing number of firms that have been certified. That is because the information on the significance of the certification becomes more well-known. Not being certified will, in such cases, be seen as a negative signal, and will make it expensive for non-certified firms to solve the fundamental problem of exchange. So the value of keeping the reputation of trustworthiness can prevent firms from cheating in trust-based G2B relationships as the costs of loosing this valuable reputation are higher than the gains that can be obtained by cheating.
All in all, the literature on trust provides insights into some general mechanisms, which govern the relationship between exchange, transaction costs and trust. It can be summarized as follows:

1. Two types of trust can be distinguished: formal trust and informal trust. Both types are important in solving the game of trust.
2. Another distinction is between calculative trust and moral trust. Although at first sight calculative trust, which is considered to stem from rational behaviour, seems to be linked to formal trust, whereas informal trust can be identified with moral trust, this may not be true. In fact, many types of informal trust also stem from rational behaviour in the sense that cheating brings about less gain than the cost of loss of reputation. Here the solution of the game of trust is institutionalized as a repeated game.

3.2 Using reputation in solving the game of trust

The previous section already describes the important role reputation has in the game of trust. Reputation is considered as one of the sources of trust: someone who has a good reputation is very likely to be trustworthy (T3-Group, 2010). Reputation is defined by (Jøsang et al., 2007) as ‘what is generally said or believed about a person’s or thing’s character or standing’ and it can be considered as ‘a collective measure of trustworthiness (in the sense of reliability) based on the referrals or ratings from members in a community’. Kreps & Wilson (1982) point out that under imperfect information, reputation is a power tool to solve dilemma in the repeated games. Resnick et al. (2000) argue that reputation can reverse this flow and ‘unsqueeze’ a bitter lemon (corresponding to the lemon market of the adverse selection problem as we discussed before). With clear reputation markers, low-quality sellers get lower prices, leaving a healthier market with a variety of prices and quality of service. For example, sellers with stellar reputations may enjoy a premium on their services; some users may be willing to pay for the security and comfort of high-quality services.

Furthermore, Resnick et al. (2000) suggest that reputation systems can solve the problem of dealing with strangers in online environments. A reputation system collects, distributes and aggregates feedback about participants’ past behaviour. Reputation systems can be called collaborative sanctioning systems to reflect their collaborative nature, and are related to collaborative filtering systems (Jøsang et al., 2007). The reason why explicit reputation systems are so important for fostering trust among strangers are twofold. First, when people interact with one another over time, the history of past interactions informs them about their abilities and dispositions. Second, the expectation of reciprocity or retaliation in future interactions creates an incentive for good behaviour. An expectation that people will consider one another’s pasts in future interactions constrains behaviour in the present (Resnick et al., 2000). Though few producers or consumers of the ratings know one another, these systems help people decide whom to trust, encourage trustworthy behaviour and deter participation by those who are unskilled or dishonest.

However, the power of the reputation effect depends on the nature of one’s opponents: notably on whether they also seek to acquire a reputation. In the G2B relationship building, as there are different types of businesses (reputable and opportunistic) existing in the market, the government needs to take the trust-based interaction with businesses as a long-term repeating game and make sure that in equilibrium the gains of violation will be lower than the cost of losing their reputation, thus negative gains for cheating.

3.3 Different solutions to the game of trust: control-based vs. trust-based governance approach
As described earlier, in modern government-to-business interactions trust-based regulation and relationship building can be much more effective and efficient than the traditional control-based regulations in minimizing the transaction costs. Moreover, deploying the instrument of trust is fundamentally important for building a more collaborative and friction-free G2B relationship. However, carrying out this concept is not as straightforward as one might expect. If it is not designed and implemented correctly, potential financial and social loss can be caused due to moral hazard and adverse selection problems caused by information asymmetry between the government and businesses.

In order to overcome the abovementioned problems, government can deploy mainly two types of governance approaches: one is via a more traditional approach of command & control-based regulation [also referred as hard law/regulation, see (Abbott & Snidal, 2003; Skjærseth, Stokke, & Wettestad, 2006)], and the other is via a much novel approach of trust-based regulation [also referred as soft law/regulation, see (Chinkin, 1989; Kirton & Trebilcock, 2004)]. Das & Teng (1998) did extensive literature review and suggested that control and trust are two key sources of confidence in building partner cooperation. Control is an important concept in management; essentially control can be treated as any process in which one party affects the behaviour of others. Control can be seen as ‘a regulatory process by which the elements of a system are made more predictable through the establishment of standards in the pursuit of some desired objective or state’ (Leifer & Mills, 1996). Besides control, trust can be seen as a second source of confidence in partner cooperation. As organizations developed close bonds over time and form a positive attitude regarding each other's reliability, trust can be considered as the degree to which the trustor (principal) holds a positive attitude toward the trustee's (agent) goodwill and reliability in a risky exchange situation.Obviously, in the G2B relationship, the more the government believes in the goodwill and reliability of the trustee (businesses), the more confidence in cooperation will be harboured.

Gribnau (2008) argues that the heart of the governance approach is a shift away from hierarchy to networks with continuing interaction between interdependent actors in order to exchange resources and negotiated shared purposes, problems, and solutions. The collaborative nature of the new governance is conveyed in the move from command and control to negotiation and persuasion. Thus, a vertical command and control approach may not suit a world of horizontal network relationships characterized by pervasive interdependence, such as G2B interactions in international trade.

Given examples in the Tax & Customs Administration (TCA) domain, regulations such as ‘transaction-based auditing’ and ‘100% scanning’ can be seen as (strict) control-based regulation; while the emerging concept of the ‘system-based auditing’ and ‘horizontal monitoring’ (also referred as ‘horizontal supervision’ in the text before 2007) are examples of trust-based regulation.

- **Control-based regulation**

*Transaction-based auditing* is a traditional approach to auditing that is highly dependent on physical checks. In the traditional way of import/export checking, the outgoing pallets are compared with the information reported by the company about the transaction. Thus the checks are made on the level of transactions. While reporting the results of a single business, separate data sets are generated to comply with a push-based method of reporting to governments and/or other parties. A hierarchical vertical comply structure is created using separate information systems for upstream reporting to various governmental agencies such as the TCA and statistics office. Traditional source documents such as purchase orders, invoices and checks are used to perform a manual audit, which is very time-consuming.
100% scanning is an extreme example of transaction-based auditing. According to the World Shipping Council (2007), ‘100% scanning’, or ‘100% container inspection’ is required by the 9/11 Commission Recommendations legislation, effective since July 2012, that all maritime cargo containers being imported into the United States must be ‘scanned’ at foreign ports of loading or they will be denied entry into the country. The legal text is ‘A container that was loaded on a vessel in a foreign port shall not enter the United States (either directly or via foreign port) unless the container was scanned by non-intrusive imaging equipment and radiation detection equipment at a foreign port before it was loaded on a vessel.’ However, this requirement was opposed by the Department of Homeland Security (DHS), Customs and Border Protection, present and former government security experts, the U.S. Chamber of Commerce, all major cargo shipper organizations, the ocean carriers transporting the cargo, as well as the European Commission and the governments of America’s trading partners. The US Government Accountability Office (GAO) report criticized this legislation as ‘a global disaster’ and that blanket scanning is not only bad for trade but also hinders the ability of the international community to improve supply chain security worldwide (GAO (United States General Accounting Office), 2008).

- Trust-based regulation

However, if companies have self-consciousness about their own problems and risks, and instead of being audited in a traditional way at a transaction level, they can enter a trust-based agreement with the TCA that the auditing can be done on simplified way on system level. The European Commission has developed the so-called System-Based Auditing (SBA), which is a holistic approach to supply management that introduces ‘trust’ at transaction level based on enhanced control at the system level.

System-Based Auditing involves the assessment of the adequacy of financial, management, ICT and legality controls in operation to mitigate the risk within the system and ensure best value. Typically, these controls are enabled by IT such as ERP, tracking and tracing systems, surveillance cameras etc. One way for companies to convince the authorities that they are in control is to show how IT is used by the company to control its operations. This has even led to a new approach in auditing, the so-called System-Based Audit approach. Based on observations of Ha (2005) and European Commission (2007b), we define the System-Based Auditing as: System-Based Audit is an audit that relies on an in-depth evaluation of the internal control systems (IT and management) of the audited company. It deploys a risk-based approach and applies extensively the information system and Computer aided auditing technique during the auditing process. Instead of control on individual business transaction, System-Based Audit applies control to the management and accounting systems of the company including assessment of the adequacy of financial, management, ICT and legality controls in operation to mitigate the risk within the system and ensure the best value. Contrast with the traditional audit approach where each individual business transaction of a company is checked, in system-based audit the IT systems that enable business processes are checked. Nevertheless, a systems-approach is more than just the simple use of ICT systems. Integration of the IT into internal control and management system of a company is the key.

Horizontal monitoring is an on-going project of in the Netherlands to carry out of the trust-based control by the Dutch Tax and Customs Administration (Dutch TCA), which intends to carry out supervision based on the confidence it has in the businesses that are worthy of that confidence (Dutch Tax and Customs Administration, 2006). Horizontal supervision aims to reduce vertical supervision (transaction-based control) that available capacity can be deployed to deal with other, less compliant, taxpayers. This means that the Dutch TCA is aiming at achieving closer cooperation with enterprises, organizations and other non-governmental bodies. This form of cooperation is known as ‘horizontal supervision’ and it may be laid down in the form of mutual agreement, which may result in greater efficiency for all parties concerned. By concluding such agreements manpower can be released, which the Dutch TCA can then go on to use to reinforce the supervision of other groups of taxpayers. Horizontal monitoring entails mutual trust between the taxpayer and the tax administration, clearer articulation of each party’s responsibilities
and means of enforcing the law, and the establishment of and compliance with reciprocal arrangements (Gribnau, 2008). Certification and the introduction of the AEO are currently considered as types of horizontal supervision, which we will give detailed discussion in the following sections.

As argued by Den Butter, Groot & Lazrak (2007), control-based and mandatory standard/regulation can result in the removal from the market of all products that do not comply with the minimum control requirement. This results in (if the requirement is set high enough) sufficient quality of supplied goods. Trust-based and voluntary adopted regulation in combination with effective (certification) labelling\(^2\) can provide buyers with sufficient information on quality differences in a situation where both low and high-quality products are supplied. Therefore, both control and trust-based regulations are required, in a vertical and horizontal way (like a jigsaw puzzle) of safeguarding our trade environment. Furthermore, proper designing and implementing regulations can make information more symmetric and less incomplete, which may take away the problem of asymmetric information identified by Akerlof (1970), thus reducing the transaction costs and facilitating high volume and better transactions.

### 3.4 Comparison of transaction cost: control-based vs. trust-based regulation

By combining the perspective of three types of transaction costs from the principal/agent with our aforementioned two types of governance approach applied in the Dutch Tax and Customs Administration (namely control-based and trust-based regulation), we undertake a comparative analysis\(^3\) showing what the expected cost changes can be by shifting from control-based regulation to trust-based regulation. As shown in Table 1, trust-based regulation may have clear advantages\(^4\) over the traditional control-based regulation in minimizing the transaction costs.

<table>
<thead>
<tr>
<th>Regulation costs</th>
<th>Control-based regulation</th>
<th>Trust-based regulation</th>
<th>Expected changes (C (\rightarrow) T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring costs (Government)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Cost of administration &amp; control system building and implementation</td>
<td>++ (Building new administrative system &amp; scanning tunnel)</td>
<td>+ (Linking existing gov. system with business and rely on business’ own control system)</td>
<td>-</td>
</tr>
<tr>
<td>- Hours and salaries of government officers</td>
<td>++ (Massive 100% physical scanning of containers on transaction level and extensive data analysis)</td>
<td>- (Lightweight auditing based on system level, IT facilitation with manpower release)</td>
<td>- -</td>
</tr>
</tbody>
</table>

\(^2\) Negative labels can be made mandatory by the government for producers of goods that do not comply with a standard. Positive labelling is used by firms to enable the consumer to distinguish (often more expensive) products that comply with high standards.

\(^3\) With ‘+’ indicating potential increase for corresponding cost, and ‘-’ indicating potential decrease in the cost.

\(^4\) Under the condition that it is well implemented without distortion.
<table>
<thead>
<tr>
<th></th>
<th>+ (Unable to detect opportunistic behaviour of businesses causing tax lost, and breaching of trade security)</th>
<th>- (Fraud behaviour is corrected by businesses themselves as driven by their self-consciousness about its internal control level)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bonding costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(Businesses)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Business cost for</td>
<td>++ (Build new transaction-based administration &amp; control system )</td>
<td>- (Maintaining and updating existing business systems for in-control signalling &amp; better government monitoring)</td>
<td></td>
</tr>
<tr>
<td>compliance management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Hours and salaries</td>
<td>++ (Information is obliged send to government on each transaction base, mostly by paper, much manpower required)</td>
<td>- (Information can be sent before transaction and in patch audited every month, done electronically, minimum manpower required but need highly skilled personal)</td>
<td></td>
</tr>
<tr>
<td>paid to handle</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>administrative</td>
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<tr>
<td>burden</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Financial cost due</td>
<td>+ (Retributions: taxes, premiums fines, legal dues; loss for losing reputation)</td>
<td>- (Negotiable with government if intentions for future improvement)</td>
<td></td>
</tr>
<tr>
<td>failed compliance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Societal cost of the</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>residual loss</td>
<td>( Residual loss for both government and businesses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Cost of losing</td>
<td>+ (Worsened competitiveness comparing to international environment, due to high cost of strict control)</td>
<td>- (Trust-based and low-cost environment enhance competitiveness for both national government and business)</td>
<td></td>
</tr>
<tr>
<td>competitiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Cost of losing trust</td>
<td>+ (Distrust among parties, difficulties in negotiation and collaboration)</td>
<td>- (Trusted and easy-going talk between parties)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Costs of government</td>
<td>+ (Cost resulting from the difference between government regulation and the government’s targets)</td>
<td>- (Negotiable and collaborative characters make the regulation a mutual task for both side and improving through time)</td>
<td></td>
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<tr>
<td>policy mismatching</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Netted sum</strong></td>
<td>++</td>
<td>- -</td>
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</tbody>
</table>

| Table 1. Transaction cost comparison of trust base regulation and control base regulation |

In Table 1, we assess different cost perspectives to carry out both types of government regulations. The government can use this analysis as part of the operation management, design and execute policies bringing net social benefit far surpasses social cost (e.g. control and administrative burden), thus create a ‘win-win’ situation.

To sum up, trust and reputation play important roles in the G2B relationship building. A trust and reputation-enhanced G2B relationship can dramatically decrease the transaction costs of both government and business and can have a positive social impact. Nevertheless, trust shall not be given as default; trust
can be seen as a game of coordination and with calculative characteristics. If trust-based government policy is not designed and implemented properly, problems like adverse selection may occur, worsening the trade environment and even increasing the transaction costs. However, remedies and solutions exist. In transaction cost economics, governance can be based on private and legal ordering mechanisms (safeguards) to protect against opportunistic behaviour (O.E. Williamson, 1985), two types of regulations (control-based and trust-based) are being utilized by the government. The game of trust can also be tackled by enhancing the reputation effect of the policy, where in the repeated game the gains of cheating are lower than the cost of loss of reputation. In the following section we discuss these issues in detail with a real life case study of AEO certificate assessment in the Netherlands.

4 The case of AEO

Designing and implementing traditional control-based regulation is not an unfamiliar topic for EU governments; however, the discussion of trust-based regulation with reputation as a median is currently under the spotlight: What are the costs and benefits of trust-based regulations in comparison with control-based regulations and how can they be carried out effectively? We elaborate these issues in this section with a case study of Authorized Economic Operator (AEO).

4.1 Authorised Economic Operator (AEO): what, how and why

The Authorized Economic Operator (AEO) certificate may serve here as a good example of the use of trust and reputation in order to lower the implementation costs of regulation in a G2B relationship. Over the last few years, especially in response to the terrorist attacks in the USA on 11 September 2001, there has been an avalanche of trade security motivated control regimes. For example, the US-led C-TPAT (Customs-Trade Partnership Against Terrorism) and CSI (Container Security Initiative) programmes; the European Union’s Security Amendment to the Customs Code (648/2005/EC); the ISO 28000 standard for supply chain security systems; and the standards to secure and facilitate global trade framework of the World Customs Organization (WCO). The aim of these supply chain security programmes is to identify security risks before goods move. Underlying them is the desire of government agencies (such as customs administration) to make efficient use of limited enforcement resources, enhance controls at the border, ensure that wealth-generating trade continues while extending controls up and down the supply chain (Grainger, 2007).

However, such a high level of trade control entails a high level of cost. Transaction costs arising from Customs activities are enormously high, reaching as much as 15% of the total value of goods traded. It is estimated that 1% reduction in transaction costs related to customs activities would yield gains of $ 40 billion worldwide (OECD, 2007; Willmot, 2007). Global governments are trying to figure out a way to tackle this paradox, with effective control but lowered administrative burden from Customs activities.

Under these circumstances, the concept of the Authorized Economic Operator (AEO) has been developed within the EU. The idea of AEO is that Customs Administration in each EU member state can establish partnerships with private sectors and certify them with AEO certificates. The involvement of the private companies in AEO will enhance the safety and security of international trade and the certified AEOs will enjoy tangible benefits such as fast customs clearance and simplified procedures (European Commission, 2007a). AEO is in fact a new, enhancing Customs control instrument (by applying risk-based pre-selection of trusted trade parties and IT facilitation) without introducing any extra burden (but rather giving relief from the existing administrative burden) for both business and government. More specifically, AEO reflects the ‘win-win’ philosophy that governments delegate major control
responsibilities to the collaborative and trusted businesses themselves, while in return these businesses benefit from trade simplification.

The collaborative relationship means to change the G2B relationship from the traditional ‘control and command’ to a more ‘trust-based’ relationship, which includes replacing the traditional labour intensive customs controls with businesses’ ‘self-control’ on customs issues. To realize this transformation, the EU Directorate-General of Tax and Customs has made a major effort to develop and promote the concept of the Authorized Economic Operator (AEO) for European businesses (European Commission, 2007a). The underlying idea is that if businesses can prove to the TCA that they are in control of the tax and security aspects of their own business processes, then they will be AEO certified by the TCA, which brings them the benefits of fewer physical inspections, fast customs clearance procedures and trade facilitation by the TCA. The aim is to achieve a win-win situation for both government and businesses, with trade simplification and lowered administrative burden.

The idea of AEO is that Customs Administration in each EU member state can establish partnerships with private companies and certify them with the AEO status. The involvement of the companies in AEO will enhance a win-win situation for the safety and security of international trade: on the one hand government can do fewer physical checks and use limited personnel for other tasks, and on the other hand the certified AEO companies will enjoy tangible benefits such as fast customs clearance and simplified procedures (e.g. containers of AEO companies will not be inspected by the customs when they pass the EU border) (2005). AEO can be seen as an extra Customs control instrument that enhances the Customs control while not introducing an extra control burden for the government. More specifically, it is a form of government that delegates certain control tasks to collaborative businesses and in return gives these businesses trade simplification.

A critical issue here is that the AEO certificate is quite unlike other governmental requirements; it is voluntary rather than mandatory: ‘It requires … no obligation for economic operators to become AEOs, it is a matter of the operators’ own choice...’ (European Commission, 2007a). Companies can make their own decisions on whether or not to qualify for the AEO certificate, based on company strategy. In addition, in spite of the facilitations AEO companies may have, the AEO certificate is not cost free. Companies have to make considerable investments (around 50K Euros for small companies, up to a couple of million Euros for large companies) to achieve and maintain the certificate. Hence, we can see AEO as a free will certificate ‘market’, with entry cost and associated benefit.

The problem raised here is that if the government cannot effectively differentiate companies from the two streams, a similar adverse selection problem to that in the second-hand car market may occur. The ‘good’ (trustworthy and compliant) companies are not willing to join when they see no fair value for them to participate: as one of the interviewed companies (a Netherlands-based international brewery) said ‘We are already a compliant company with a good reputation, and our current procedure is simpler than that of others anyway, why should we invest more to get the AEO certificate?’. On the other hand, the ‘bad’ (opportunistic and fraudulent) companies may see opportunistic benefits (with less checking and simplified procedure may create chance for easier way of committing fraud), relatively less compliance cost than ‘good’ companies (they can make a false compliance report to show the fulfilment of the requirements), and thus are more willing to get the certificate (See Figure 2).
The original aim of the government is to focus control effort on potentially fraudulent companies, to limit the number of physical inspections and to simplify the procedures for trusted companies with an AEO certificate. As indicated in the interview with the Dutch Tax and Customs Administration (TCA): ‘If companies are already in good control themselves, why should we waste our resources to exert extra control on them?’ However, the consequences of the adverse selection problem may differ from the government’s expectation. The situation may even deteriorate: if more ‘bad’ companies obtain the AEO certificate but commit fraud nevertheless, a market of ‘lemons’ will be created and the public will lose their trust in the government, thereby causing more societal loss.

4.2 Case study: AEO certificate assessment in the Netherlands

On April 16, 2008, the first AEO certificates awarded to 19 Dutch companies. The introduction of the certificate provides both customs and businesses an opportunity to work more efficiently. Though a great effort has been made, due to lack of experience in carrying out trust-based regulations, and the vagueness assessment guideline itself, there still exist a big gap of common understanding between businesses and government for AEO implementation. The Netherlands is one of the leading countries in international trade and the Dutch TCA is recognized as one of the most innovative ones in the world, especially in the field of trade facilitation. The Dutch AEO certificate assessment practice is perceived to be well-established and effective by European Commission.

In our case study we investigate the Dutch AEO assessment approach; concerns, problems perceived by both parties and plausible solutions for tackling the issues. We undertook in-depth interviews with the Dutch TCA on their general AEO assessment approach. Semi-structured interviews were used as the primary method for the data collection (Eisenhardt, 1989b; Yin, 2003). We conducted seven interviews with the Dutch TCA and attended one auditing visit with the Dutch TCA to an AEO applicant company (an international petrochemical company, referred as PETRO). As PETRO has a lack of knowledge about application procedures and requirements of the AEO, it hired a large consulting firm (Deloitte) to assist in the assessment. In total we interviewed ten persons from the Dutch TCA and three from the company. The interviewees typically have an auditing or EDP auditing background. Interviews were tape recorded with the participants’ prior agreement, then transcribed for participants’ feedback and our analysis. We discovered that IT-enabled risk management may effectively eliminate the information asymmetry for G2B relationship building. The Dutch TCA has adopted risk management as part of their audit procedures.

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5 Including developing the most recent AEO guidelines to assist the AEO certification procedure (European Commission, 2007a)
They view it ‘as a structured process, consisting of well-defined steps, according to which a systematic identification, analysis, prioritization and treatment of risks is taking place, so as to support improved decision-making’ (European Commission (Fiscalis Risk Analysis Project Group), 2006). The so-called IT-enabled risk management has two meanings: first it means that information technology and information systems are the main focus for the assessment, and second it refers to automated IT support, in the form of decision support systems, for the general risk management approach. In this case, the Dutch TCA assesses the IT maturity level of the companies, and uses it as one of their major decision criteria for AEO certification. Moreover, the Dutch TCA deploys as much IT facilitation as possible to make the risk management more efficient and effective.

The key focus of our case study is to find out how the Dutch government carries out the AEO assessment regarding it as a novel trust-based regulation. To map our research findings in a theoretical framework, we adopt inter-organizational framework of trust defined by Sako & Helper (1998). Three types of trust are distinguished:

- **Contractual trust** refers to a belief in a partner’s willingness to carry out its contractual agreements.

- **Competence trust** is related to the perception that a partner possesses the capabilities of doing what it intends to do and requires a shared understanding of professional conduct and technical and managerial standards.

- **Goodwill trust** refers to the assumption that the partner will make an open ended commitment to take initiatives for mutual benefit while refraining from taking unfair advantage.

We argue that in order to effectively deploy trust-based instrument of regulation (such as granting an AEO certificate), one needs to have a proper evaluation scheme on counterparties’ behaviour, competence and goodwill. The following major findings emerge from our case study.

### 4.2.1 Less focusing on the contractual context of AEO certification in the Netherlands

Christensen & Gressgård (2002) argue that governance of cooperative arrangements involving exchange of money and products/services has to be based on clearly defined contracts, and such relations are therefore more often regulated by detailed contracts than are other types of relationships. However, in the G2B relationship, if the government decides to adopt trust-based regulation rather than control-based regulation, the focus shall not be at the contractual level. In the traditional control and demand method of government regulation, companies place their emphasis on the contractual document and legal text to comply with the government. Each violation or even a slight (unintentional) infringement of the contractual compliance will result in a severe sanction/fine. Businesses are more sceptical about initiating any cooperative relationship with the government in such a case. On contrary, under the trust-based AEO certificate, companies will have their own autonomy in applying decisions and in is compliance level. There have been three levels of certificate of compliance defined by the AEO guidelines [see, (European Commission, 2007a)]. AEO applicant companies can voluntarily apply for the suitable level of certificate according to their own circumstances.

Therefore contractual level trust building seems less important for AEO in the Netherlands. The Dutch authorities rely more on the other two types of trust for the AEO assessment, which we consider in the following sections.
4.2.2 Competence trust signalling and the use of IT

Competence trust refers to one’s perception of whether a partner is capable of performing the activities that it is responsible for according to the cooperative agreement. It is important to be well informed about the potential partners before entering into agreements. This is particularly true for companies that do not have a strong brand name and reputation (e.g., SMEs). It is argued that provision of information by either of the parties has a significant effect on enhancing trust and reducing opportunism (Sako, 1998). O’Reilly (1983) indicates that the quality of decision making increases with the decision maker’s information level. However, if the quality of information itself can hardly be evaluated, information behaviour (information seeking and information encountering activities) can have important signalling effects on observers (Feldman & March, 1981). ‘Signalling’ has been considered as one of the most important strategies of solving asymmetric information problems in the job market and capital market, e.g., (Gertner, Gibbons, & Scharfstein, 1988; Spence, 1973). The general idea behind signalling is that one party (informed party) conveys some meaningful information (signal) about himself to another party (under-informed party). Due to this extra information, the under-informed party is able to classify the counter parties as good or bad and make sensible selection decisions. ‘Screening’ is another way of dealing with adverse selection, but in contrast to signalling, the under-informed party moves first. It means that the under-informed party can induce the other party to reveal their information, for instance by providing a menu of choices in such a way that the choice depends on the private information of the other party (Rothschild & Stiglitz, 1976). An example in the job market, a job candidate will send his CV with education level and working experience to the employer to signal that he is the most suitable candidate; at the same time, employers will arrange their own interviews and assessment procedure to screen the candidates and test their abilities.

Application of advanced IT may serve as an effective way of signalling for businesses to indicate their types, which will enable the government to effectively differentiate ‘good’ from ‘bad’ companies for certification. One of the major concerns for the government in the AEO certification is the supply chain safety and security. Gutierrez and Hintza (2006) argue that supply chain security can be implemented via facility management, cargo management, human resource management, information management and business network and company management systems. IT facilitation can enhance all five perspectives:

1) For facility management, the use of IT has greatly improved inventory management and control. IT-based access control procedures and technologies (e.g., Public key infrastructure (PKI) security, smart cards) enhance facility protection and monitoring functionality;
2) For cargo management, the use of cargo tracking and tracing and anti-tampering technologies (e.g., bar code, Radio-frequency identification (RFID), Global positioning system (GPS) tracking, smart container seals) and cargo inspection technical solutions have enhanced cargo management;
3) For human resource management, most modern organizations apply Enterprise Resource Planning (ERP) system for better HR management, information dissemination and responsibility assignment;
4) For information management system, real time information recording and secure data exchange have been adopted by many organizations;
5) For business network and company management system, most companies have already built up a company security management system and business partner evaluation system for better risk management.

IT-based control for supply chain security can significantly lower labour costs and data error rates associated with scanning items and extended identification to individual items. The systems can provide quality information that enables companies to track literally billions of objects across the value chain, increasing the efficiency of individual processes, improving asset utilization, increasing the accuracy of forecasts, and improving the ability of companies to respond to changing conditions of supply and
In our PETRO case study we find that there are two main signals that a company can send to the government to prove their security status: 1) the use of integrated IT applications for supply chain management (e.g., well implemented ERP system, just-in-time (JIT) programs, electronic data interchange (EDI), and point-of-sale data sharing programs) and, 2) the use of IT applications for security control (e.g., application of GPS, Radio Frequency Identification (RFID) and smart seal technology). To apply for AEO status, companies must first fill in a self-assessment. Part of the self assessment is a risk analysis, detailing the security threats and their impact for a specific company. In addition to the above mentioned general IT systems, companies can also run the self-assessment via an automated toolset, which is yet another enhanced signal to the government. In our case, an automated self-assessment tool ‘Digiscan’, developed by Deloitte, was used. The Digiscan tool is an expert system that is based on the AEO guidelines and criteria issued by the EU. It is a rule-based system, to supports companies to identify cases of potential Customs-related risks in their own organization. The system consists of facts, decision rules, and a rule interpreter. All facts are stored in a database and the evaluated risks are described in abstract mathematical rules. A rule consists of one or more facts (preconditions) connected with each other and actions. Rules in the form of IF ‘x’ THEN ‘y’ are particularly suitable. These rules are the basis for the computer-assisted analysis of risk cases. Digiscan supports the company’s AEO self-assessment in an interactive question-answering style. The system generates, based on the AEO Guidelines, a sequence of questions that help the company to improve the quality of their self-assessment. As Digiscan supports a risk-based, systematic and objective description of the business, the quality of the business self-assessment can be perceived better than without it. The end result of the Digiscan supported self-assessment is a so-called summary result which ranks the company on a 1-5 scale for various risk indicators. This summary can be used by the Dutch TCA for further evaluation. Currently, the value of automated tools to assist in self assessment is explored. Potentially, such tools could enhance the reliability of the self-assessment. Using the tool would then count as a signal that the company takes compliance seriously. However, the current version of the tool, an automated questionnaire, may not be sufficient for the Dutch TCA to conduct a thorough risk analysis and self-assessment. Therefore, the Dutch TCA and Deloitte are currently discussing adjustments, both to the tool and to the way its evidence is being used in auditing.

Via IT enabled system and implementation, businesses in the Netherlands can signal themselves as trustworthy and as the same time have the capability to carry out their own control, the Dutch TCA thus uses this criteria as one of the major judgement for the AEO assessment.

4.2.3 Competence trust screening through risk management by the government

Instead of passively receiving ‘signals’ from applicants, the Dutch TCA also actively screen companies by including the specific IT requirements in their risk management approach that all applicants have to fulfil in order to get the certificate. Das & Teng (2001) argue that risk is the variable that connects trust and control, that trust and control jointly determine one’s perceived total risk. The risk-based approach to trust has gained increasing acceptance in literature (Gambetta, 2000; Mayer, Davis, & Schoorman, 1995). Williamson (1993) suggest that we can even treat trust as a subset of risk that trust is a balance of benefits / risks and the goal is to maximize profits and to minimize costs. Risk can be referred either specifically to uncertainty, which means the variability in outcomes around the expected values or to the expected value of losses, which means the expected value of losses to be paid by the insurer (the expected loss) is high (Harrington & Niehaus, 1999).
In our study the Dutch TCA expects major two supporting role of IT for the AEO applicant companies to eliminate risks; namely (1) **Real-Time Monitoring** and (2) **Information Sharing.** Real-time monitoring means that IT is used to monitor continuously the location and state of the cargo. Information sharing is done via a service-oriented architecture that gives the Dutch TCA (possible) direct access to the database of the owner and the carrier, to read the stored data about the container and relevant commercial information. With this type of IT application referred by a company, the government will have confidence that containers from such a company are unlikely to be used to smuggle goods, and hence they do not have to physically inspect these containers at the border.

The extent of controls the trust that the government entitles to the business should be proportionate to the level of the assessed risk. A well-defined risk management approach is important for the government to determine where the greatest areas of exposure to risk exist, and supports management decisions on how to allocate limited resources effectively. Combining with the risk management approach, the Dutch TCA can focus customs’ control activities with their limited resources, in particular, on specific risks that are not sufficiently covered by measures taken by the businesses. Therefore, they have to assess the economic operator’s organization, processes, procedures, administration, and so on. The detailed risk management approach of the Dutch TCA is discussed in (Liu, Tan, & Hulstijn, 2009). It includes the following steps: (i) Determine fulfilment of formal (legal) conditions, (ii) Understand the business, (iii) Clarify the customs’ objectives, (iv) Identify risks, (v) Assess risks, (vi) Field auditing, (vii) Respond to risks, (viii) AEO status granting and (ix) Evaluation, facilitation and monitoring. The combination of specific IT requirements and risk management approach provides the Dutch government with a good screening mechanism for selecting the right companies in the pool, thus decreasing the chance of market failure caused by information asymmetry.

![Figure 3. IT enabled risk management for AEO certification countering adverse selection effect](image)

With the risk-based and IT-enabled screening from the government side and internal control signalling from the business side, the adverse selection is tackled. Figure 3 presents the changes: for the ‘bad’ company (A), as the signalling costs of implementing the required IT solution will outweigh the potential fraud benefit, it will decide not to apply for the AEO certificate. Anyhow, if the ‘bad’ company (B) would

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7 The Dutch DTA will not require specific IT solutions, to avoid being biased towards specific IT vendors, but they could recommend generic types of IT requirements as we discussed above.
like to have simplified tax and customs procedure and decides to apply for the AEO certificate, it must be compliant with the IT requirements of the government. Moreover, the implementation of the advanced IT solution itself will minimize the fraud possibilities of the ‘bad’ companies and may finally transfer the ‘bad’ companies to ‘good’ ones. The market can correct itself such that ‘good’ companies join and the ‘bad’ ones may leave the market.

4.2.4 Goodwill enhancing via collaborative and proactive G2B interactions

Signs of goodwill (moral responsibility and positive intentions toward the other) are also necessary for the trusting party to be able to accept a potentially vulnerable position (risk inherent). The goodwill dimension of trust includes positive intentions toward the other, and positive intentions appear as signs of cooperation and proactive behaviour. The important point is that, over time, it is the actual behaviour of the parties that determines their reputation of being trustworthy (Sako & Helper, 1998). According to the European Commission (European Commission, 2007a), in order to assess the AEO status the customs audit will rely on the informational rather than physical activities to form the core of security assessment. Results from our case study indicate that the aforementioned information is mainly achieved via proactive interactions between the government (DTCA) and the business (PETRO) as described in Table 2. Via such close interactions, the actual behaviour of the business will be perceived by the government. (T3-Group, 2010)

<table>
<thead>
<tr>
<th>Government (DTCA) requirement</th>
<th>Business (PETRO) initiatives and responds</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Show us your risks (risk source + drivers)</td>
<td>● Run self-assessment (in our case, based on automated tool set of Digiscan) to identify risks (risk source + drivers)</td>
</tr>
<tr>
<td>● Show us your risk mitigating strategies</td>
<td>● Identify and document existing risk mitigating strategies</td>
</tr>
<tr>
<td>● Show us how you apply IT and internal control procedure to operationalize your business process and mitigate your risks based on the AEO guidelines with regard to: 1) Facility management, 2) Cargo management 3) Human resources management 4) Information management and 5) Business network &amp; Company management systems</td>
<td>● Identify IT and internal control facilitation of the supply chain security based on the AEO guidelines with regard to: 1) Facility management, 2) Cargo management 3) Human resources management 4) Information management and 5) Business network &amp; Company management systems</td>
</tr>
<tr>
<td>● Show us your internal (internal control) approach and inter-organizational (with supply chain partners) approach for supply chain security</td>
<td>● Document procedures in internal control and supply chain partner management system with regard to supply chain security</td>
</tr>
<tr>
<td>● Show us the remaining risks</td>
<td>● Determine remaining risks</td>
</tr>
<tr>
<td>● Show us how you plan to deal with the remaining risks (indicate documented IT control application)</td>
<td>● Plan/implement additional measures for the remaining risks</td>
</tr>
<tr>
<td>● In the future, open your ERP system allow DTCA to extract data from it</td>
<td>● In the future, open part of ERP system or extract a sub-system (without confidential commercial info.) and allow DTCA to read from it.</td>
</tr>
</tbody>
</table>

Table 2. G2B interactions during the AEO assessment procedure
Clearly, the government to business (G2B) interactions on the AEO auditing are in line with our earlier discussion of system-based auditing. The AEO interaction is different from the traditional relationship of government and business which is based on one-sided government control. The AEO is oriented towards trusted relationship building, where businesses prove to be ‘in control’ by themselves. The self-assessment run by the company is of great importance for the AEO assessment, as the DTCA mainly relies on the self-assessment summary result to identify the risks from the company side. In this case, PETRO applied an automated self-assessment tool (Digiscan) to prepare their self-assessment report. Digiscan provides a detailed set of standardized questions and automated risk-based scoring to assist companies assess their risks. In the next two sections we will focus on the findings with regard to the important role that information technology (IT) plays in the AEO assessment. We find that the emerging information technology imbedded in the business processes as well as in the auditing procedure can be used to reduce monitoring and bonding costs for both government and business, thus to enhance the sustainability of the coordination equilibrium in the game of trust and facilitated international trade.

5  **Policy recommendations: more government involvement in enhancing the reputation effect of AEO**

To enhance the reputation effect of AEO, the government needs to make the AEO certificate as a kind of quality standard, in such a way that the AEO certificate can be seen as a positive signal for qualified management and trade procedure in the market. When companies do business with each other, the AEO certificate should be able to guarantee that each AEO-qualified company satisfies the criteria listed. As the AEO certificate shows that the Customs authorities can trust a company, this will also give a signal to other companies that they can trust each other with the same certificate.

Four factors may influence the reputation effect of AEO:
- The popularity (awareness) of the certificate in the market;
- The reliability of the certification authority;
- The effectiveness of the controls and
- The international recognition among Customs authorities

- **The popularity (awareness) of the certificate in the market**

When more companies choose AEO certification, there will be more awareness from businesses of the importance of the certificate, as well of what criteria they have to meet. This creates a restorative effect for the network externality of the certification. As an illustration, a certificate of which the assessment criteria are unclear will provide little information over the way in which a business should carry out its transactions, and thus give little information over the reputation of that business. However, when everybody is fully aware of the assessment criteria of a certificate, it will provide the desired trustworthy information over a business that acquires this certificate.

The government can play a role by leading this effect through information campaigns. In fact, the greatest benefit can be achieved if the certificate can be recognized by the entire industry. For the government, this forms a part of the utilization of the network externality of the certification, where the value is of such a certificate is greater if more businesses become certified. More companies certified leads to more awareness in the market and will result in a stronger reputation effect for the certification.

- **The reliability of the certification authority**
The reputation effect also depends on the reliability of the certification authority. In the case of the European-wide AEO certificate it is located at national level of the Customs authorities. If many corruptions and biased judgments are present at national customs authorities, the certificate will become a less effective tool for businesses to estimate and carry out trustworthy transactions with each other. Reliable and unbiased certification procedures backed up by the authority are necessary to make the AEO certificate function as a quality standard.

- **The effectiveness of the controls**

The same counts for the effectiveness of controls. If the conditions of an AEO certificate are not being controlled effectively, the ownership of such certificate will have less effect on the reputation of businesses. With effective control from the government side, it will be more difficult for the businesses to circumvent without being noticed. It is therefore also in the best interest of an AEO certified company to keep an eye on the trading conditions of their partners, as in the modern network society one violation of the standard in the chain will endanger the reputation of the whole network of certified companies.

- **The international recognition among Customs authorities**

Last but not least, the more customs authorities recognizing the AEO certificate, the larger the reputation effect will be on the businesses. Currently the AEO certificate is only an EU development, however, if it can be mutually recognized internationally (especially in the US, Japan and China), it will bring more value and benefit for the businesses. Not only will the reputational effect of the AEO be enhanced in the international scope, since more business operations will be covered by the certificate through mutual Customs recognition, but it will also increase the direct profit as a percentage of the total cost of applying for and maintaining a certificate. At the moment, it is still difficult to predict whether the AEO certificate will become a worldwide standard; if it does, it will reduce worldwide transaction costs significantly.

### 6 Conclusions

In this paper we have discussed major issues for G2B relationship building. We focused on the problems caused by the information asymmetry between the government (principal) and businesses (agent). We link the principal/agent model with transaction cost economics and distinguish three types of costs associated with the principal/agent character in the G2B relationship, namely monitoring costs by the government, bonding costs by the business sector and societal costs of residual loss if the targets of government regulation are not fully met. We clarify why the trust-based approach for governance is more transaction cost-effective than the control-based approach. However, we argue that a trust-based approach must be properly designed and institutionalized to minimize problems that may be caused by moral hazard and adverse selection. Good institutionalization is also needed to allow the game of trust to bring about a cooperative solution to the fundamental problem of exchange in the G2B relationship.

This paper elaborates these issues with an example of Authorized Economic Operator (AEO). On the one hand, a trust and reputation-based design of the AEO enhances security and control with less physical checking for the Customs; on the other hand, it may reduce the administrative burden and facilitate trade for the business. The major feature for designing and implementing the AEO certification is to institutionalize it as a repeated game of trust where reputation is built up in such a way that the sustainability of the coordination equilibrium in the game of trust is guaranteed by the high costs of loss.

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8 This is based on the assumption that the cost of obtaining and maintaining a certificate do not increase when the certificate is internationally recognized.
of reputation in relation to the gains of cheating. We further point out in our case study that the new ways of implementing IT systems and risk management can be used to build competency, goodwill and trust that reduce both monitoring and bonding costs, and hence decrease the total costs of a G2B relationship. Lastly, in order to make the AEO certificate a real success, we recommend there should be more government involvement in enhancing the reputation effect of AEO by increasing the awareness of the certificate in the market, enhancing the reliability of the certification authorities, improving the effectiveness of the controls and pushing the AEO certificate towards an internationally recognized standard. This government involvement is warranted as it can help to internalize the positive network externalities of AEO certification with respect to the reputation effect.

References


