Patent Protection in India: 
dealing with the threat of corruption

Models from Game Theory

ABSTRACT:
Patents are becoming increasingly important in the Indian economy, but their protection may be threatened by corruption. Generally speaking, corruption undermines the "rule of law", which is needed for adequate protection of patent rights, but it is unclear how the influence of corruption works in specific cases. This research project has investigated the situation in India and formulated game models to help answer the question: "How is patent protection in India threatened by corruption, and how can small and medium-sized enterprises in India deal with it?". After describing the total patent protection process (from filing the application to enforcing the verdict of an infringement case), two situations are selected for more detailed modelling with game theory. The constructed models provide more insight into the mechanisms of corruption and patent protection, and the resulting recommendations may serve as a starting point for any small enterprise getting involved with patent protection in India.

KEYWORDS:
patent protection, corruption, game theory, India, intellectual property rights, mechanism, judiciary, infringement.

Delft University of Technology
Faculty Technology, Policy and Management
Department Multi Actor Systems
Dr. Ir. B. Enserink
Dr. W. M. de Jong
Prof. Dr. Ir. W. A. H. Thissen

David Laurens Bijl
davidbijl@gmail.com
Executive Summary

This research project is concerned with the question "How is patent protection in India threatened by corruption, and how can small and medium-sized enterprises in India deal with it?".

A patent is the right, granted by the government, to exclusive use of an invention, for a limited period of time (usually 20 years). There is some discussion about the necessity of patents, but this research project goes with the traditional view that patent rights and their effective protection are an important motivation for inventors and entrepreneurs to strengthen the economy by innovating.

This research project broadly defines corruption as the intentional abuse of power and trust for personal gain, but focuses on specific types of corrupt behaviour that are prevalent in relation to patent protection, such as bribery / extortion, collusion, and breach of confidentiality.

The effective protection of patent rights is only possible if the general situation in the country can be described as being "under the rule of law". This expression means that the laws are more powerful than any individual in the country - no one can consider himself to be "above the law". Corrupt behaviour undermines the rule of law, and therefore threatens patent protection (among many other legal rights). India is one of a number of countries in which corruption seems to permeate all levels and sectors of society, which makes it worthwhile to investigate how exactly corruption could threaten patent protection.

The research itself consists of three types of activities. First a literature study was needed to specify the research question. After arrival in India, interviews and desk research were conducted in an iterative process, to get more information about how things work in India. Finally, the findings were used to construct a model of the total patent protection process, and two game theory models of the most important steps in that process.

Game theory is appropriate because it models strategic interaction, which is a common aspect of situations involving corrupt behaviour. The models from game theory are essentially qualitative, although numerical payoffs are sometimes used for clearer presentation.

The constructed model of the entire patent protection process encompasses everything from applying for a patent at the Patent Office, through pre-grant and post-grant opposition and legal battles over infringement, to the enforcement of the outcomes of infringement trials. Two situations or "arenas" are selected for game theory modelling: (1) the initial check at the Patent Office, whether the patent has any relevance for national security, and (2) a lawsuit over infringement of the patent before the regular courts.

Game Model 1: National Security Check

The national security check at the Patent Office is modelled as a two-level game. The players are the patent applicant, the controller of the local Patent Office, and the patent review committee of the Defense Research and Development Organisation (DRDO). It is assumed that the applicant is the true inventor, and that the patent is not related to national security in any way. It is also assumed that both government officials are inclined to demand bribes, because without this assumption there is no strategic interaction to model. Although there seems to be a fair chance of encountering a corrupt government official, one must keep in mind that there is no reliable estimate of this chance at present. In this situation, patent protection means that the application quickly passes this phase, without any extra costs, and moves on to the rest of the patent registration process. One factor enabling corruption to threaten patent protection, is the absence of appeal procedures against the decision of the DRDO. Another important factor is the possibility of setting a "trap", which is a sting operation that can catch a government official red-handed if he accepts a bribe. Although the real chance of a successful trap is unknown and difficult to estimate, the models show that it is
beneficial for the applicant if the real chance of a successful trap is high, while the DRDO and / or the Controller estimate the chance of a successful trap as very small.

The recommendations for this first arena depend on the type of applicant, who can either be committed to a zero-bribe policy, or is accustomed to paying bribes if its benefits outweigh the costs. For the type of applicant that is open to paying bribes, it is best to go along with the hints (for extra money) of the Controller (or the DRDO if it comes to that), and simply pay the bribe. The zero-bribe applicant, however, should hide his rejection of bribery for the Controller, but set up a trap instead (with the help of the Anti Corruption Bureau). If the trap fails, or if the Controller expects a trap, the applicant will face the DRDO, and should convince the DRDO that there is no way that a bribe will ever be paid. However, it is of utmost importance that the applicant does not offend the DRDO in any way, because the final decision of the DRDO (to release or detain the invention) may depend for a large part on their feelings towards the applicant.

The models indicate that both types of applicants have more or less the same chances of experiencing the whole spectrum of possible outcomes, from getting a quick approval to losing the whole invention (if the DRDO files it as "top secret"). The zero-bribe type applicant appears to have more control in the interaction with the Controller, but for the bribe-paying type applicant it is easier to avoid extreme outcomes in the interaction with the DRDO.

**Game Model 2: Infringement Court Case**

The second situation that is modelled with game theory, is the legal battle over infringement of the patent. This game is played out between the judge, the patent holder, the infringer, and both parties' lawyers. It is assumed that the patent holder is the rightful owner of the patent rights, and that the infringer has actually (and purposefully) infringed upon the patent. In this situation, patent protection means that the court case is swiftly decided in favour of the patent holder, and the infringer is ordered to stop the infringing activities and pay compensation to the patent holder. This second game model is set up in a very different way as compared to the first model. The interaction in court is simplified to such an extent, that the "probable outcomes" can be calculated from the types of players involved. The judge can be either corrupt or incorruptible, the patent holder can be of either the zero-bribe type or the bribe-paying type, and the lawyers of both parties can have three different types of loyalty: universalist lawyers are loyal to fairness and playing by the rules, particularist lawyers care only for the outcome of their client, and non-loyal lawyers are loyal only to themselves. It is assumed that the infringer has no strong moral barriers against acting corruptly, since it has already been assumed that he knowingly infringed upon the patent. For each of the possible combinations, the model can be "run" and the probable outcomes determined. A comparison of these outcomes can then lead to conclusions about the influence of corruption on patent protection and the circumstances in which it is strongest.

Incorruptibility of the judge has a positive effect on the payoffs for the patent holder and the infringer, as it is not possible for them to spend money on bribing the judge. There is little difference between the outcomes for the infringer and a bribe-paying patent holder, but for a zero-bribe type patent holder it is essential that the judge is incorruptible. The patent holder might be able to influence the choice of judge, by filing his lawsuit in a particular jurisdiction, or by applying for a transfer during the proceedings of the case.

As can be expected, the most problems arise (for any party) if their lawyer is non-loyal. The outcomes with universalist or particularist lawyers are very similar in most cases. However, because the particularist values the interest of his client above any universal rules, the outcomes for an individual player are higher on average if he has a particularist lawyer. In theory, it may be better for both players if both lawyers are universalist, because this may facilitate cooperation and limits the options for opportunistic behaviour by other players. However, for the way the current game
model has been set up, "win-win" situations come only in the form of the "fair settlement", which can only be reached if both players have a lawyer who is universalistically or particularistically loyal (and it makes no difference which of the two types it is). It is not within the scope of this research to investigate the ways in which patent holders and infringers can try to distinguish loyalties when hiring their lawyers.

Most of the issues related to attitude or communication that played a role in the national security check are no longer important in the infringement court case. For example, the possibility of trapping a corrupt official plays a negligible role in the court situation, and so does the related issue of presenting oneself as a zero-bribe hard-liner or a flexible bribe-payer. There are also good appeal procedures available, and corruption seems to diminish as one moves to higher courts.

**General Conclusions**

Patent protection is threatened if Controllers of the Patent Office, DRDO commission members, judges and / or lawyers are corrupt. The main mechanism in the national security check is the direct "extortion" of bribes from the patent applicant, by government officials who can hinder the registration of the patent. In the infringement court case, corruption operates differently, because the infringer could bribe the judge and the patent holder would never even know if a bribe was paid somewhere. The matter is further complicated by the lawyers of both parties (patent holder and infringer), who can also be corrupt and try to bribe each other and / or collude against their own client. Surprisingly, the police are absent among the factors causing corruption to threaten patent protection, although surveys indicate that it is by far the worst public service in terms of corruption. It does matter, however, if the Anti Corruption Bureau is corruption-free itself, but because this is a special department of the police, it is not clear whether it is corrupted to the same extent as the general police, or not at all.

The main failures in countermeasures against corruption, insofar as it threatens patent protection, are the lack of appeal procedures and unknown (possibly low) chances of success for setting bribery traps in the situation concerning the national security check. In the second arena, the infringement court case, the reduction of corruption relies less on institutions and more on the character of individuals.

**Recommendations**

There is no conflict between the recommendations for the national security check and the infringement court case. However, the actions of the applicant in the first arena may have consequences for the rest of the patent registration process. It is advisable for the patent applicant to make a conscious effort to be polite and respectful towards the Controller at all times. An alternative approach is that the applicant successfully traps the Controller and thus removes him from office. His successor might be less corrupt, is probably less well-connected, and may have learnt from his predecessor that this particular applicant cannot be messed around with, all of which may benefit him during the completion of the patent registration.

The recommended strategies for a bribe-paying company are often different from those recommended for one committed to a zero-bribe policy. Generally speaking, the outcome for the bribe payer is like a compromise (success, but at the cost of a bribe), whereas the zero-bribe patent holder causes an all or nothing scenario (either complete success or utter failure). From this research project it cannot be concluded that one of these two policies or identities is more profitable for an individual company. However, if a large number of enterprises would choose to take the zero-bribe path, corruption in general would be forced to decrease, and that would probably yield benefits for all companies (including the bribe-payer type companies).
**Usefulness of Game Theory**

First of all, game theory has been useful as a modelling tool in this research, because it was found to be possible to actually construct game models that capture important aspects of reality. However, the reality of corruption in the area of patent protection is extremely diverse, and the models constructed in this research project are very general in comparison.

The game models presented here are too general to be of direct use in the specific situation of one small or medium-sized enterprise. A company interested in patenting in India, would have to build new and more detailed game models for its own specific situation. However, even without game models, an entrepreneur could still make better decisions by combining his own capacity for strategic thinking with the lessons, opportunities and threats highlighted in this research project.

**Further Research**

The subject of Indian patents is quickly growing in importance, and will undoubtedly attract more research in the future. Further research could expand the game models, investigate alternatives to patenting, and try to determine how "Western" and "Indian" cultural backgrounds are different and how these influence behaviour related to patent protection, corruption, and many other areas of interest.
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2 Introduction

Six years ago two Dutch entrepreneurs moved to Pune, the 8th largest city of India, and started making candles in the kitchen of their home. Today, Chikali Great Commission Engineering (CGCE P LTD) is a medium-sized company, has expanded its activities to include product development engineering, and is on the verge of signing million-dollar design and manufacturing contracts with customers in the United States. However, the greatest miracle is that this has been accomplished without paying a single rupee in bribes. The consensus is that without "facilitation payments" or "greasing the palms", nothing gets done in India, but CGCE is an exception to this rule. How do they do it? What problems will they encounter when they expand further in the area of innovative product design and manufacturing? Will patents provide adequate protection? This last question, about patent protection, will be the focus of the research project described in this document.

2.1 The Research Question

The main research question has been broadened to include the fate of other small and medium-sized enterprises that are in a situation similar to that of CGCE. The research question is framed as follows:

How is patent protection in India threatened by corruption, and how can small and medium-sized enterprises in India deal with it?

The formulation of the research question reveals that the first problem is a lack of clarity or insight: "Patent protection seems to be threatened by corruption, but how does it actually work?". Naturally, the next question is a call for practical measures: "What can we do to deal with this threat?".

A patent is the right, granted by the government, to exclusive use of an invention, for a limited period of time (usually 20 years). For the Indian Patent Law, an "invention means a new product or process involving an inventive step and capable of industrial application" (Krishna & Saurastri website).

Corruption is defined in this research project as "the intentional abuse of power and trust for personal gain" (chapter 2 presents other possible definitions and a motivation for this broad conception of corruption). To specify what is meant by corruption, often a number of corrupt behaviours is listed, which include bribery, extortion, nepotism, fraud, collusion, breach of confidentiality, and all kinds of organized crime. Some types of corrupt behaviour are more prevalent in relation to patent protection, such as bribery / extortion, collusion and breach of confidentiality. Other types of corrupt behaviour are difficult to take into account in a general analysis of corrupt situations. Nepotism and cronyism is behaviour that shows favouritism to relatives or friends in stead of making decisions based solely on merit. These types of behaviour are not included in the analysis, because the relationships that can give rise to nepotism, show so much variation among cases, that no generalisations can be made. Financial fraud is also excluded from the research scope, because it has no direct relation to patent protection.

2.2 Problem Relevance

This section examines why the threat of corruption for patent protection is a real problem and worth researching. The main argument consists of three statements, which are presented in the first three paragraphs: patent rights are important, their protection depends on the rule of law, but this is undermined by corruption, and all of this is the case in India. The fourth paragraph explains why the research question focuses on small and medium-sized enterprises.

Patents rights are becoming increasingly important in the Indian economy. First, the number of
The number of patents granted each year has been doubling for the past three years (Ministry of Commerce & Industry, Press Release, 2 April 2008). Secondly, innovation will be an increasingly important factor in the Indian economy, as opposed to low cost of materials and labour (Kapoor, 2007:21). If firms are to innovate, patent rights must be granted correctly and protected adequately. There is some discussion on this point. Park (2001:40) supports the traditional (and probably majority) view with his empirical findings that the enforcement of patent rights does stimulate productivity growth, and more so than copyrights or trademarks. On the other hand, a new and thought-provoking article by Boldrin and Levine (2005) claims that patents and copyrights are not necessary. This research project can not explore this debate further, but sides with the traditional view: if India is to innovate, patent rights must be protected. The third argument is that India is increasingly getting involved in global markets, where everybody uses patents and licensing structures to their advantage (Dole, interview).

Patent protection is dependent on the rule of law. The term "rule of law" is used here to indicate a situation in which everyone and everything adheres to the law or is punished according to the law. The law rules the country in stead of powerful individuals. A situation with strong rule of law is a vital prerequisite for any rights of minorities or individuals without power. An inventor's patent rights only have practical value if the rule of law prevents more powerful individuals from copying his invention.

Corruption undermines the rule of law in India. In general, corruption provides ways for the powerful to by-pass the restrictions of the law that otherwise guarantee protection for the weak and fairness towards the equally powerful. In the case of India, corruption seems to be widespread according to reports of Transparency International (2007) and the Centre for Media Studies (2005) (see chapter 2 for a more detailed overview of corruption in India). In addition to actual corruption, the fear of corruption also prevents people from even trying to assert their rights (according to interviews). This also encourages people to stop relying on the rule of law and engage in corrupt methods themselves.

The threat of corruption for patent protection is especially troublesome for small and medium-sized enterprises. This again has to do with the notion of "rule of law". Large corporations that are led by powerful families have less need for patent rights than do small ones, because the powerful can stand up for their own rights (interview). On the other hand, small and medium-sized enterprises need the power of the law to assert their rights.

This line of argumentation is not purely theoretical, but has practical implications as well. For example, in a recent survey about patenting activity, several Indian companies indicated that they do not expect patent rights to be enforced due to corruption in the judicial system (interview with the surveyor).

At this point, it must be mentioned that this research project also uncovered a report of 2008 by the Property Rights Alliance, which compared several countries and constructed indicators for the degree of protection of general property rights. Some of the data focus more specifically on patent rights and corruption (see Appendix A), and lead to the conclusion that India is not doing much worse than many other countries, and scores slightly above average when compared to other countries in the same region.

2.3 The Literature Study

This research project started with a literature study to help specify the research question. After arrival in India, interviews and desk-research were conducted in an iterative process to find out in which situations the threat of corruption for patent protection was the worst. The third phase of the
project was to make game theory models of the selected situations, because game theory can be used to describe how corruption threatens patent protection, and it may also lead to practical recommendations. Each of these research activities is described here in separate sections.

The first step in this research was a study of the available scientific literature. The aim was to determine which aspects of the problem area had already been researched and which had not. This has helped to make the research question more specific and to limit the scope of the research.

The broad topic of corruption has received considerable attention in recent years, primarily from a theoretical angle, but also in the form of empirical research. For example, a distinction can be made between "petty" and "grand" corruption, and these may have very different forms and consequences (Cameron et al., 2005, Transparency International India, 2005). Some researchers have tried to describe precisely what role "middlemen" play in corrupt exchanges (Bertrand et al., 2007, Khanna & Johnston, 2007). Does corruption breed more corruption? Graf Lambsdorff et al. (2005) agree while Cameron et al. (2005) conclude that less exposure to corruption does not lower an individual's propensity to engage in corrupt behaviour.

Game theory has often been used to model an aspect of corruption, for example by Saha (2001) and Cameron et al. (2005). A specific class of game theoretical models, known as principal-agent models, seems particularly suitable for modelling delegation in bureaucratic hierarchies (which are prevalent in India) (see Bendor et al., 2001). However, Groenendijk (1997) argues that delegation is entirely different from principal-agent situations, because the latter involve information asymmetry. Teorell (2007) argues that principal-agent models are not suitable for modelling corrupt behaviour if corruption is wide-spread. Other types of (less game-theoretical) models of corruption in business have been created by Sylwester (2001) and Mengistae et al. (2007). However, none of these focuses on the relation with patent protection.

Except for the mechanisms of corruption, a lot of research has also been directed towards determining the results of corruption. Most studies attribute negative consequences to corruption, especially when viewing the results at higher levels of aggregation (i.e. a whole national economy). For examples, see Bingeman et al. (2004), Vittal (2004), and Mengistae et al. (2007).

Some research has focused on the specific situation in India. Chakrabarti et al. (2007/2008) studied the judicial system in India and its relation to general corruption. Jeffrey (2001, 2002) and Deshingkar et al. (2005) have explored how the caste system aggravates corruption in rural areas. A further focus on how corruption works in rural areas is provided by Veron et al. (2006). This is different from the situation in cities, because rural communities are much smaller and local family leaders, land-owners and bureaucrats have much more (local) power than their counterparts in the big cities. However, patents are more likely to be relevant to enterprises and industries that are situated in the city.

An important and complex facet of India is its culture (mindset, values). The question whether there is a relation between corruption and culture is a sensitive issue, and will probably not be resolved in the near future. Widmalm (2005) claims that corruption is not a function (or result) of culture. However, Johnson (2005) does find significant differences in the role of whistle-blowers in exposing corruption, and Verma (1999) asserts that there are age-old cultural roots of corruption in the Indian police force.

This short overview of relevant literature reveals that this research project is unique because it brings together patent protection, corruption, game theory and India. Many good scientific articles have been written linking two or three of these key aspects, but not all four. For example, Andersen & Konzelmann (2008) use game theory to explain the benefits of patents, but do not write about the threat of corruption. Raghunathan (2006) comes close with his book titled "Games Indians Play", which connects corruption, game theory, and the Indian "mindset". However, his analysis is too
general and unstructured to apply directly to the issue of patent protection. Alternatively, if a comprehensive article was written on general game-theoretical models for analysing the influence of corruption on patent protection, this research project would have consisted of applying those models to the particular case of India. Since such ready-to-apply models have not been found in the literature, this project will include the formulation of the necessary game-theoretical models.

2.4 Interviews and Desk Research

The main data sources used in this research project are interviews and documents, because of the diversity of ways in which corruption may threaten patent protection, and because corrupt behaviour is intrinsically hidden. Interviewing people is also crucial for gathering accurate information, because the pace of change is very fast in India, whereas administration is still slow. Another source of accurate and up-to-date information is the world of journalism, especially certain "weblogs" that often contain more in-depth and independent information than the newspapers.

Interviews and desk research have alternated in an iterative process, because interviews often gave totally new perspectives on the problem area, but desk research was needed to formulate good questions in preparation for the interviews. It was difficult to get started because the interviews and desk research together formed a chicken-and-egg problem: which can be done first? The base for this phase of the research project was the office of CGCE in Pune, India. All interviews were done in person, partly because many Indians are very reluctant to talk over the phone. Several key interviews were not conducted in Pune, but in Mumbai (Bombay), Goa, and even Chennai (Madras) when the author happened to be in that city. Below a brief overview of the interviews is given, as well as an overview of the most important documents and news sources found during desk research.

Although some interviews were the only way to get specific facts, most interviews were used for verifying findings of the desk research, gauging the relative importance of issues, and finding out how things work in India (i.e. the internal processes of the patent office or the courts). The topic of "cultural differences" was included in almost every interview, but the answers could often only be retrieved indirectly (i.e. by asking an Indian about his experiences in Western countries, or about the regional differences in India). Not all potential interviewees could be actually interviewed, mostly because of the distance involved (and unwillingness to give a telephone interview), and sometimes due to schedule or time constraints. In total, 14 one-time interviews were conducted with a broad variety of people, each giving a unique angle on the problem area: lawyers, patent office employees, researchers connected to the chamber of commerce, Western entrepreneurs, small business owners, the Vice-President of a large software company, and a consultant for NGOs (non-governmental organisations). In addition to these interviews, more background information about life in India was provided by ongoing conversations with local Indian friends and Western expatriates.

During the desk research, a number of important documents and useful news sources were uncovered. Here a selection is presented of the most important sources (except for scientific articles, as those have already been discussed in the section about the literature study).

In dealing with the subject of patents in India, an obvious document to start with is the Indian Patent Act (1970). However, this legal text is not easily understood by the uninitiated, making the Draft Patent Manual (2008) all the more important. This document is created and maintained by the Indian Patent Office and gives a practical introduction to the whole process of patent registration. In addition to this, the website of patent lawyers Krishna & Saurastri is quite unique in providing a very helpful "frequently asked questions" section. (Generally speaking, Indian websites are still in their infancy concerning accessibility of information and user-friendliness - although this is changing quickly.). For an overview of the importance and activity concerning patents in India, many sources point towards the Evaluserve report Patenting Landscape in India (June 2008).
As for the topic of corruption, a few important documents exist. Recent publications from Transparency International are the Corruption Study 2005 (of India) and the Global Corruption Report 2007 (which focuses on the judiciary and includes a section on India). The indigenous Centre for Media Studies (CMS) conducted the surveys for the corruption study of 2005, and separately published a more detailed report of Corruption In Judiciary (2005). NGOs (non-governmental organisations) are not the only ones to publish reports on corruption. In December 2001 the 16th Law Commission of India published the 179th Report (of the Law Commission) on The Public Interest Disclosure and Protection of Informers. Although the issue at the time was the protection of "whistle-blowers", the report also gives a perspective on Indian corruption in general. The Law Commission was founded in 1955 and independently researches issues with the goal of preparing proposals for law reforms.

It is important to have some understanding of the Indian culture (the way of thinking and feeling), because it has a profound influence on expectations and behaviour, both of which are essential part of the game theory models that will be constructed. (Chapter 3 deals with these subjects in detail.). For understanding culture and cultural differences, the traditional sources are the books by Hofstede & Hofstede (2005) and Trompenaars & Hampden-Turner (1997). These resources identify global differences in culture, which gives a very general picture. For a better understanding of what India is really like, the book Being Indian by P. K. Varma (2004) is invaluable. His book is not strictly scientific, but it does provide insight that would take many years of living in India to develop for oneself. Another book is Games Indians Play, by V. Raghunathan (2006). This book is less comprehensive, and describes problems in Indian society with the "prisoner's dilemma" from game theory. He also gives his opinion on what characteristics are "typically Indian". Although both Varma and Raghunathan are Indians, they are not afraid to highlight also the negative sides of Indian culture, and their language is more harsh than any Western or "outside" writer could afford to use.

The last source that ought to be mentioned here, since it is often referred to, is a web log called Spicy IP India (IP stands for Intellectual Property). It serves as a platform for a group of Indian patent lawyers, researchers and students to analyse and discuss current events in the area of patents in India. Topics that are often covered are government policies on intellectual property, important court cases concerning infringement, and developments in the Patent Offices. One of the most important aspects of the Spicy IP group, is its independent attitude, which gives it the freedom to critically analyse anything.

2.5 Modelling with Game Theory

Game theory is a set of tools that can be used to study human behaviour or decisions in a specific type of situations that are characterised by strategic interaction. "Interaction" means that there is more than one "player" involved in the "game". If the interaction is strategic, the players, while making their decision, take into account what effect their decision will have on the decision of other players (Rasmusen, 2005:9), which, again, will affect the decision of the first player. During the 20th century, the study of strategic interactions in game-type situations, has developed into a whole new field of science. Game theorists have devised several types of game theory, and used them to gain more insight in politics, economics, social behaviour, and even biology. This section first explains the general components of game theory, explains why game theory was chosen for this research project, and highlights some of the limitations of game theory. Section 4.4 gives a more detailed introduction of the type of game models used in this research project.

How game theory works in general

A game setup consists of a number of basic parts: the players, the options they can choose from, the
outcomes for each player of the choices made by the players, and the preferences of each player for certain outcomes. Often, the results are translated into a numerical "payoff" that includes the preferences: each player prefers high payoffs to lower payoffs. Rasmusen (2005:10) lists players, actions, payoffs and information as the basic elements of a game. Although Rasmusen (2005) makes a distinction between actions and strategies, this research project uses "strategies" to denote the options, actions or alternatives that players choose from. Information is important, because the players' strategic thinking processes are dependent on information (i.e. about the players, the payoffs). If a player is missing a piece of information, or if the information is incorrect, this will influence the decisions of that player. The fifth element of a game model is the set of rules. For example, in some games, all players choose their actions simultaneously, but in other cases, the sequence of decisions is defined.

To determine which strategies the players will (or should) choose, game models need a so-called "solution concept" (Rasmusen, 2005:18), a well-defined way to solve the game and find the outcome. One well-known solution concept is that of dominant and dominated strategies. For player X, strategy A is dominated if for each of the other players' strategies, player X has another strategy that yields the same or better payoffs as compared to strategy A. (Strictly dominated means that there is always a strictly better payoff, not the same). For player X, strategy B is dominant, if it yields better payoffs than any other strategy (A, C, D,...), no matter what the other players do. (So if a player has a dominant strategy, all his other strategies are dominated by definition). The game can sometimes be solved by finding dominant and dominated strategies for each player. Every player will choose his dominant strategy (if available), or at least he will not choose dominated strategies. Dominated strategies can be deleted for each player, and if the game is played out again and again with these smaller strategy sets, the end result may be that only one strategy is left for every player. However, in many cases dominant or even dominated strategies do not exist (Rasmusen, 2005:26). Here the Nash equilibrium may be a good solution concept. A game is in Nash equilibrium if all the players choose such strategies, that it is not beneficial for any player to change his strategy, if the other players also do not change theirs.

Game theory is generally used in two ways: either in a descriptive way, explaining why people make certain choices in certain strategic situations, or in a prescriptive way, that is to solve the game model and recommend that people follow the strategies that the players chose in the model. This prescriptive type of game modelling can easily be used outside the scientific field, for example by a company that needs to make big strategic decisions about merging, venturing into new markets, establishing a monopoly, or starting a "price war". To be clear, the part of setting up the game is always a descriptive model of reality, but the conclusions (about which strategies to choose) can be either descriptive or prescriptive.

Graphic representation of games is often done with either a matrix ("normal form") or a tree structure ("extensive form") (for examples, see Rasmusen, 2005:14,20). The matrix is only suitable for games with two players, because the strategies of one player can then be listed as rows and the strategies of the other player as columns. Each field or cell in the matrix then shows the result of the interaction of the row and column strategies. The normal form (matrix) also assumes that players act simultaneously, or without knowing the other player's choice before choosing their own strategy. The extensive (tree) form is used if (possibly more than two) players act sequentially.

Games can be cooperative or non-cooperative. Cooperative games are games in which the players can voluntarily enter into agreements, and those agreements can be enforced (i.e. by law or some other process outside the players' influence). Non-cooperative games have no mechanism for enforcing agreements. The possibility of cooperation between players (by enforceable voluntary agreement) can significantly change the outcomes of some games that are similar to a prisoner's dilemma or tragedy of the commons (for examples from Indian society, see Raghunathan, 2006).
A fourth factor that can be used to distinguish different kinds of game analyses, is whether the game is qualitative or quantitative. As a matter of fact, many games use quantitative payoffs, but in a qualitative fashion: the numbers have no direct relation to real payoffs, only an ordinal relation to reality (i.e. 3 > 2). The main reason for using these numerical payoffs, is that the reader can instantly see which strategy is preferred in a certain situation, in stead of seeing 'a' and 'b' in the payoff structure and then having to read in the legend that 'a > b'.

Why game theory is used in this project

The goal of this research project is to gain insight into how corruption threatens patent protection, which is primarily through the decisions made by individuals. These decisions are not taken in isolation, but often in situations of confrontation between two or more individuals, each with his own goals, preferences, and set of available strategies. Game theory is the most suitable tool for modelling and understanding how all these elements interact with each other.

Another encouragement to use game theory is that Indians are generally inclined to think strategically, and possibly more so than other people groups (see section 3.1). One of the requirements in game theory modelling, is that the players do indeed think strategically about the expectations of the other players, their probable choices, and what strategy would then be best for themselves.

Limitations of game theory

Humans beings are incredibly complex, and so is the way individuals make decisions, especially if other individuals are also involved in the decision making process. Game theory tries to model this kind of situation, but necessarily must reduce the complexity of reality to relatively simple rules of behaviour and ways of making trade-offs.

Except for the problem of the complexity of human individuals, the current research subject also includes many situational factors, such as the relative wealth and status, connections between the individuals involved, the relative size and industry of firms involved, and their company culture. Within the time constraints of this research project, only a few game models can be defined and analysed, so most of these (greatly varying) factors will have to be excluded from the analysis. (For a distinction between structural (constant) and individual (variable) factors, see section 4.2, step 10). If someone would build one large game model to cover all the relevant cases, it would become extremely complex, whereas a model has the highest demonstrating value when it is kept as simple as possible.

Section 4.4 gives a more detailed overview of how game theory was applied in this project (i.e. which types or variants of game theory).

2.6 Empirical Basis of the Research

This chapter will briefly discuss the achievements and impossibilities of empirically basing the analyses performed in this research project. After a general overview of data gathering problems in India, the discussion will focus on some of the most important variables of this research project, and to what extent the value of these variables can be estimated from empirical data.

The availability of accurate data is a general problem in India. Ramamurthy and Naikare (business consultants) write in the doing business with INDIA report (2007) that "One of the largest drawbacks in India is the availability of data in the public domain.". "Whatever is available is either outdated or is highly fragmented, with no single authoritative source." (doing business with INDIA, 2007:75). A researcher for the Chamber of Commerce had a similar experience when conducting
research into the awareness of Indian companies about patents: "In preparing the survey, we had a lot of problems in finding the right companies to send the survey to. For example, there is no database (i.e. of the Patent Office) from which one can easily select a list of companies in Pune that have filed patent applications. The Registry of Firms is very proud at its database of firms since 1947, but there is no quick way to ascertain if the listed companies are still active." (interview). However, the situation is improving as digitization of information is under way in many government departments, which makes information more easily accessible, often via the internet.

An official is either corrupt or incorruptible

This research project has been conducted under the implicit assumption that "corruptness" is a relatively stable attribute of individual government officials: an official is either corrupt (seeking bribes and undeserved power) or incorruptible (refusing to accept bribes even when offered to him). There are no direct empirical findings to justify this dichotomy, but there are some more general or philosophical arguments. First, corrupt behaviour, just like many other kinds of behaviour, has a relation to the values or beliefs that the individual holds to. If the individual firmly and deeply believes that one should not accept bribes, or that money and power are not at all important, this will be reflected in his actions. The point here is that deeply held values and beliefs are long-term factors, so an official cannot be incorruptible the first day, and corrupt the next day. Secondly, past actions have a reinforcing effect on future decisions: if someone accepts a bribe once, it is easier for him to do the same the next time. Similarly, if someone has built up a reputation of incorruptibility, it is often valuable for him to uphold it, and this may help neutralize the temptation to act corruptly.

Although there may still be a "grey area" between corruption and incorruptibility, the dichotomy presented above works fine for the purpose of modelling. It is also not specified where exactly the line is drawn, because this is not necessary for the construction of the models.

The chance of encountering a corrupt official

To get an idea of the scale of corruption and its effects, it is natural to use some notion like "the amount of corruption". This rather vague idea can be formulated much more precisely as "the chance of encountering a corrupt government official (in a particular department)". With this formulation, the "amount of corruption" is defined from the perspective of an individual or a small or medium-sized enterprise (SME) that is interested in patent registration. This variable plays a major role in SMEs' decision making: if literally everybody is corrupt, it is probably not worthwhile to even start registering a patent, but if the Patent Offices and the justice system have only a few corrupt individuals, the resulting well-protected patent can be a major asset for the enterprise.

The estimation of the chance of encountering a corrupt official, makes use of the dichotomy (presented above) between corrupt and incorruptible officials. The models in chapters 4, 5 and 6 point out specific departments and levels in the public sphere, that are relevant for the SME: the Controller of the local Patent Office, the Controller General of all Patent Offices, the patent review commission of the Defense Research and Development Organisation (DRDO), the judges at the District or City Court, but even more so the judges of the High Courts, and lawyers specialized in the area of patents. For each of these groups of people, a separate estimation should be made of either the chance of encountering a corrupt individual, or of the percentage of individuals that are corrupt. This percentage can be directly substituted for the chance of encountering such individuals, if it is assumed that further complicating questions can be ignored (i.e. "Do corrupt officials process cases more quickly?", and "Who assigns the cases to the officials, and is this person corrupt?"). Because no statistical data was found for the corruptibility of employees of the Patent Offices and the DRDO, the next paragraphs will only discuss possible estimates for corruption in the judicial system.
For the estimations of corruption in the courts, concerning judges and lawyers, the Centre for Media Studies report provides some useful statistical data (Centre for Media Studies, 2005, Volume II: Corruption In Judiciary). Although this research project is interested primarily in the chance of encountering corrupt judges and lawyers in the High Courts, the survey data of the Centre for Media Studies (2005) only concern the lower courts. There are two ways to estimate the chance of encountering corruption in the courts.

First, one could assume that this chance for patent holders is the same as for the average person dealing with the lower courts. According to the survey conducted by the Centre for Media Studies (2005, Volume II), "79% of the respondents, who had been interacting with the judiciary, agreed with the statement that corruption was prevalent in the Department" (p.5), and "almost 54% of the respondents interacting with judiciary had gone for other avenues for getting their work done, against 38% who had used the normal process." (p.6). These "other avenues" include paying bribes and using influential contacts (p.6), and the "work" in most cases is to get administrative work done faster or to get the judgement faster (p.7). (The emphasis on getting things done faster is not surprising, because there is a severe shortage of judges compared to the number of cases (p.3).). These survey results give an indication that the chance of encountering corruption in the courts, is somewhere between 54% and 79%. However, these numbers represent the situation in the lower courts, and include all kinds of court officials - not only judges.

The second route for estimation is to determine the actual percentage of judges that is corrupt. The survey of the Centre for Media Studies (2005, Volume II) did not measure this percentage directly. However, out of the 54% (p.6) of respondents that used alternatives to the normal court procedures, 86% paid a bribe (p.6), with various goals such as getting a favourable judgement, speeding up judgement, registrations, obtaining bail, advancing or delaying the case, getting the case listed, or manipulating the public prosecutor or a witness (p.7). Of those respondents that paid a bribe, 5% paid money to the judge, 59% to a lawyer, 30% to a court official, 8% to a public prosecutor, and 14% to middlemen (p.8). (Since this adds up to 116%, some respondents bribed more than one person.). With the assumption that each respondent was involved in only one court case, that corrupt and incorruptible judges and lawyers handle the same amount of cases, and counting only bribery as corruption (ignoring the use of influential contacts), a crude estimate can be made of the percentage of corrupt judges and lawyers. If one multiplies the percentages of respondents that used alternative methods (54%), the percentage of those that paid a bribe (86%), and the percentage of bribe-takers that is of the right category (5% for judges, 59% for lawyers), the outcome can be used as a rough estimate of the percentage of corrupt individuals (2.3% of judges and 27% of lawyers). However, the middlemen who were paid by 14% of respondents, normally pass on part of the money to the person they are hired to influence. The matter is complicated further because lawyers can also function as middlemen, public prosecutors are in a similar position as lawyers, and only bribery was taken into account - ignoring the susceptibility to "influence". Therefore, the percentage of judges that is corrupt might be higher than 2.3%, whereas the percentage of lawyers that accepts bribes for themselves might be lower or higher. The only conclusion that can be drawn from these calculations, is that there are at least a few corrupt judges and lawyers in the system. And again, the data presented here are only for the lower courts, while corruption is often believed to be much less prevalent in the High Courts (several interviews), and the survey data pertains to lawyers in general, whereas this research project is interested specifically in patent lawyers.

The chance of successfully trapping a corrupt official

Except for the generally interesting "chance of encountering a corrupt official", another variable plays a major role in the situations highlighted by this research project: the chance of successfully trapping a corrupt official. What is commonly called a "trap" in India, is like an (American) "sting operation", where someone offers a bribe to a public official, and at the moment he accepts the
bribe, the police rush in and catch the official red-handed. For all corruption-related police action, there is a separate department called the Anti Corruption Bureau (ACB), at the local level, while the Central Bureau of Investigation does the same at the national level. During this research, the chance of getting trapped emerged as one of the biggest fears for corrupt officials and simultaneously one of the few tools that individuals can use to directly "attack" corruption. (Many other threats to corruption are irrelevant if corruption is (or is perceived as) widespread within society.). The following paragraphs lay out a way to construct an estimation for this variable, and discuss which data are available.

The chance of successfully trapping a corrupt official, depends on numerous factors, such as the experience of the ACB officers, the technology used in coordinating the trap, and the skills of the civilian in hiding his true intentions for the public official. If the corrupt official even remotely suspects a trap, he will not accept the bribe and the trap fails, so the expectations of officials about the success of traps, also plays a role. If there are some corrupt individuals within the ACB, these can warn the officials that are to be trapped. If corruption is more systemic in the ACB, it is possible that trapped officials can "buy" their release before their capture is officially registered and criminal charges are pressed.

The newspapers regularly report the successful trapping of corrupt officials, but it is unknown how many times a trap fails. For most of the factors described above, either their influence on the chance of a successful trap is difficult to define more precisely or it is difficult to quantify. For example, how much does an additional "unit" of experience increase the chance of a successful trap? Or, it is clear that sufficient leaks drive the chance of success to zero, but how many leaks are there in the ACB, if any? This research project has not found any data that is directly related to the factors determining the chance of a successful trap. However, there are survey data available about corruption in the general police force (Centre for Media Studies, 2005, Volume 9: Corruption In Police Department). With the same methods that were used for the judiciary in the last subsection, rough estimations can be made for the number of corrupt police officers. Of those respondents who had interacted with the police, 87% agreed that there was corruption in the police force (Centre for Media Studies, 2005, Vol.9, p.3). However, this is not a direct indicator for the number of corrupt officers, which can be constructed in the following way. 70% of respondents had used alternative (often corrupt) methods in order to avail services from the police (p.6), and 80% of these respondents paid a bribe (sometimes in combination with other methods) (p.7). The availed "services" were not always legitimate. For example, 16% of the 80% that paid a bribe, did so to avoid being fined for a traffic offence (p.8). In these cases, the police officer is not the only corrupt actor, so here only those instances are counted in which the services were legitimate, which is true in 78% of the cases (p.8). If one multiplies the percentage of respondents that used alternative methods (70%) with the percentage of those that used a bribe (80%) for availing a legitimate service that should be bribe-free (78%), this gives a lower-bound estimate for the percentage of police officers that are corrupt: roughly 44%. Interesting as this may be, the amount of corruption in the Anti Corruption Bureau could be much less, because it is a separate organisation next to the regular police. There are no survey data available for this group.

### 2.7 Structure of the Report

Chapter 2 defines corruption and describes the occurrence of corruption in India from several angles. Chapter 3 gives much needed background information about Indian culture, judicial system, and patents. Chapter 4 then formulates a broad and detailed model of the total patent protection process, from patent filing to the enforcement of court verdicts in infringement cases. From this total process, two steps are selected for modelling with game theory, which is done in chapter 5 and 6. Finally, chapter 7 presents the conclusions and recommendations for dealing with corruption in patent protection.
3 Corruption

The aim of this chapter is to provide an overview and understanding of corruption in general, to explain the definition of corruption chosen for this research project, and to specify how corruption works in India.

3.1 Corruption in General

Corruption is a very broad and vague concept, but always with a negative connotation. The general meaning is a "lack of integrity or honesty (especially susceptibility to bribery)" or "use of a position of trust for dishonest gain" (WordNet dictionary). Specific corrupt actions include bribery, extortion, nepotism, cronyism, fraud, graft, embezzlement, and the like. Other closely related behaviours are collusion, cartels, breach of confidentiality, and all kinds of organized crime.

There are a number of aspects or "dimensions" of corruption that are often used by authors or speakers to specify what kind of corruption is meant. Corruption can occur at different levels in society: between lower bureaucrats and civilians, at the level of companies, regional governments and the city mafia, or among the very elite of the country. Corruption may entail a voluntary agreement between parties (in tenders or monopoly grants), involuntary agreement (when extorting a bribe or other services), or individual action (i.e. financial fraud or embezzlement). Corruption occurs within several sectors of industry, each with its own power structures, items of interest, and relevant ministries. A distinction can also be made geographically, between international or domestic corruption, or according to the various states within India. Lastly, types of corruption can be distinguished into that which takes place in cities as compared to corruption in rural communities, because the (social) environment is different in many ways.

When corruption takes place, there is always a "victim". The victim is often an individual (i.e. if a court dispute is settled by bribing the judge), but can also be a group (such as the competitors in an unfair government tendering process), or society at large (because the tender cost more of the taxpayers' money than was necessary).

Because corrupt activity is almost always illegal, and entails an agreement between only a few parties, it is very difficult to detect. There are also no agreed-upon standards for measuring the "amount of corruption" that takes place in a particular area or organisation. For a number of years, Transparency International has been publishing a corruption perception index for each country, which is itself calculated from a dozen other indices. Although many scholars use this index in their models for the actual volume or severity of corruption, Transparency International keeps emphasizing that the index only indicates the perception of corruption: to what extent do people feel that a country is corrupt? It seems reasonable to assume that the perception of corruption is related to the actual level of corrupt activity, but still the index is a very rough measure at best. What is possible, is to conduct a survey and ask people if they paid bribes (voluntarily or not) and if so, how much. This has been done by the Centre for Media Studies, an Indian non-governmental organisation, but this method can only register the "petty corruption" (at the lower levels of bureaucracy).

3.2 Definition of Corruption

For the purpose of this research project, the definition of corruption is kept fairly broad. It will not be limited to only the giving and receiving of bribes, as Van Hulten of Transparency International does in his book Corruption (2002).

The Organisation for Economic Cooperation and Development (OECD) focuses on the bribing of
public officials in the context of international business (OECD anti-bribery convention). This project does not exclude corrupt international relations (because patents and business have an increasingly international character), but the emphasis is more on corruption within India. The definition of corruption is also not limited to public officials, but in principle includes any "position of trust". The reason for this is that public and private power are often combined in India, and both forms involve trust of a group of "dependents" on a powerful individual.

All societal levels should be included in the analysis, because corruption at any level can threaten the protection of patents, even if the patent holder is a small or medium-sized company. However, the only available data is about the lowest levels of bureaucracy, and the picture constructed from indirect indications and opinions becomes increasingly unreliable towards the top of the social ladder.

Excluded from the scope of this research project is any kind of financial fraud or embezzlement, since it has no direct relation to patent protection. Of course a leak of funds within the Indian Patent Office would have practical consequences for the patent registration process, but this effect is considered too indirect and too general to be included in the analysis.

This leads to the following definition of corruption for this research project:

The intentional abuse of power and trust for personal gain, including all kinds of bribery, extortion, and favouritism, but excluding financial fraud.

3.3 Corruption in India

This section gives an overview of the occurrence and severity of corruption in India. Possible causes and solutions will be examined in the next section (2.4).

Where does corruption occur in India?

Many Indians would answer this question with "everywhere". For example, Raghunathan chose to phrase one of his twelve canons of Indianness as "deep-rooted corruption and a flair for free riding" (2006:16-17). Among the interviews conducted in this research project, one interviewee in particular described corruption as "omnipresent" in India. These broad characterisations of the situation in India are backed up by survey data from Transparency International. The India Corruption Study 2005 gathered data from 14,405 respondents, spread over 151 cities and 306 villages of 20 States (p.5). This study estimated the "total monetary value of petty corruption in 11 [public] services [...] at Rs. 21,068 crores" (p.12) (equivalent to more than 3 billion Euro). The total number of households that paid these bribes is estimated at 145.4 million (p.12). These figures may already seem large, but they only represent the petty corruption "experienced by the ‘Common Man’ in getting services from various service-providers, i.e., Government Departments. [...] This study does not cover corruption at various other levels, such as where a business man pays [a] bribe to an Income Tax official. It also does not cover the mega corruption, [...] in which [...] thousands of crores of rupees are paid as bribes to corrupt functionaries or Government funds are siphoned off on a large scale." (India Corruption Study, 2005:foreword).

This survey among users of public services has recorded percentages of respondents that had paid a bribe in order to get a service that should be free of charge. It is important to note that these civilians would rather have not paid the bribe, but felt more or less forced to, since they were legally entitled to receive the service for free. (This situation should be clearly distinguished from cases involving civilians offering bribes in order to receive services that they are not entitled to.). Except direct experience of bribing, the survey also recorded the quality of service, the frequency of using connections or middlemen to get things done, the perception that a department (public service
provider) is corrupt, the perception that there was a lack of commitment in the department to reduce corruption, and the perception that corruption had increased in the last year. Because many of these measures are more subjective, they will not be mentioned here.

Table 1 lists the 11 public service sectors of the survey, each with the percentage of respondents that claimed they had to pay a bribe. A division is made between "need based services", which are requested by civilians only when needed, and "basic services", which are consumed in a more continuous fashion. (This subdivision is quite arbitrary, but follows the division made in the Transparency International India (2005) report). Within the two categories, the service sectors (departments) are listed according to increasing levels of corruption.

<table>
<thead>
<tr>
<th>Department</th>
<th>Direct experience of bribing (% of respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Need Based Services</strong></td>
<td></td>
</tr>
<tr>
<td>Rural Financial Institution</td>
<td>19 %</td>
</tr>
<tr>
<td>Income Tax (Individuals)</td>
<td>20 %</td>
</tr>
<tr>
<td>Municipal Services</td>
<td>23 %</td>
</tr>
<tr>
<td>Lower Judiciary</td>
<td>47 %</td>
</tr>
<tr>
<td>Land Records &amp; Registration</td>
<td>48 %</td>
</tr>
<tr>
<td>Police (Crime / Traffic)</td>
<td>80 %</td>
</tr>
<tr>
<td><strong>Basic Services</strong></td>
<td></td>
</tr>
<tr>
<td>Water Supply</td>
<td>9 %</td>
</tr>
<tr>
<td>PDS / Ration Card / Supplies</td>
<td>16 %</td>
</tr>
<tr>
<td>School (up to 12th grade)</td>
<td>18 %</td>
</tr>
<tr>
<td>Electricity (Households)</td>
<td>20 %</td>
</tr>
<tr>
<td>Government Hospitals</td>
<td>27 %</td>
</tr>
</tbody>
</table>

*Table 1: Differing percentages of respondents claiming that bribes were required by public service departments. (table adapted from Transparency International India's Corruption Study 2005, p.9).*

From the data found by the survey, two conclusions can readily be drawn.

1. Corruption does occur frequently and is a problem for the lower levels of society.
2. The occurrence of corruption shows large variations between public service departments, with the Police being the worst, followed by Land Records & Registration and the Lower Judiciary.

Substantial differences in levels of corruption have also been found between states of India. The states of Kerala and Himachal Pradesh stand out as by far the least corrupt, while corruption is worst in Jammu & Kashmir and Bihar. (Transparency International India, 2005:10).

**How severe are the effects of corruption?**

At present, there is no reliable or standard way to measure the effects of corruption, because cause and effect are linked in a very complex way. For example, one could try to draw conclusions from a country-wise comparison with the corruption perception index as input and the size or growth of the economy as output. Then there are countless variables that could interfere with the hypothesized relation (for example, population growth or political stability) and if a correlation is found, one still
needs to prove the direction of the causality (since economic prosperity may well be the cause of lower levels of corruption, in stead of its consequence).

It is possible, however, to formulate qualitative assessments or arguments for the severity of corruption's consequences. The 16th Law Commission of India quoted a well-known economist in this respect: "Mehbub-ul-Haq [...] pointed out four key characteristics that make corruption more damaging in South Asian countries than in any other parts of the world" (179th Law Commission Report, 2001:18). These four reasons are summarized here, because they provide an interesting perspective on how the consequences of corruption can be very different in various regions.

1. Corruption occurs "up-stream", at the top, where fundamental decisions are made about development priorities, policies and projects. In industrial countries, at least these core decisions are relatively transparent and merit-based.

2. Money acquired through corruption is immediately smuggled out to safe havens abroad. This capital flight is worse in South-Asia than in for example North Asia, where corrupt gains are more often reinvested in the economy.

3. Corruption in South Asia often leads to promotion, not prison. The "big fish" rarely "fry" – unless they belong to the opposition. In contrast, industrialized countries often have a process of accountability where even top leaders are investigated and prosecuted. In South Asia, the corrupt are just too powerful and gain even more power.

4. In South Asia, 515 million people live in poverty. In other, faster growing [or larger] economies, corruption might be affordable. Combating corruption in South Asia is not just about punishing corrupt politicians and bureaucrats but about saving human lives.

(Summary of arguments from economist Mehbub-ul-Haq, who was quoted by the Law Commission of India in its 179th Report, 2001:19-20).

Although some of these arguments may be slightly outdated, especially the fourth argument drives home the point that corruption is a huge problem in South Asia (which, for a large part, consists of India). The following paragraphs will investigate what causes this corruption, how corrupt deals work, and what can be done to avoid or stop it.

3.4 How Corruption Works Exactly

This section discusses the motives, opportunities and mechanisms involved in corruption, and concludes with possible countermeasures that may be taken to limit corruption or its consequences.

**Motives for Corruption**

As with all human behaviour, there must be some forces driving people to engage in corrupt activities. These "motives" are not necessarily rational and may even be part of the unconscious. Three such motives will be presented here.

The first possible motive for corruption is a tendency found among human beings of all cultures, ideologies, and levels of income. This tendency, commonly called "greed", is "an excessive desire to acquire or possess more than what one needs or deserves, especially with respect to material wealth" (American Heritage Dictionary). The connection to corruption is easily made, because the goal of corrupt actions is private gain. Although greed must play a role for some corrupt bureaucrats or businessmen, there are other possible motives.

In discussions about corruption, another issue that is frequently raised is that of low salaries for government officials. The rationale is that government officials are more or less forced to accept bribes and act corruptly, because their salaries are not sufficient to cover the costs of living. When
this argument is raised, it often sounds as if the ultimate survival of the government official is at stake. This could be the case for the lowest level of employees, but often the actual problem is the cost of living on the level that is expected of the government official according to his caste, status, or simply the fact that he has a government job. So although the issue is probably not survival, salaries can be quite low. In addition to this, it is possible that the employee had to "buy" his position in the first place, and even after getting the job, money may be required from the official by those higher up in the hierarchy (for example, see Centre for Media Studies, 2005, Volume 9: Corruption In Police Department, p.12). One must keep in mind, however, that low salaries are never an issue for the corrupt individuals at the top of the hierarchy, and these are significant contributors to the total "amount" of corruption.

A third motive for corruption can be caused by the expectations of those around the corrupt person in question. The government employee may be pressurized by the monetary needs of his relatives, but colleagues and business contacts may influence him in different ways. In a society where corruption is ubiquitous or systemic, it may be very hard for any individual to abstain from corrupt activities. Except "peer pressure", there may also be more tangible factors involved that go beyond feelings. For example, corruption can become so predictable that the expected costs of bribes or double work are included in budgetary calculations, from which they cannot be removed by a single non-corrupt employee. Or in some situations, an honest employee could refuse to get involved in his boss's corruption, but this is impossible if all bosses are corrupt. On a higher level, there may be a tradition of corruptly allocating tenders every year, in which an incorruptible individual cannot withstand the pressure of the others involved in the deal, even if he is the official decision-maker. Thus a largely corrupt society, such as India seems to be, may strongly motivate individuals to participate in corruption.

Opportunities for Corruption

After the general motives for corrupt behaviour, this section will explain what conditions of the Indian society provide ample opportunities for corruption. Only the major issues are covered here, which are a lack of computerization, discretion and lack of accountability, administrative secrecy, and overly bureaucratic procedures (often called "red tape"). Together, these four opportunities for corruption help to sketch the situation in India.

Corruption is facilitated by a lack of automation or computerization in many government departments and agencies. Levels of corruption often decrease significantly with the implementation of computerized administration, provision of information and services through the internet, replacing cash by bank transfers, and similar automation projects. For example, Saxena (2007) reports in a working paper that many Indian states have tried to computerize land records. He said the ultimate success of these projects depends on making the official land records themselves available on-line, so that land owners are no longer dependent on the petty bureaucracy to provide them with a copy.

The Law Commission of India, in their 179th report (2001:15), lists discretion and lack of accountability in public functions as one of three major opportunities for corruption. "Discretion" means that a public official can do whatever he thinks best, and a "lack of accountability" means that there is no-one who regularly evaluates his decisions against higher standards. Most employees are held accountable by their immediate supervisor, but the supervisor does not necessarily use the right "higher standard". The issue is, ultimately, one of accountability towards the law and the interest of the general public. Varma (2004) states that the general opinion (in India) is that a government job is not to serve the public but to fill one's own pockets. Moral relativism (see section 3.1) diminishes public morality, leaving only the private notions of morality. If people do not really believe in the official (legal) standards, there is no-one to check the behaviour of government
officials against those standards, and thus there is no public accountability.

One interviewee mentioned that "if something happens in secret, there is always much scope for corruption". The issue of secrecy is different from the issue of discretion and lack of accountability. With secrecy, possibly corrupt public sector decisions are not just allowed (discretion) or not checked (lack of accountability), but are kept secret as a matter of rule. The Law Commission of India asserted that the "prevalence of administrative secrecy [...] encourages corruption and lobbying and insularity from democratic control." (179th Law Commission Report, 2001:15). In October 2005, the Right To Information Act (RTI) was passed, which is increasingly being used by non-governmental organisations and individuals to break through the "administrative secrecy" in individual cases. However, many military or intelligence agencies are exempt from RTI applications (Right To Information official website, FAQ point 9), and it seems that the Supreme Court of India has also been trying to evade RTI scrutiny (Times of India, May 1, 2008).

A fourth and well-known opportunity for corruption is bureaucratic "red tape", which can be defined as "excessive formality and routine required before official action can be taken." (Unabridged Dictionary). The situation is that of a civilian or company needing a particular service from a government official. The excessive formalities cause a lot of trouble and delay, thereby increasing the incentives for the civilian to bypass or speed up the process by bribing the official. To give an indication of red tape in India, the Times of India reported that "the red tape associated with starting business hasn't got any better. India has the highest number of procedures (13) for commencing business. The smaller neighbours seem to have a better system with Sri Lanka and Maldives having just five for the same. It takes 33 days to start a business in the country compared to just 2 days in Australia. The country has among the highest [number of] procedures (46) to enforce a contract." (Times of India, May 5, 2008, data based on a World Bank report of 2008).

Method or Mechanism of Corruption

The (active) motives and (passive) opportunities for corruption in India have been described above, but this explanation is not complete without some indication of the methods or mechanisms actually used in corrupt behaviour. Many times, corruption comes down to paying a bribe directly. This subsection presents three variations to the simple bribery scenario, involving middlemen, personal connections, and the tools originally designed to combat corruption.

Middlemen often play a role in corrupt transactions between a public official and a civilian who wants something from the official (this can be either his legal right or an undeserved favour). Although it is possible to have a direct transaction of bribe money, often some problems arise. Especially if the concerned public official is not at the lower levels of the hierarchy, the bribe-giver may not know whom to approach and how to approach him. The public official (bribe-taker) may not trust the bribe-giver or may not even know that he exists. According to Khanna & Johnston (2007), middlemen can reduce uncertainties for both the bribe-taker and the bribe-giver in these situations.

High-ranking connections are another specific method of getting things done. For example, one interviewee told me about a conflict between his housing society and a local building contractor. (In Pune and many other Indian cities, owners of apartments in the same building or compound are organised in so-called "societies"). The contractor had dumped rubble against a wall encircling the compound, damaging the wall and almost causing it to collapse. After a long time of pleading and threatening, the society finally managed to get the contractor to start clearing the rubble, but this was only possible because the family of one of the residents knew the Director General of Police in Mumbai (!), who forced the local Pune police to cooperate against the contractor. According to several interviewees, it is often necessary to find other ways of getting justice done, because the official system does not work. An interesting question is whether connections are generally more
effective then bribes. One interviewee, owner of a small business, said that "even when you bribe, they don't take you seriously, that's why personal connections work much better".

A third and surprising mechanism in corrupt actions is the use of anti-corruption tools. If government officials have too much discretion, literally any instrument can be used for corrupt purposes, often including those especially designed to combat corruption. An example of general discretion was given by one interviewee who said that the police can write down all kinds of false accusations, and later erase them when the accused has paid some money. In a similar fashion, traps and raids, tools specifically designed to counter corruption, can actually be used by the police (or other corrupt parties) for extortion. Newspapers regularly report (i.e. Times of India, July 11, 2008) about inexplicably large amounts of cash found in the houses of high-ranking politicians or bureaucrats, who are subsequently charged for corruption or tax-evasion. In these cases, the general question in the minds of people is: "Who organised the raid?", "Which enemies does he have in politics, business or family affairs?".

**Countermeasures Against Corruption**

As with any age-old problem, several partial solutions have been found already. This subsection gives an overview of countermeasures against corruption in general. Because this research project concerns itself with the problems of corruption from the perspective of small and medium-sized enterprises, this overview does not include solutions focused on changing the whole system, which is more the domain of governments, legislators and action groups. The first four countermeasures for companies are related to strategic or long-term decisions, but the last two paragraphs give some short-term solutions as well.

According to interviewees, the size of companies is very significant for dealing with corruption. If the government agencies of any country harass a large (multinational) company with requests for bribes, the company can just threaten to divert their investments to other countries. It works the same way at the level of states within India. If the company is very big, the advantage lies not only in economic power, but the company probably also has much better (higher) connections that it can use to get things done. Although the size and connections of large companies can be used to counter corruption in public organisations, they may also be used for corrupt purposes if the company leadership chooses to do so.

The opposite strategy may also work: stay small. One interviewee stated that he is afraid of growing his small company and really achieving something, because "being small means you are easily overlooked". Another interviewee, leading a company with about a dozen employees, said they could avoid extortion by government officials because of their small size and a general policy aimed at keeping a low profile towards the government. A third interviewee said that CGCE (the author's base of operations) should be very careful when growing bigger. Especially the new factory that is being built, will put the company on the map and make it much easier to find for corrupt government officials, local politicians, or the mafia, seeking to extract bribes.

An interesting outcome of studying decision-making processes is the importance of the first meeting, due to a kind of precedent-effect. If the interaction with a particular government office is to be repeated several times, it is very important to consider how to act the first time, because this creates expectations for all the subsequent interactions. Take, for example, a licence that needs to be renewed every 6 months. If a bribe of 300 rupees is paid the first time, the official will expect at least the same amount the second time, and may even ask for 400. However, if one succeeds, with considerable difficulty, to get the licence the first time without paying any bribes, this can also function as a precedent, making it easier to get the licence renewed in the future without paying the bribe that is customary for other applicants. In the same train of thought, a reputation of being "that one company that never pays the bribe", may help to convince corrupt officials to just provide their
service without expecting a bribe, even if this particular official has not been encountered in the past. Two interviewees claimed that their company has a growing reputation of never paying any bribes.

The last of the long-term or strategic countermeasures is to choose the right industry to operate in. According to Naipaul (1990:11-12), the Jains (a small and peace-loving strain of Hinduism) have a long tradition of moving out of industries as they become more mafia-controlled. According to some interviewees, the worst industries to be in, from the viewpoint of evading corrupt practices, are property and construction. (This is partially confirmed by the survey of Transparency International India (2005), which found that, out of those respondents who had used services from the departments of Land Records & Registration, 48% claimed they needed to pay a bribe (p.9)). Although an individual company can choose to avoid those industries where most corruption occurs, this is obviously not a solution for society as a whole.

The primary device created by the legislature to counter corruption, is the special police department called the Anti Corruption Bureau (ACB). The Central Bureau of Investigation (CBI) is similar to the ACB, but operates on a national level. One interviewee's advice for companies operating in India is: "When you encounter corrupt officials refusing service without a bribe, send an email to the ACB at the first sign of problems. You may also contact the Secretary for Industry, who is the final boss of the ACB.". Apparently, this interviewee has faith in the ability and willingness of the ACB to get corrupt government officials behind bars. However, another interviewee warned that there is always some hidden agenda behind a trap (catching a bribe-taker red-handed) or raid (to discover inappropriate assets, like hundreds of thousands of rupees in cash). For example, a (political) enemy of the bribe-taker could have set the trap to remove his rival. Or even worse: someone might have refused to pay bribes to the police, after which the police tries to get back at that person and raid his house (and might even plant false evidence, like drugs). It is very difficult to get an accurate picture of the corruptness or incorruptibility of the ACB, so the general advice is to use the ACB, but with caution.

Lastly, some practical advice can be given for dealing with (possibly corrupt) government offices. One interviewee emphasized to keep copies of all important documents, signed by the receiver. This is proof that a certain document was received by the government office. If problems arise later on, these signed copies can be used in (semi-)judicial trials to force government officials to work with you in stead of against you. In a similar way, the Right To Information Act can be used to force public offices to provide copies of important documents or information about the (lack of) progress of your application (see the Right To Information official website). A third way to deal with corruption is simple persistence. One of the interviewed advocates (lawyers) displayed a firm belief in quickly following up applications and "causing nuisance" if procedures are threatened to be delayed. Although bribes may be prevented, there are considerable costs involved with frequently going to the public office, constantly pleading your case, demanding justice, submitting and re-submitting official requests, etc. Even so, the corruption survey of Transparency International India (2005) reveals that many individuals do put in extra effort in order to avail public services, ranging from an average of 27% of respondents who interacted with the police (p.33), to 42% of those who interacted with the water supply department (p.65) (see also pages 54, 86, and 105).
4 Introducing the Problem Background

The purpose of this chapter is to go deeper into the problem area formulated in the introduction to the research project. In order to clarify the problem situations, three areas will receive special focus, each in a separate section. To sketch a broad but relevant background, the first section will present the fundamentals characterising Indian society. These fundamental values, structures, and rules for behaviour form a clarifying basis for the other two sections that describe the specific workings of justice and patent protection in India.

4.1 Fundamentals of Indianness

It is impossible to give here a complete description of fundamental aspects of Indian culture. However, an attempt is made to highlight those characteristics that are typically Indian and also have a bearing on the behaviour of individuals in situations of (possible) corruption. Because cultural (behavioural) characteristics are such a broad, interconnected, or "fluid" field, they could have been described with a totally different set of words than that which is used here. Each "characteristic" has a separate subheading, but is very much connected to the other characteristics. Therefore, the reader is advised not to attach great meaning to the separate subheadings, but to see them as merely highlights out of a sea of cultural tendencies that is difficult to define. After highlighting two central values of Indian culture, a short explanation is given of hierarchy, powerful individuals, fatalism, unquestioning acceptance, strategic outlook, absence of generalized trust, opportunism, and a positive image.

What is Valued?

It is convenient to start a discussion of culture with a discussion of values, as these are the things that drive behaviour and mould social norms. Cultures have complex sets of values, and Indian culture is about as diverse as that of all of Europe. This research project has highlighted two items as the things most valued in "the" Indian culture, thus it was necessary to generalise.

The first thing that is highly valued in India, is material wealth. This may sound surprising for the average Western person who may still think of India as the land of the gurus, of spirituality, and especially of renouncing earthly attachment (see Clooney, 2002, point 3). As has been observed during this research project, many Indians are very religious. And it is true that Hinduism has deeply rooted in the minds of Indians the notion that the ultimate goal of life is liberation (moksha) from the illusion (maya) that Westerners call reality. On the other hand, Hindu religious rituals are generally performed with the express goal of receiving material blessing from the deity (Varma, 2004:62), and Hinduism acknowledges many paths towards the final escape, one of those paths being the pursuit of material wealth (artha) (see Mahabharata, 12.161, and Varma, 2004:65). All of this is not meant to say that Indians are more greedy than other peoples, nor that material wealth is necessarily a bad thing. It actually makes a lot of sense that in a country with millions of people living below the poverty line, people generally strive hard for material wealth.

The second general value that was identified in this research project, is social status. It is very important for an individual to be recognised, well-respected, maybe even famous (Varma, 2004:23,25). And this is not only important for himself, but also for his extended family, his employees, and anyone who manages to associate himself with the "important" individual. An individual's status is automatically reflected upon his surroundings, and vice versa (Varma, 2004:34,35,48,49). On the one hand, social status is directly connected to wealth, and there is causality in both ways: Wealth can increase status (by showing one's wealth and being generous), whereas status can be used to amass wealth (through semi-formal influence and lucrative jobs). On
the other hand, social status is also related to social hierarchy in Indian society, which is partially connected to the caste system, and will be described further in the next paragraph. Social hierarchy, status, and wealth are all potential sources of power. Although real power seems to be valued in Indian society, this research has chosen to formulate "status" as a central value in stead. The reason is that Indian society, much more so than some other cultures, places great emphasis on making power visible (Varma, 2004:18, 19), which is an alternative definition of "status".

**Hierarchy**

Social hierarchy is much more prevalent in Indian society than in the Netherlands. The idea that certain individuals have (and should have) much more power in society than others, has a profound influence on human behaviour. As causes of the characteristic labelled "hierarchy", the extended family and the caste system will be described shortly.

Traditionally, Indians grow up within a so-called "extended family", which includes grandparents, some uncles and aunts, and nephews and nieces, all living in the same house. According to Forbes Magazine (2007), a survey among India's middle class (30% of the population), recorded that more than 70% of married couples have "moved out of the traditional joint family households [and] into their own homes" as nuclear families (consisting of only father, mother and children). However, the extended family pattern still has a substantial influence on individuals and society, especially because the generations that are still in power now, almost all came from extended families. One interviewee mentioned that "it is good that the extended family often still lives together in the same house, because this facilitates the transfer of the family's values from grandparents to grandchildren". Within the extended family, there is a very specific (though mostly unwritten) structure of hierarchy, with older family members having more authority than younger ones, and males more than females. In exchange for respect and obedience, the members higher up in the hierarchy must protect and care for the others, and are responsible for their well-being (Kakar, 1981:117-119). The bottom line is that many Indians still grow up with a "sixth sense" for the relative importance of individuals.

The caste system is similar to the extended family in the sense that it produces within each individual the idea that society is structured with many levels of authority, and that it is best to obey the unwritten rules associated with it, even as one tries to "climb the social ladder" or improve one's material circumstances. Castes differ from social classes because the way the caste system is cemented in the social consciousness, makes it almost like an unalterable law of nature (Vestner, 1991:227). To illustrate how deep the effects of caste can sometime go, one interviewee mentioned one of her employees, who came from one of the lowest castes. When he was hired and first came to work, he had said that he was not capable of anything (in the sense of "too dumb"). Apparently he had heard this message his whole life, because he was from a low caste, and had come to accept it as the truth. The strict separation between castes is exemplified in the behaviour of his fellow employees, who (for the first few months) would not allow this "outcaste" to sit and work with them at the same table. Another area of life where caste considerations are still very much alive, is that of selecting marriage partners, often through advertisements in newspapers stipulating the requirements of future brides or grooms (see also Varma, 2004:25). It seems that the caste system is still deeply rooted, and may contribute to the structuring of society in numerous hierarchies.

The fact that a whole society believes in the hierarchical structure, and therefore upholds it, has some implications for corruption as well. These will become clear in the following paragraphs, as other characteristics are described that are connected to hierarchy, such as personal dictatorship, fatalism, and a lack of critical analysis.
Powerful Individuals

Whereas hierarchy describes a system of several layers of wealth and power, a related, though slightly different factor is individual authority. It is related to a hierarchical system, because every individual listens, believes and obeys those individuals in the hierarchy that are above him. However, the issue of powerful individuals goes further. One one side, one of Raghunathan's twelve "canons of Indianness" is "A sense of self-worth that is massaged only if we have the authority to break rules" (Raghunathan, 2006:16-17). From the other side, there is the ease (if not eagerness) with which the population accepts dictatorial rule by a powerful individual. According to Varma (2004:47), there was no sign of protest anywhere in the country, when Indira Gandhi took over power in 1975, imposed the state of emergency, jailed almost the entire opposition, and effectively took absolute power in all of India. People simply accepted that someone else was now in power, and instantly tried to share in the benefits distributed by the dictator, in stead of opposing his (or her) injustice. Indeed, strong leaders and fervent devotees work together for the same goals of gaining personal wealth and influence (Varma, 2004:48,49).

This tendency towards authoritarian control, and the tendency to submit to it, show that the "fundamentally Indian" cultural characteristics leave little room for universal justice. In stead, there is much room for the abuse of (public) power for personal gain, or in other words: corruption.

Fatalism

According to several authors, fatalism is part of life in India, and stems from Hinduism (Naipaul, 1990:15, Communicaid, 2007, many others). Indeed, a "fatalist outlook" is one of Raghunathan's twelve "canons of Indianness" (Raghunathan, 2006:16-17), and he gives plenty of examples (p.43-46). In the West, the word "fatalism" has a negative connotation. In this research project, the term is used in the sense of "accepting one's fate" which often boils down to accepting the status quo and not planning ahead to avert disasters. A mere description of the causes and effects of fatalism can be perfectly neutral and free of connotations. However, if someone finds the status quo (and disasters) undesirable, that person must (by logical inference) also feel negatively about fatalism.

The existence of a strong (feeling of) hierarchy in society can contribute to a fatalist outlook. Feelings of fatalism may be aggravated by authoritarian decision making, both in the family and at work. For example, some fathers who are in their forties, still need to accept decisions from grandpa, about whether a son should take a certain job offer, or (in some families) whether a baby daughter should be born or aborted (interview).

One of the effects of a widespread acceptance of "fate", is that the powerful are seldomly challenged - that is, by the less powerful. Although the powerful constantly challenge each other (be it politicians, business tycoons, or gurus), they are not held accountable by the mass of less powerful individuals. Thus widespread fatalism in India causes a lack of accountability, which leaves opportunities for corruption.

Unquestioning Acceptance

If people are brought up within a strongly hierarchical surrounding, they are also conditioned to believe authority figures more than their own observations. The tendency for authoritarian control not only limits universal justice (as explained in the previous subsection), but also limits the recognition of reality or truth.

There are two ways in which the school system and society together discourage critical analysis and learning. First, in schools, children and students often have to memorize whatever the teacher tells them, and are not really stimulated to inquire, observe, and form their own opinion. (This characterisation is supported by Saibal (March 3, 2008) on a consulting weblog, reactions of his
readers, and a few interviews conducted during this research project). Secondly, in education, the content or practical use of what is learnt is much less important than the immediate and long term status conveyed by an education (Varma, 2004:114,130). Because of this, there is less room for critical and balanced analysis of government decisions, as compared to "the average Western country". Of course, every country has bright minds that will learn to critique, and masses of people who blindly accept other peoples' opinions. The point here is that India probably has a lower percentage of people possessing the skills for critical analysis. This makes it easier for the powerful to abuse their power and engage in corruption, because their actions are less likely to be discovered or publicly challenged.

**Strategic Outlook**

"Being too intelligent for our own good" is one of Raghunathan's twelve "canons of Indianness" (Raghunathan, 2006:16-17,47). He asserts that Indians are so intelligent that they quickly see through strategic situations, but therefore also lack the kind of generalized trust (which is depicted as less intelligent, more naive) that exists in many Western societies. On the one hand, this finding supports game theory as an appropriate modelling method for Indian behaviour, because game theory assumes that actors think strategically. On the other hand, this "strategic outlook" also supports the notion of a lack of generalized trust, which reveals more about how to fill in the game theory models.

**Absence of Generalized Trust**

The absence of generalized trust has already been touched upon in the paragraph about a strategic outlook. "Low trustworthiness" is yet another one of Raghunathan's twelve "canons of Indianness" (Raghunathan, 2006:16-17) (see also Varma, 2004:36,38). One interviewee explained that trust and relationship are not related in India. "Relationship" is very important in Indian business, and it means eating together, drinking tea, going to weddings, and other such social activities. However, these relationships are not used for building trust, as the average Westerner might expect. Even though you go to each other's weddings, there is no reason to trust each other. Real trust is only built over time, like a track record of faithfulness. Reversing the perspective, the relationship is also not dependent on trust. So if you cheat each other, you can still happily sip tea together! (according to the interviewee). From several interviews, it can be concluded that the traditional way of doing business in India is through very long-term relationships. These relationships often involve families, communities or even larger people-groups. Two businessmen can more or less trust each other if their business relationship was started by their grandfathers.

This research project found that Indians generally do not trust each other if there is not already a very long relationship, and they also do not expect to be trusted. This has implications for the way parties interact in situations where corruption may influence patent protection. In general, a lack of trust will heighten the level of strategic thinking, and also decrease the likelihood of reaching an agreement.

**Opportunism**

Opportunism is to take "advantage of opportunities or circumstances, or of seeking immediate advantage with little regard for ultimate consequences" (Webster's Dictionary). Opportunism in business relationships is both cause and consequence of the behaviour described in the paragraph about "lack of generalized trust". Other examples of opportunism in India are widespread evasion of taxes and electricity bills.

How can you not pay your electricity bill? According to one interviewee, you delay payment until
the end of the year, then one of the higher ranked inspectors comes to check, and you just negotiate a lower price. What is striking about the evasion of taxes and electricity bills, is that this opportunistic behaviour is not always born from necessity, but also displayed by rich people (Varma, 2004:78).

In the experience of some interviewees, many small businessmen in India defect on their first deal, for example by not paying for products received, or by supplying extremely low quality material with a nice polish over it. In the West, this is seen not only as unethical and fraudulent, but as stupid, too. However, in India, many may call it "cunning", because they seem to value a quick profit more than a long term relationship of trust (which, in business, can create continuous profit).

This predisposition to take advantage of opportunities without regard for the consequences, has direct implications for the behaviour that is to be expected in the situations that will be modelled with game theory in later chapters.

A Positive Image

It is very important in India to "keep up appearances". There are three areas where a positive image must be maintained: oneself, others, and India in general.

The importance of maintaining a good image of oneself towards others is obvious, because status is fundamentally important in society. However, one's personal image of oneself is also important. Varma (2004:31) writes that "most Hindus genuinely believe that irrespective of their expedient behaviour, they belong eternally, by the very nature of their being, to the moral sphere. They see no contradiction between this vague sense of moral superiority and the obvious immorality of their actions."

Keeping up a good appearance of others is similar to the concept of "giving face" that is so important in East-Asian cultures (for example, see Tjosvold et al., 2004). In India, the cultural imperative of "face" may play a role, but there is often also a more practical reason, namely that any person that feels insulted may take revenge and cause a lot of damage.

The third object of praise is India itself. Tourism books and media naturally only present the bright side of a country, but in the case of India this tendency is found in many other areas of society. Although most Indians identify themselves strongly with their region, tribe or caste, in stead of with "Mother India" (Naipaul, 1990:4, Kapoor, 2007:23, ), they do express pride about India to foreigners. This may encourage trade and tourism, but more importantly, the portrayed glory of India reflects positively on the image or status of the Indian.

One peculiar example of the importance of image and fame in India, is that most Indians find a big company name more important than interesting work, high quality work or even a high salary. According to an Accenture survey among the "Class of 2008", a "majority of India respondents (62 percent) would like to work for a large corporate organisation compared to only 34 percent of overall respondents" (Business Today, 29 June 2008, p.24). One interviewee explained that it is especially the family of the employee that values a famous company more than a high salary, and that the choice of employer "brand" often also has a large impact on marriage opportunities (which are also heavily influenced by the family).

The fact that image, appearance and "face" are important in Indian society, means that these will probably also play a role in the interactions regarding patent protection and corruption. Violating the unwritten rule of "keeping up appearances" may cause unnecessary irritation or anger of Patent Office employees, lawyers, or judges.
4.2 Justice in India

This section gives an overview of the current state of affairs concerning justice in India. How does the judicial system work in general? How does corruption enter into the courts? What factors limit corruption in the judicial system? These are the questions that will be answered in this section.

First it must be noted that there is a problem with justice in India. If the problem is not actual impunity, there is at least a strong perception of failing justice in India. Opportunism and corruption would have no effect if justice were swift and accurate. One interviewee in particular expressed how little faith he has that justice will prevail. When asked how he can lead a company without any confidence in the delivery of justice by the system, he replied that he just hopes that he will not be affected. He also indicated that he is afraid of growing his company and really achieving something. This is how widespread opportunism and corruption can prevent growth and prosperity, aided by (a perception of) impunity. This section will investigate the current state of the judicial system in India.

Overview of the judicial system

The hierarchy of courts in the judicial system is of interest in view of corruption, because all the appeal options follow the same structure. Appeals go from junior civil judge to senior civil judge (or equivalent city or district courts), to the state High Court single judge, then to the High Court division bench (which comprises two or more judges), and finally to the Supreme Court (Lawyers Club India, April 10, 2008).

Apart from the regular courts with judges, there are a number of government officials and committees that perform semi-judicial tasks. Shamnad Basheer, a patent expert, explains: "Since the patent controller is a “tribunal” (at least when deciding on whether or not something is patentable), [he] will be bound by the supervisory jurisdiction of the High Court under Article 227." (SpicyIP weblog, June 29, 2008). The IPAB (Intellectual Property Appellate Board) is another semi-judicial entity, which is just one step below the High Court in the order of appeals.

A third, interesting feature of the judicial system in India, is that people file court cases very easily, because it is relatively inexpensive. According to an interviewed lawyer, "most people are not afraid of filing a court case, since it is rather cheap. Because a law degree costs only 20,000 INR in school fees, many people choose to become lawyers. This means that the lawyers are both able and forced to charge relatively low fees for their services, especially when compared to the USA. Basically, anybody can get a lawyer. A related issue is that the expensive lawyers are not always of higher quality, so a poor person still has a chance of getting a better lawyer than a large company."

Corruption in the judicial system

Long delays are a major and well-known issue in the Indian justice system (and are partly caused by the large number of court cases filed). According to one interviewed lawyer, trials take on average 7 years to reach completion. Other interviewees indicated that the delays are the biggest problem in the judicial system. Delays can both be caused by bribes, and also give cause for further bribes. The survey conducted by the Centre for Media Studies (2005) reported that 9% of those who give bribes in the (lower) courts, do so in order to delay a case, and 23% do so to speed up judgement (Vol. II, p.7). However, it is not always possible for a bribe-payer to delay or postpone a case. according to one lawyer, delay or postponement in a criminal trial is only possible by adding more witnesses. In the High Court, everything is computerized, so there is no way to speed up one's trial, except for legitimate, exceptional reasons, such as old age. Judges fix the date on which the next appearance in court is to happen. Then clerks could still remove the case from the board, but this is getting increasingly difficult because of computerization.
As already mentioned, computerization generally decreases the opportunities for corruption. The higher courts are generally computerized by now, but many local court administrations are still paper-based. Computers and automation both decrease the power of individual employees over individual cases, and increase transparency. For example, if a file "gets lost", it can be recreated in most cases, thus keeping any court administrative personnel from earning money by losing files. This "recreation" appears to be a new phenomenon, made possible only because of computerization. However, according to one lawyer, it still helps a lot to have a diligent lawyer who will check everything and immediately file a complaint if something "fishy" is going on.

Another lawyer pointed out that most corruption in the courts happens with little things. The granting of bail and the fees involved are a good example, because the Judge has discretion in these matters. Small decisions also attract more corruption than big decisions, because the details are not so much in the spotlight as is, for example, the final verdict. Another corrupt scheme that is often used, is to pay government lawyers or public prosecutors to do their job badly. There is ample opportunity for corruption here, because it is often difficult to distinguish real mistakes from purposeful mistakes inspired by bribes.

Factors that limit corruption in the judicial system

There are also several factors that limit the extent of corruption in the judiciary.

First, if a corrupt judge is encountered, it is often possible to have the case transferred to a different judge. It may not be necessary to actually accuse the judge of being corrupt, because many other reasons can be given for the transfer request, such as unwillingness of the judge to accept a writ petition, or other small irregularities.

Secondly, it is possible to trap corrupt Judges by setting up a sting operation (called a "trap") with the Central Bureau of Investigation (CBI). The CBI uses more or less the same methods as the ACB (Anti Corruption Bureau), but operates on the national level. The CBI is to be preferred in matters concerning the judiciary, because local ACB officers have a higher chance of being under the influence of the judges in question.

Thirdly, there is a Judicial College, that has the task of preventing and punishing corruption within the judiciary. The same functions are performed for other public organisations by the Central Vigilance Commission (CVC). According to one interviewed lawyer, the Judicial College is very effective, and they have made judges resign in the past.

A fourth factor is public scrutiny. Although Indian society is not always well-equipped to perform public scrutiny (see section 3.1), it does play a role in limiting corruption. According to one lawyer, "there is very little corrupt influence in the final verdict of judges, because it is much riskier, as the trials are public and open to scrutiny.". Sometimes the press takes up a specific case of gross injustice, and thus puts pressure on courts to indeed deliver justice. The emergence of internet and freedom of the press do inspire a cautious hope that corruption can eventually be decreased in India, according to interviewees.

One issue that regularly comes up, is the retracting of witness statements. Often the press mentions that a witness "turned hostile", which means that the witness revoked one of his earlier statements. Because of this practice, it is very easy for corrupt people to silence witnesses and thus erase evidence. An interviewee gave the example of the murder of a girl in a bar, with about a hundred witnesses. However, not one of the witnesses would testify in court. Many of these people retracted their earlier statements when they where asked to testify in court, because the accused was the son of a powerful local politician or businessman. (The killer eventually did get convicted because the media took up the case and pushed for justice). Several NGOs are working together to get laws passed that make it impossible to revoke witness statements, but they have not succeeded yet.
Several interviewees agreed that corruption is a problem in the judicial system, but insisted that it only occurs in the lower courts. Mr. Bharucha, as former Chief Justice of India, made an often quoted statement that implied that roughly 20% of judges is corrupt, and implied that this corruption is not necessarily limited to the lower judiciary (Press Information Bureau, 2001). One interviewee also noted that the extent of corruption in the lower courts has become worse during the last 15-odd years.

4.3 Patent Protection in India

This section will go more into the details of patent protection in India. After a short introduction about what patents are, the general phases of patent protection are described. One paragraph will be dedicated to the legal issues involved in patent protection. The section ends with an overview of the current role of patents for Indian businesses, patent-awareness, and trends for the future.

What is a Patent?

A patent is "the exclusive right granted by a government to an inventor to manufacture, use, or sell an invention for a certain number of years." (Dictionary.com Unabridged). The Indian Patent Act defines an invention as follows: "'invention' means any new and useful- (i) art, process, method or manner of manufacture; (ii) machine, apparatus or other article; (iii) substance produced by manufacture, and includes any new and useful improvement of any of them..." (Indian Patent Act, 1970, section 2 (1) j.).

Although every patent relates to an invention, not every invention is patentable. The requirements for patentability of an invention are: (1) Novelty, (2) an Inventive Step, and (3) Industrial Applicability (Krishna & Saurastri, Patents FAQ, 23 June 2008). In addition to these three requirements, a number of specific categories are not patentable, or only under certain circumstances. For example, Indian patent law does not allow any patents on agricultural methods or atomic energy, allows only process patents (no product patents) on medicines, and only allows software patents if the invention is directly connected to the operation of a machine (such as chemical process control software) (Indian Patent Law, 1970, sections 3 and 4).

Current Use of Patents and Future Expectations

The dominant culture in most of India seems to be a culture of copying and not a culture of patenting. According to one interviewee, Indians do a lot of reverse engineering: taking an imported product, taking it apart, and finding ways to reproduce it themselves (for slightly lower costs). Compared to China, India is running 10 years behind if measured by patenting activity. "In 2007, there were 245,161 invention patent applications filed at the SIPO [Chinese Patent Office …] In contrast, a total of 24,505 applications were filed at the IPO [Indian Patent Office] in 2005–06, …" (Evalueserve Report, 2008:13). This indicates that Chinese domestic companies are way ahead of those in India, in terms of patenting activity and awareness about the importance of patents. However, the use of and awareness of patents is growing sharply, with the number of granted patents doubling every year (Ministry of Commerce & Industry, Press Release, 2 April 2008).

General Phases of Patent Protection

This research project uses the term "patent protection" in a very broad sense. A patent is successfully protected if the true inventor gets the patent granted without too much difficulties or bribes, and his patent rights are upheld in court, which means that any infringers are effectively stopped from infringing. From this definition, four general phases of patent protection can be distinguished:
1. Patent registration
2. Infringement and its detection
3. Litigation about patent rights
4. Enforcement of the judge's decision

These phases comprise the total "patent protection process", which will be subdivided into twelve steps and described in more detail in chapter 4.

**How Patent Law and Infringement Work**

If a person or company (the "infringer") infringes on a patent, the patent holder normally tries to get the court to issue an "interim injunction" against the infringer. The goal is to stop the infringer from making money without a licence. Because of the backlogs in the judicial system, it takes a long time before the final verdict is reached, so the only effective way to reach the patent holder's goal is an interim injunction. This is normally only granted in a "prima facie" case: a clear-cut case of infringement with lots of evidence. As a counter-move against the patent holder's actions, the (suspected) infringer often claims that the patent should not have been granted in the first place, and tries to get it revoked by the court. Any grounds on which the patent should have been denied in the examination phase at the Patent Office, are legitimate grounds for revoking a patent even after it has been granted (Indian Patent Act, 1970, section 107 (1)).

It may not always be necessary to go through the whole litigation process with the courts. Another option is to use so-called "raids" as a deterrent. According to an interviewed patent lawyer, this could be done as follows: The patent holder hires a private detective to find out exactly where the infringing material is produced, stockpiled or sold. Then the patent holder files a case before a court to get an injunction and / or a seize order. The best thing is to get a blanket order (which is not always given), which makes it possible to impound any infringing material found anywhere. The patent holder should be careful not to let any specific information about the infringers leak to the police, because corrupt police officers could warn the infringer in return for money. After getting the order from the judge, the patent holder takes the police and raids the infringer's place. The physical evidence of infringing material can later be used in court, if necessary. However, in some cases the raids alone are already an effective deterrent to further infringing activities by others.

**International stake in Indian Patents**

Although this research project largely ignores the international relations that may be involved with patents, it is appropriate to make some remarks here about international interests. On top of the fact that the number of Indian patent applications is relatively small, approximately 80% of Indian patents is filed by foreigners, and only 20% come from domestic applicants. For comparison, in China, domestic applicants filed more than 62.4%. (Evalueserve Report, 2008:13). According to Evalueserve research (2008:4), there are only four Indian organizations in the top 50 patent filers at the Indian Patent Office (measured by number of published patent applications between January 2005 and December 2007). These four are the Council of Scientific and Industrial Research (CSIR), Ranbaxy Laboratories, Dr. Reddy's Laboratories and the Indian Institutes of Technology.

Besides having a low number of patents, the patenting activity of Indian companies and institutions is also relatively low. Evalueserve uses the ratio of revenue to the number of patent applications as a measure for how active an organisation is in patenting. It finds that the top 10 Chinese patent-filing organizations have an average ratio of 7.94 patents per 100 million USD, whereas the average ratio for the top 10 Indian organizations is only 2.14 (numbers converted from revenue-per-patent ratios published by Evalueserve, 2008:14). According to Evalueserve (2008:14), this "clearly indicates
that the patenting activity exhibited by Chinese companies is almost four times more intense than that in Indian companies.

**The Patent Offices**

In the course of this research, a number of issues have surfaced concerning the organisation of Indian Patent Offices themselves. These issues are the extent of automation or computerization, patent examiners' professional capabilities, and a few reported cases where corruption might have played a role.

The Indian Patent Offices are quickly being automated or computerized. According to one interviewee, already 200,000 patents have been granted in the past, and the majority of those will be available on-line at the end of the year 2008. Patent applications can also be filed on-line, but only a few hundred per year take that route, as most patents are still filed in hard copy format. However, all hard copy applications are already being digitized for internal use (interview).

Although the Patent Offices are working hard to keep up with the growing number of patent applications, some people have serious concerns about patent examiners' professional capabilities. For example, the following was posted on SpicyIP weblog: "Talking about the three major requisites for patentability, [an examiner at the Indian Patent Office] said: “Anything and everything on this earth is patentable provided it is novel, inventive and industry applicable.”. [... However,] section 3 [of the Patent Act] includes several patentable subject matter (or patent eligibility) exclusions such as "method of medical treatment", "software per se", "method of agriculture" etc. In other words, although you come up with a new, non obvious and useful "method of agriculture", you are still not entitled to a patent in India. What is striking is that this is a statement made by someone in whom the government of India vest the power to decide whether or not society needs to bear the burden of a 20 year monopoly." (emphasis removed and added) (SpicyIP weblog, July 6, 2008. For the issue of identifying the examiner, see July 17, 2008).

Newspapers and weblogs have reported on a few cases where corruption might have played a role in decisions made in the Patent Office. SpicyIP reports on a case that is similar to the so-called "Valcyte case", where "a patent was granted after completely ignoring the opposition request to be heard." (SpicyIP, February 19, 2008). This "completely ignoring the opposition" may have been caused by a technical mistake, but is also the typical kind of behaviour that is caused by bribery.
5 Building the Model

This chapter presents the detailed model of the "total patent protection process". First the four broad phases of the patent protection process are elaborated further into 12 steps. Two of the most significant steps, where corruption has the most potential to decrease patent protection, are then selected for modelling as games. The formulation of the twelve step model, and the selection of the most relevant "arenas", is based on the Draft Patent Manual (2008) and several interviews.

5.1 Four Phases in Patent Protection

The complete process of patent protection can be divided into the phases of patent registration, infringement, litigation and enforcement of courts' decisions.

At the very beginning of the patent protection process is the decision of an inventor: whether to apply for a patent or not. This decision is not treated as such in this research project, as it depends on many factors, including the expected payoffs of registering a patent, which depends on the whole patent protection process. To start the whole process, we assume that the inventor does apply for a patent.

After a patent application has been filed, the Patent Office takes a number of steps before granting the patent to the applicant (whom we assume to be the inventor). In this "patent granting process", the patent is examined on mistakes, checked with previously published inventions, and under certain circumstances the patent may even be granted to someone other than the applicant. These details will be filled in in the next section.

A patent that has been granted, prohibits anyone other than the patent holder (and those whom he licences) from using, manufacturing or selling the patented invention. If someone violates this rule (by using the invention), it is called "infringing upon the patent", and the violator is called "infringer". The chances of infringement depend on expected profits, expected punishment, and of course the chance of detection, which will all be detailed further.

Once infringement has been detected by the patent holder, he can take the infringer to court in order to protect his patent rights (exclusive rights to the invention). Other options are arbitration or settlement. All legal procedures cost money (for both parties), so in some cases it may be better for the patent holder not to exert his rights.

The final phase of the patent protection process is the enforcement of the decisions made in the legal phase. Courts' judgements are worthless if the punishment is not carried out. Arbitration has no effect if the agreed damages are not paid. An order for shutting down the infringing activities (called an "injunction") is just a piece of paper if the operations are not actually shut down. This fourth and final phase is as important for patent protection as is the first phase of granting the patent to the "first and true" inventor.

5.2 Twelve Steps of Patent Protection

The four phases described in the previous paragraph have given an outline of the whole process. Now these four phases will be described in more detail in twelve steps, which is necessary for the next paragraph, where the "hot spots" or "arenas" will be selected with regard to the influence of corruption.

The process of patent protection starts when an inventor files a patent application at his regional Patent Office. For the purpose of this research project, we assume that the "applicant" (who filed the application) actually is the true inventor of the invention. This assumption is made because we will
describe the process of protecting a valid patent, and see how corruption may interfere with this process.

**Step 1: National Security Check**

The submitted application is first checked for anything that might be relevant for national security. If this is the case, the Controller General of the Patent Office notifies a special committee of the DRDO (Defense Research and Development Organisation) and prohibits any publication or communication of the invention. The DRDO may decide to overturn the Controller General's initial decision, which means the application proceeds in the normal fashion. If the DRDO agrees that the invention is to be kept secret (and thus no patent will be granted), it may choose to compensate the inventor, but it has no obligation to do so. There is absolutely no appeal possible to all these decisions.

Most applications have no relation to national security. However, if the Controller General and the DRDO are both corrupt (and know that about each other), there is ample opportunity for extortion, because there is no appeal procedure possible.

This first step is not a problem if it can be clearly shown that the invention has already been published, and therefore is not worth keeping secret any more. If the invention was published under the name of the original inventor, it can still be patented, because a publication by the inventor himself does not count as "prior art" (see step 3). However, a published invention may attract much more (ungrounded) opposition from competitors (before or after the grant), and may also facilitate infringement, both of which are detrimental to the inventor.

**Step 2: Backlogs**

Under normal circumstances, the examination process (step 3) could be initiated almost immediately after filing the application. However, according to one well-informed interviewee, there is currently a backlog of applications waiting for examination, which amounts to a delay of 8 months. Delays generally invite corruption, because people think that it may be possible to by-pass the delays by paying a little extra here or there.

For the inventor, these delays are not necessarily problematic. The priority date, which is very important for proving to be the first (and thus legitimate) inventor, is already established as the date when the application was filed. The backlog is for the examination of the patents, which just causes the "patent pending" status to last longer, until the patent is finally granted.

The only problem the delays could cause for the inventor is that the official acceptance of the patent application also takes longer (step 4). This means that there is more time for competitors to use the invention without being liable, because liability for infringement starts at acceptance (step 4).

**Step 3: Examination**

The normal process of patent registration continues with examination by a specialised Examiner. The patent is examined on two criteria: (1) "Is the application filed correctly and are all the forms filled out?" and (2) "Does the described invention qualify as patentable material, is it new (novel) and non-obvious?".

For this research, we will assume that the patent application is filed correctly, with all the needed forms filled out, correct contact details, clearly formulated claims, all necessary attachments, and all official fees paid. So only the second criterion plays a role here.

The most important part of a patent is the list of claims. These are statements that need to be formulated very precisely, because they describe what exactly the invention includes. The criteria of
novelty and non-obviousness are evaluated using these claims. This is the criterion of novelty: the claimed invention must be new. If anything claimed in the application has already been published earlier in any publication in or outside India, that claim needs to be eliminated or changed (amended). The earlier publications are also called "prior art".

An invention is "obvious" if a person "reasonably skilled in the art" (the "art" is the industry to which the invention relates), could simply combine separately published ideas to come up with the claimed "invention". A real invention is non-obvious.

The Examiner is the one who searches all the publications and compares them to the patent application to determine if it is a legitimate invention. He then writes a report for the Controller General, who will ultimately decide which amendments are needed. If the Examiner is corrupt, he might threaten to write an unfairly strict report (asking for amendments that are not needed), thus inducing the applicant to soften the way by paying a bribe.

It could happen that the Examiner does not search well enough and thus an application is approved that should not have been, which could cause problems later on. However, if this happens, there is no way the Central Government or any government officer can be held responsible for it (Indian Patent Act, section 13 (4)).

**Step 4: Acceptance**

After sufficient amendments are made, the Controller General needs to officially accept the application. Here again, if the Controller General is corrupt, he might stall, come up with new small faults and the like, all the while hinting at "speed money".

The whole issue of acceptance has remained a little unclear, but the author of this report is of the opinion that liability of infringers starts from the date of acceptance, and not earlier. Although infringement lawsuits cannot be initiated until the patent has been granted, the verdict in such a court case can calculate the compensation (to be paid by the infringer) from the date of acceptance.

**Step 5: Opposition**

Before the patent can be granted to the applicant, Indian patent law gives an opportunity to anyone to oppose the application. The full specification of the invention is published in an official newspaper called the "Official Gazette", which starts a period of four months in which objections can be made against the application. This is called "pre-grant opposition", because it is done before the patent has been granted. Many companies wait until after the patent has been granted, and then start a procedure of post-grant opposition.

Objections can only be made on two grounds: (1) the invention was "wrongfully obtained" from the opposing party, or (2) there has been a prior publication of at least one of the claims of the patent application.

If a pre-grant objection has been filed, the Controller General will hear both parties and decide who gets the patent. If the invention was "wrongfully obtained" (i.e. stolen), the Controller General may decide that the application is to be treated as if the opponent had filed it. This means that the first applicant has gone through all the trouble of the previous steps, only to finally lose his patent application to a competitor (who claims to be the true inventor). Remember that we assumed that the applicant is the first and true inventor. If the Controller General is corrupt, he might collaborate with the opponent to frame the applicant, to create the appearance that he had wrongfully obtained the invention. However, for these and similar decisions of the Controller General there is an avenue for appeal: the IPAB (Intellectual Property Appellate Board). Therefore the Controller General will only behave corruptly at this point if he knows that the IPAB will not punish him for it (which
means that key IPAB officials also need to be corrupt and known to the Controller General).

Suppose that the Controller General and the IPAB are both corrupt and try to give the patent to the opponent, then it is still possible to appeal to regular courts or the special corruption courts of the CBI (Central Bureau for Investigation). However, because of the appeal procedures, it may still take a long time to get justice for the applicant / true inventor.

On the other hand, if the IPAB is incorruptible, the true inventor can still get his patent, even if an opponent stole the idea from him and quickly filed a patent application before the real inventor could do so.

### Step 6: Registration

After the opposition period has ended, the patent needs to be entered into the registers, including name and contact details of the patent holder. There is an official fee involved with this, but a corrupt registrar might ask for something extra to do his job well. (Such extra registration costs are not uncommon in other public service departments, as evidenced in the report of Transparency International India (2005)).

However, there is a much more serious possibility: After the original patent holder has registered it on his name, a competitor might come, pay the registrar a large sum, and change the records to state that now *he* is the patent holder. This may sound absurd, but exactly the same is a well-known problem in the Indian house rental sector, and one of the reasons why many Indian houses cannot be rented for longer than 11 months (according to interviews). Of course, this crime may be found out and eventually be punished in court, but this could take a very long time and a lot of money (see section 3.2).

### Step 7: Infringement

When someone uses, manufactures, sells or imports the patented invention without obtaining a licence from the patent holder, this is called infringement. After the patent has been granted, infringers can be sued not only for their activities since the granting, but even since the official publication of the accepted patent (see step 4).

A competitor of the inventor who may be thinking about infringing upon the inventor's patent, will take into consideration factors such as the expected gain from using the patented method or product as compared to other options, and the expected punishment for infringement. If the situation involves a high-tech invention, infringement is only possible if the competitor has enough technical expertise to actually make or use the invention. The expected punishment for infringement depends on the power balance of the competitor relative to the patent holder, the amount of punishment recommended by law, the extent of corruptibility of the judiciary, the delay in punishment (i.e. because of backlogs in the courts), and the chance that the infringement will be detected.

### Step 8: Detection of infringement

Detection of infringement is defined here as the top management of the patent holder (firm) finding out that a competitor has infringed on his patent. Because this research project investigates patent protection from the perspective of small and medium-sized enterprises, the "patent holder" is thought of as a company, not an individual. Besides, patent rights themselves were created for economic use in the first place.

One interviewee made the following comment on the chances of detection: "Because India is such a large country, and most of the businesses are small and not registered, it is very hard to detect infringement of your patent. Of course, this does depend on the type of invention you are patenting:
some complex or expensive inventions may only be copyable by large firms."

Starting from this general sketch, we can assume that the chance of detecting infringement is higher when:

1. The chance of infringement actually happening is high (see step 7), because infringement cannot be detected if it does not happen.
2. The patent holder company is large, relative to industry size.
3. The competitors are concentrated in a few, large companies.
4. Much information about the patent and how to report infringement is passed down to the patent holder's employees.
5. Information and motivation about reporting patent infringement is given to licensees (if any).
6. Information about the trade or industry, and its companies, is easily accessible.
7. The invention is a product rather than a process or method (because the product can be spotted in the marketplace, whereas a process is hidden in the infringer's factory).
8. The invention is for the consumer market rather than for the government (because the infringing product or method can be spotted more easily if the market is more transparent).

**Step 9: Whether to sue the infringer**

In case of infringement, the objectives for the patent holder are (1) to stop the competitor from continuing his infringing activity, and (2) the payment of damages or compensation by the infringer, to the patent holder. These will be discussed in more detail in step 10 (the court's decision).

There are three options for the patent holder to choose from:

1. Sue the infringer
2. Do nothing
3. Negotiate a settlement

If the infringer is serving a market (segment) in which the patent holder's company is not interested (also for the future), then lengthy court procedures may not be necessary because a settlement can be reached more easily. It may be possible to negotiate with the infringer, including the possibility of a license agreement, which is advantageous for the patent holder because royalty payments are an easy source of cash.

When choosing not to sue the infringer, care must be taken that this does not lead to an effective loss of patent rights. If patent rights are not actively defended (within one or three years of detection of infringement), these rights can be lost.

The expected costs and benefits of litigation will be discussed further in step 10 (the court's decision).

When suing an infringer, there are two levels of courts where the patent holder can start the legal process:

1. At the City Civil Court: Sue for injunction and a declaration of ownership of patent (stating that the patent holder indeed owns the patent). The patent holder can also include a petition for liberty for damages (which, probably, keeps open the option to sue for damages later). This is more appropriate if the infringement has just started and there are almost no damages to be paid yet.
2. At the High Court: The same things can be done, but here it is also possible to sue for damages directly.

Often, after an injunction is awarded, the infringer tries to come to a settlement with the patent holder. This saves a lot of money, and, through a licence structure, might actually benefit both parties.

**Step 10: The court's decision**

Infringement cases are normally dealt with in the District Court (Indian Patent Act, section 104). Appeals can be made to the High Court of the respective state. After that, the case goes to the Supreme Court.

In the typical Indian infringement case, the defendant (infringer) immediately files a counter-claim for revocation of the patent, claiming that the patent should not have been granted in the first place. Both cases are then transferred to the High Court (Indian Patent Act, section 104).

Already in an early stage of the legal process, a judge can issue an "interim injunction" to immediately stop all infringing activities. This is only possible, however, when the case of infringement is obvious, called a "prima facie" case.

At the conclusion of the case, after all arguments are brought forth and witnesses have been heard, the court can order a permanent injunction, and "damages" to be paid in compensation for the profits foregone by the patent holder.

The immediate halting of all infringing activity is often the primary objective for a patent holder wishing to defend his patent. The reason for this is that every product made by the competitor, takes away part of the market share of the patent holder, which stands not only for profit, but also production volume, which is important for economies of scale, expansion plans, job security, and local influence. Because of long delays in the Indian courts, with profits being lost to the infringer every day, the interim injunction is very important to the patent holder.

The issue of interim injunction is central in the short run (a matter of weeks), whereas the possibility of either permanent injunction or patent revocation is a long term result (estimated between 3 and 15 years). (This variation is partly caused by variation in delay times in the slow and overburdened court system). Each of the parties involved values every outcome in his own way. For example, even if the patent is revoked relatively quickly after 3 to 5 years, the interim injunction would still benefit the patent holder. In game theory, all these results of the decision-making process are called "payoffs". A more precise examination of the payoffs for the patent holder would also include the court fees, wages of lawyers, hours spent for the case, and bribes paid (if applicable).

What determines the outcome of a court case? Normally, one would say that all depends on evidence and a good lawyer. However, in India a number of other conditions could play a role, which will be listed below. In this research project it is impossible to take into account all the different circumstances that can arise in individual cases. Rather, the effects of structural factors are explored. Variations between individual cases, however, might have effects of equal or greater magnitude than the structural factors and should be studied in that respect.

Structural factors relevant in court cases:

- Appeal options (to move the case to higher courts)
- Massive case backlogs (leading to delays)
- Transparency of the court's administration processes (to prevent files getting "lost")
- Lawyers could function as middlemen in corrupt transactions (because they have all the
necessary contacts)

- Case transfer options (to another judge or court on the same level)
- Existence and effectiveness of the ACB (Anti Corruption Bureau) and the CBI (Central Bureau of Investigation), with their "traps" (sting operations against accepting bribes), "inappropriate wealth"-investigations, and special fast-tracked corruption courts.

Factors that could be classified as either structural or individual:

- The chance of facing a corrupt judge at the initial level. (Section 1.6 explains the possibilities and difficulties in estimating this chance.).
- The chance of encountering a corrupt judge in the appeals court. (Several interviewees stated emphatically that corruption is only an issue in the lower courts, and does not occur in the higher level courts. However, other sources such as the "E-Voices of Human Rights" (April 21, 2008) describe many examples where even members of the Supreme Court acted suspiciously).
- The loyalty of lawyers to their clients. (One might attempt to bribe the lawyer of the opposing party, to do his job poorly).

Circumstances in court cases that vary too much among individual cases:

- "Influence" of each party over the judge, or over each other. (Influence is conceptualized as all types of influence that one person can have over another that stem from a relationship and not directly from bribes or intimidation. A has influence over B, if, for example: A is B's father-in-law, B lives in a house owned by A, A's company employs half of B's extended family, A funds B's political campaign, B's company is dependent on a special licence issued only by A's uncle, etc.)

Another circumstance that varies widely among individual cases, is the strength of moral or internal barriers for the patent holder to pay bribes. This variation will be included in the game analyses, because it is interesting to investigate the differences in options, strategic choices and outcomes for two types of patent holders. The games will be analysed twice: once with a bribe-paying patent holder and again with a zero-bribe patent holder.

If the courts rule according to justice, the infringer was "awarded" an injunction, either interim or permanent, depending on the stage of the proceedings. If this is the case, we can continue with step 11: enforcement.

**Step 11: Enforcement of the injunction**

An injunction means that all infringing activities are stopped immediately. This means that policemen and/or government officials need to go to the infringer's production facilities, order the infringing part of the production to be halted, and seal the place so that production cannot be resumed again.

There may be several reasons for the injunction not to be executed properly. From an Indian perspective, the most straightforward thing to do for the infringer, would be to bribe the inspectors when they come to close down production. Similar things happen frequently with licences or electricity bills. Another way to escape the injunction might be to secretly start production in a different location, while the first production site is closed down under the injunction.

If the injunction is not enforced properly, the judge can start a procedure of contempt of court, which brings us at step 12.
Step 12: Contempt of court

A judge can charge any person with "contempt of court" if that person hinders the course of justice. The accused person will then have to defend himself in a separate court case. On the Lawyers Club India forum (April 20, 2008), Hon. Justice Markandey Katju is quoted on the purpose of the contempt facility: "In a Democracy the People should have the right to criticize Judges. The Purpose of the contempt power should not be to uphold the Majesty and Dignity of the Court but only to enable it to function."

"Interfering with the course of justice" includes not only the hindering of proceedings in the courtroom, but also the refusal to pay damages allocated by the court, or not executing other court orders like an injunction.

Another report on the Lawyers Club India forum (March 13, 2008) reports: "Of late, there is a general tendency on the part of the governments and other authorities to thwart implementation of judicial orders and writs, leaving the aggrieved party with no alternative but to invoke the contempt jurisdiction." (This quote may serve to show that court orders are indeed not always obeyed, at least by government agencies).

In practice, Indian judges do not seem to hesitate to invoke the contempt laws. The only way for an infringer (and the inspector, if applicable) to avoid the serious trouble of contempt proceedings, is to make sure that the judges never find out that their rulings were not carried out.

5.3 Selecting Focus Areas for Game Modelling

From the twelve-step process presented in section 4.2, the focus areas or "arenas" will now be selected, bearing in mind the probability of reaching that step, what could happen there (alternatives), the probabilities of each alternative materializing, and the effects of each alternative if it becomes reality. This way of thinking is equivalent to that of a decision tree. The only difference is: At each decision node, multiple actors interact in a game-type manner, which determines the outcome of that situation.

Probabilities and effects can differ a lot, between the case of an applicant or patent holder that is extremely committed to a zero-bribe policy, and one that is willing to pay a bribe if necessary. If the patent holder is open to paying bribes, he can basically "bribe his way" through all the steps, thereby achieving higher chances of reaching the end, but at higher cost since bribes can be extracted from him at every step. The case of the zero-bribe patent holder is much more interesting, because the refusal of the compromise of bribing forces the decision into more extreme avenues. In an encounter with a corrupt government official, either justice is done simply and quickly, or the patent holder gets into big trouble (such as long delays), or the corrupt official is arrested for corruption. Therefore, the case of the zero-bribe patent holder can more clearly point out which steps should be selected for further modelling.

At this point it must be noted that the limits of time and effort made it impossible to specify quantitative probabilities at each step within this research project. Therefore a more qualitative argumentation will be used to select the most interesting steps out of the whole patent protection process. First, a number of arguments are brought forth for or against selection of specific steps, which will lead to a final selection of two of the twelve steps.

Delays in the patent registration system are not an issue for most applicants. The priority date (or date of filing) is most important, plus getting the patent granted in the end. As soon as the patent application has been accepted and published, the rights to the invention are protected. The only reason for making haste with getting the grant, is that court procedures for damages (due to infringement) can only be started after the patent has been granted. However, settlements or
licensing agreements can, in principle, be made even when the patent is still pending. In the absence of a reason to make haste with getting the patent granted, there is little scope for corruption in connection with backlogs at the Patent Office (i.e. bribes to speed up the process). Therefore, steps 2, 3 and 4 are not selected for game theory modelling to explore how corruption can influence patent protection.

Step 5 (pre-grant opposition) and step 9/10 (infringement court case) are connected. If there are appeals made in the pre-grant opposition phase, the case could get to the High Courts and revolve around the same issues that are central to infringement cases. Therefore, if pre-grant opposition (step 5) is selected as one of the relevant interactions to be analysed, there is already some reason to also analyse how infringement cases are dealt with in court (step 10).

The probabilities and effects relating to steps 7 and 8 (infringement and detection of infringement) depend in large part on aspects of the patent holder's firm and competitors, of the industry in general, and on the nature of the invention. Corruption plays no direct role here, but only indirectly through the expected punishment of an infringer. Therefore steps 7 and 8 are not the most relevant for the modelling of the influence of corruption.

One interviewee specifically pointed out that the main problem with patent protection lies in a lack of enforcement of patent rights due to case backlogs in the courts, which prevents a patent-holder from swiftly bringing infringement to a halt. This suggests that step 10 (the court's decision), and therefore also step 9 (whether to sue the infringer) are the most relevant choices for further analysis. (Step 11, enforcement of the injunction, is omitted here because the argument focuses on the courts).

Step 11, enforcement of injunction (stopping the infringing activities), is crucial for the actual protection of patent rights. However, it will not be included as one of the areas to be modelled, because of step 12, "contempt of court". Contempt of court procedures in India seem to be quite effective in forcing people (including the police) to obey court orders such as an injunction. The contempt of court procedures are very fast, very clear, and have direct consequences for those not obeying court orders. Therefore, the threat of enforcement (step 11) not happening, is countered by the actual effectiveness of contempt of court procedures in India (step 12).

All the previous arguments, taken together, point towards a few situations (arenas) being most salient to the success or failure of patent protection as it is influenced by corruption. These arenas are briefly highlighted below, as a more complete discussion will follow in the coming sections of game analysis.

- Step 1: National security check. The main problem here is that appeal is not possible by law (because of the sensitivity of national security issues).
- Step 10: The court's decision. The chance of reaching this step is not that large, because after registration of the patent, it first needs to be infringed, the infringement needs to be detected and the patent holder needs to opt for suing (in stead of settlement), before it comes to a court case. However, there are many opportunities for corruption and delays to effectively nullify the patent rights.

During this research project, step 5 was initially included as one of three arenas to be modelled. However, it was dropped after the game setup phase, due to its complexity and time constraints on the research project. Besides, the aspects of the patent that are relevant in step 5 (pre-grant opposition), are also covered by step 10, thus reducing the need for a separate analysis of step 5.

The two selected focus areas or arenas will each be modelled in detail in the following two chapters, using game theory.
5.4 How Game Theory is Applied in This Project

This chapter has given a description of most important phases of the life cycle of a patent (from the viewpoint of protecting the patent rights). Each of the two selected arenas has a different set of players, each with various strategies to choose from, and specific rules that apply to that situation. The specific form that is chosen for the game setup and analysis, is different for each of the two selected "arenas". However, there are a few common characteristics of the modelling approaches, which will be explained first. (For an introduction to game theory, please see section 1.5).

The game modelling approaches of this research project are all qualitative. As section 1.6 has explained, it was impossible to get sufficient quantitative data, especially for the payoffs and risks involved, and for the estimations of the likelihood that certain civil servants will be corrupt. Another general feature of this project's approach is that it did not use the normal form in a pure way, but adapted it to the specific needs of the game arenas.

In arena 1 (the national security check), a payoff matrix is used just like that of the normal form method, but it is not specified that the players move simultaneously, nor is it clear which party (can) move first. These ambiguities lie at the heart of the corrupt transaction situation, and are the result of the attempt to model many slightly different real life interactions with only one game model. Instead of defining which player moves first (as in sequential games in extended form), the game analysis explores the credibility of threats that can be made by the players. For example, in a negotiation situation, player A could claim that he will never "give in". If there is enough reason for player B to believe him, this will change the way player B chooses his strategy, since he can no longer hope to get the payoff that would have resulted form A's "giving in". A second (minor) adaptation to normal form games, is the use of numerical payoffs in a qualitative model to display preferences more clearly (as is explained in section 1.5). Another feature of the arena 1 model is the use of a "two-level" game (because in reality the patent holder has to deal sequentially with two different levels of government authority). Because (in this case) level 2 is played out after level 1, the outcomes of level 1 are the starting point for level 2. However, the expected outcomes at the second level may also influence the choices made during the first level, which is why the games must be analysed together.

For arena 2 (infringement court case), different modelling techniques were chosen than for arena 1. The strategic interactions in arena 2 are also divided into two phases, but this is not exactly the same as a two level game. One of the factors that makes Putnam's concept (1988) of a two level game unique, is that one of the players is involved in both levels, encounters different "opponents" on each level, and must keep in mind that his actions on one level can have effects in the other. In the game model of arena 2, all four (or five) players are involved in both stages of the game. Another difference between the models of arena 1 and 2, lies in the way the models try to capture the diversity of real life situations. Some factors have too much variation altogether, and had to be left out of the model completely, such as the existence of personal (family) connections to powerful individuals. Other factors can be fixed by assumptions (i.e. the assumption of corruptness of patent office employees in arena 1). However, in arena 2, there are three player types (judge, lawyers, and patent holder) that have a variable associated with them (corruptibility, loyalty, and bribing policy, respectively), and this has a profound influence on the way the game is played and on its outcome. Arena 2 is analysed by first defining the general game, and then calculating the most probable outcomes, for each value combination of the variables.

Now the game models can be set up and analysed, in chapter 5 for arena 1 (the national security check), and in chapter 6 for arena 2 (the infringement court case).
6 Arena 1: National Security Check

Because the chosen modelling technique is game theory, actors will be called "players" throughout the game analysis, even though they may not think of the situation as a "game". One can think of "actors" as the description of real world persons or organisations, and of "players" as their more generalized and more abstract representation in the game analysis.

For each player, the goals, strategies, perceptions, and preferences will be described. An interesting addition made by Scharpf (1997:84-87) is the "interaction orientation" of a player, which describes in what way the players care about the outcomes for the other players. (In order to avoid confusion with the "mode of interaction" that will be described below, the interaction orientations are labelled "attitudes toward other players" in this project.). Together, these five parts completely define the player for the purpose of game theory. In order to compare the players with each other and to clearly present the differences and similarities between them, a separate paragraph is devoted to each of the "parts" that make up the players.

After the description of all players according to their goals, strategies, perceptions, preferences and attitudes, the structure of the game itself needs to be defined. The "mode of interaction", as formulated by Scharpf (1997, p.47 and ch.5), can be used to describe how the players interact to produce the outcome of a decision or game. The four modes Scharpf distinguishes are "unilateral action", "negotiated agreement", "majority vote", and "hierarchical direction". Not every mode can appear in any type of institutional setting, which Scharpf divides into four types: "anarchic field", "network", "association" and "organisation". For example, unilateral action can be used in all four institutional settings, but hierarchical direction is only possible within an "organisation". The game structure is completed by describing all the other "rules of the game": both physical possibilities and impossibilities, unavoidable consequences of certain actions, but also societal "institutions" or rules that all players adhere to, often unconsciously.

When the players and the game structure have been set up, the game is ready to be "played out". This is the analysis of how all the players' options and choices interact, and what the most probable outcomes will be. This format presented above will be used in the coming sections for analysing the three selected situations (arenas).

6.1 General Game Setup

Players

There are three players involved in the first arena, which deals with checking whether the patent is relevant for the national security of India. The players are the inventor, the Controller General of Patents, and the Defense Research and Development Organisation. Because the inventor is the one who filed the patent application, he will be labelled "Applicant". The role of Controller General of Patents, is often played by the head of one of the four local Indian Patent Offices, who has the rank of Assistant Controller. Therefore, this player is denoted "Controller". The Defense Research and Development Organisation (DRDO) is instituted by the government and ultimately decides whether patent applications are to be kept secret (because the inventions has a bearing on national security) or can be used in general business.

Assumptions

The vast majority of inventions has no value for or against national security. Because this report is about the general case of patent protection in India, and does not concern a specific type of inventions, we assume that the invention in question has no relation to national security whatsoever.
However, as will be shown, this does not mean that such an invention is safe from being classified as "top secret".

For the purpose of simplifying the model, it is assumed that the Controller is corrupt, which means he will try to get some extra income from bribes, and does not mind to be dishonest or unfair or to bend the rules. Without this assumption, the Controller will simply do his job, and since the invention is assumed to be unrelated to national security in any way, the Controller will simply approve the application. It was found to be impossible to estimate the likelihood that a Patent Office Controller is corrupt, as has been explained in section 1.6.

Other (minor) assumptions are the following:

- The Controller and the DRDO both initially assume that the Inventor is just like all other applicants, his only objection against bribing being the loss of money.
- The Controller cannot be punished for wrongly selecting (detaining) an application for inspection by the DRDO Commission.
- If the Applicant pleads for release, but the DRDO still detains the application, there is a small chance that the Applicant succeeds in damaging the DRDO Commission's reputation by involving the media, or because other (legal) investigations may be started.

**A Game Played on Two Levels**

When the Controller detains the patent application, the DRDO is notified and can review the decision of the Controller. Therefore, the decisions relevant in this arena can be divided into two connected games, or a "two level game". The first game is played between the Applicant and the Controller, and concerns whether the Controller will forward the application to the DRDO or release it for normal processing. The second game is played primarily between the Applicant and the DRDO, possibly with some influence of the Controller, and determines whether the invention is stashed away as "top secret" or released for the benefit of the Applicant and the economy. The different aspects of the three players are described first, but the game structures of the first and second level game are elaborated in separate paragraphs. The strategies, although they are intimately connected with the players, are also described separately for both levels of the game.

**Two Types of Applicants**

The presence or absence of certain norms can make a huge difference in a "game" type situation. Norms can be added into the model as enabling or disabling certain strategies. Even if only one strategy is disabled for only one player, this limits the number of possible equilibria and thus may cause a very different outcome of the game. For the present research project, there is one question of norms that is both relevant to the game analysis and interesting from a cultural point of view. Suppose there were two similar entrepreneurs in identical situations, with their only difference being that one is extremely intolerant of bribes and refuses to pay, whereas the other has a more "pragmatic" view and occasionally uses bribes to get things done. What would happen in these situations? Would the outcomes be different? To answer these questions, the following game analysis will be conducted twice, once with an Applicant that never bribes and once for an Applicant that examines the costs and benefits of bribing. As information plays an important role in strategic games (see Rasmusen, 2005), it may also make a difference if one player knows what norms an other player adheres to.

**Goals**

The players' goals are important, because they both steer the players' decisions and also indicate
whether there is antagonism or scope for cooperation.

The Applicant's goal is to get his patent application past this first hurdle of checking for national security, so he may proceed with the application process and finally use his protected idea to generate wealth.

The main goal for the Controller is to earn as much as possible from his high position in the patent office. It has taken a lot of time and effort to get promoted to this level, and there are not many years left until retirement. "Gifts" from Applicants can be a welcome additional source of income, but the Controller must avoid losing his job over allegations of corruption. This characterisation of the Controller is supported by chapters 2 and 3, although it must be said that the interviewed Patent Office employees themselves appeared to be very honest.

The goals for the members of the patent review commission of the DRDO can be assumed to be similar to those of the Controller: collect a lot of bribes without getting caught. However, members of the DRDO commission probably have more influence than the Controller, more secrecy about their decisions and motivations, and thus more discretion.

**Attitudes Toward Other Players**

In general and initially, "interaction orientations" (Scharpf, 1997:84-87) or interpersonal attitudes are assumed to be purely individual, i.e. actor X has no positive or negative feelings about what happens to actor Y. (This indifferent attitude is supported by Varma (2004:101,102) in his characterisation of general Indian behaviour).

The DRDO committee might have some permanent relationship with the Controller, but this varies widely in individual cases and therefore cannot be taken into account. However, since the second level game is probably an often repeated game for the Controller and the DRDO, it may be in the interest of the DRDO to avoid hostilities from developing between them, and to keep the Controller out of jail.

For the Controller, hostilities towards the Applicant may have developed in the first level, but otherwise the Controller is assumed to be indifferent about the results for the Applicant. The final payoff for the DRDO is also of no concern to the Controller, but as these two have met before and will probably meet in the future, the Controller does take care that the relationship is not damaged.

**6.2 Level 1 Game Setup**

**The Rules of the Level 1 Game**

The "rules of the game" include physical possibilities and impossibilities, unavoidable consequences of certain actions, but also societal "institutions" or rules that all players adhere to, often unconsciously.

The "mode of interaction" at level 1 starts out as unilateral action, but probably negotiations will open up. However, a negotiated *agreement* cannot be enforced by law, because bribery is illegal. In the absence of legal enforcement, agreements could still be effectively enforced if both parties have strong moral (inner) or social (outer) norms that force them to "keep their word". In this case, at most one party (the Applicant) can be assumed to have such norms. Therefore, no real agreements can come from negotiations, only the exchange of information and if anything is traded, it will most probably have the character of "on the spot" transactions.

Although the general expectation may be that the Applicant, after submitting his patent application, patiently waits for news from the Controller, it is quite possible for the Applicant to actively seek
contact with the Controller and try to influence him in his decision. Therefore, the (sequential) tree structure of a game is not very appropriate, and a matrix will be used to visualise the game situation (as explained in section 4.4).

If the Controller and Applicant agree that the Applicant will pay a bribe and the Controller will release the application, the Applicant has the choice of trying to trap the Controller red-handed in the act of accepting a bribe. It is not guaranteed that the trap will actually capture the Controller, because he might suspect something or may have been warned. If the Controller is caught, we assume that the application is released by the Controller's successor, because he wants to avoid all suspicion until things have "cooled down" a bit. On the other hand, if the trap fails, it can be assumed that the Controller immediately forwards the application to the DRDO, as this is the safest way to take revenge. Although revenge is of course not strictly necessary, it seems natural to assume that a corrupt Controller will also want to take revenge when someone threatens his position and income with a police trap. The probability of success in setting a trap, is very difficult to estimate, especially because the police itself seems to be largely corrupt (see section 1.6).

**Strategies for the Level 1 Game**

With "strategies" of players is meant the options they need to choose from. Scharpf (1997) calls these "capabilities", and other game theorists make a distinction between actions and strategies, where the latter are combinations of actions (Rasmusen, 2005:10). In this research project, strategies are the basic actions, capabilities, and / or alternatives that players can choose to use in the game. Some strategies are mutually exclusive, other can be combined.

The Applicant has two active strategies he can follow: (1) he can bribe the Controller to approve the application, or (2) he can influence the Controller to do the same. In this report, "influence" means using influential contacts to persuade someone (i.e. if my uncle is an old friend of your boss, I can influence you). Although in the Indian reality, influence is a very determining factor (Varma, 2004:23-24), it is not suitable for the general analysis performed here, because the presence or absence of influence relationships varies wildly between actors that are otherwise very similar. (The real world "actors" are too diverse on this point to be modelled by game theoretical "players").

Except "active" strategies, there are also more "passive" strategies to consider. If the Controller asks for a bribe, the Applicant can set up a trap together with the ACB, a special anti-corruption department of the police. A third option that is easily overlooked, is the option to do nothing. This means the Applicant does not offer a bribe (or not pay the bribe when asked for), nor does he set up a trap, but patiently awaits the final decision of the Controller.

The Controller also has three strategies to choose from. The Controller may threaten to forward the application to the DRDO, at the same time hinting at the possibility of bribing. Alternatively, he may actually forward it, which means that the Applicant can now try and present his case to the DRDO. The third option is to approve the application straight away (without even hinting at a bribe), which is the right thing to do (since we assumed that the invention has no relevance at all for national security, and therefore ought to be released).

**6.3 Level 1 Preliminary Game Analysis**

For this initial analysis, we can use the payoff matrix of basic game theory to analyse the "logic of the situation" as Scharpf calls it (1997:73). "Non-cooperative" game theory assumes that the institutional setting does not allow for enforced contracts, and therefore this type of game theory is appropriate in this situation. If the payoffs are accurate enough, and no essential mechanism or condition has been left out, we can go further than "analysing the logic", and even identify Nash equilibria. (A Nash equilibrium is a situation in which each player's current strategy is the best
possible choice, if none of the other players change their strategy). It is possible to have several Nash equilibria in a game situation, which then requires closer analysis of the situation to find out how each equilibrium can be reached and which is the most probable outcome.

Table 2 presents the outcomes (payoffs) of the different strategy combinations. In each cell of the matrix, the upper right result corresponds to the Controller, and the lower left result accrues to the Applicant.

If one assumes that the zero-bribe identity of the Applicant prevents him from using strategy 1 (bribe), this strategy is still included here because at the outset, the Controller thinks that bribing is a real possibility. Thus the matrix represents the knowledge that the players have in common.

For each player, the best outcome (given a particular strategy by the other player) has been highlighted. For example, given that the Applicant chooses strategy A (to bribe), then the Controller can choose among the outcomes "Money", "Game 2", and "Zero" by choosing strategy 1, 2 or 3 respectively. Of these outcomes, "Money" (from the bribe) is the best. "Zero" indicates that there is no extra benefit nor any loss or risk involved for the Controller. "Game 2" means that the application is forwarded to the DRDO and the level 2 game starts of which the outcome for the Controller is yet unsure.

In cell B1, the outcome depends on the chance that the trap is successful. If it is, the Controller gets Jail (very negative) and the Applicant's application is approved. If the trap fails, the game progresses to level 2. (Pluses and minuses were added to indicate how positive or negative a certain outcome is for a player).

In cell C1, the outcome depends solely on the final decision of the controller. By doing nothing, the Applicant actually forces the Controller to make a choice between "simply detaining" and "simply approving" the application. Therefore, the outcome for the C1 combination is the maximum of "Zero" and the outcome of the level 2 game, for the Controller. For the Applicant, the outcome is "Approval" if the Controller prefers "Zero" over "Game 2", and otherwise equals the outcome of the level 2 game.

Apparently, the only Nash equilibrium is B2, which brings the players into the second level game. First the level 2 game will be analysed, after which the probable outcomes of the second game are entered into the payoff matrix of the first game (see the matrix above). Then the analysis can be finalized and the conclusions presented at the end of this section.

<table>
<thead>
<tr>
<th>Controller's strategies</th>
<th>Applicant's strategies</th>
<th>1. Threaten to detain and solicit a bribe.</th>
<th>2. Simply Detain</th>
<th>3. Simply Approve</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Bribe</td>
<td></td>
<td>+ Money</td>
<td>Game 2</td>
<td>Zero</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ Approval - Money</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. If asked for bribe, Trap</td>
<td></td>
<td>-- Jail (or Game 2)</td>
<td>Game 2</td>
<td>Zero</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ Approval (or Game 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Do Nothing</td>
<td>Max( Zero , Game 2)</td>
<td>Appr./Game2 dep. on Ctrl</td>
<td>Game 2</td>
<td>Zero</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Table 2: Payoff matrix for level 1, showing the "logic of the situation". Players' best strategies (conditional on the other player's choice) are set in bold type.
The analysis of the second level game, will need to take into account how the second level was reached. There are five cells in the matrix (see table 2) that (could) lead to the second game, which can be reduced to three logically distinct cases:

1. The second game is entered from column 2 (the Controller simply detaining the invention).
2. The Controller had asked for a bribe (column 1), but the Applicant had neither paid the bribe nor tried to set a trap ("Do Nothing", row C), so the Controller was forced to choose between "simply detain" and "simply approve", and chose to detain (effectively ending up in C2).
3. The Controller asked for a bribe, the Applicant set a trap (situation B1), but somehow the Controller escaped and then detained the application to get back at the Applicant.

The possible effects of these three different cases will be discussed in the analysis of the level 2 game (see the end of section 5.5).

6.4 Level 2 Game Setup

The second level game revolves around the issue of permanently releasing or detaining the patent application. The DRDO has a lot of discretion in making this decision, but it can still be influenced by the Controller and the Applicant.

It is important to realize that this higher level game is probably new to the Applicant, but very familiar to the Controller and the DRDO, since they have repeatedly played the same game together with different Applicants. If neither party is sent to jail, retires, or is replaced by government agency restructuring, the Controller and the DRDO will meet again in the future. Therefore, some outcomes of this game that have immediate positive value, may actually be evaluated negatively if they prevent gains from future games.

The Rules of the Level 2 Game

There is no formal way to appeal to the decision of the DRDO. One can only send a writ petition to the government, asking for release, but court cases are out of the question. The DRDO may decide to pay compensation for the years of secrecy. Only if compensations money is promised, but never arrives, the applicant can start a court case, and / or use the Right To Information Act, to get the money. However, this will never touch the issue of whether the patent should have been withheld or not (according to an interview).

Strategies for the Level 2 Game

At the start of the level 2 game, the DRDO has five strategies to choose from. First, the DRDO could, in principle, choose to not even bother to look at the reported application, leaving it detained (possibly because the DRDO committee members are "too busy" with other work). If the Applicant gets his hands on the exact status of the application, and / or keeps pleading with the Government, this strategy may have to be abandoned or the DRDO might get into legal trouble. The second strategy is to simply release the detained application, which is what ought to be done, since we assumed that the application has no relevance for national security. Thirdly, the DRDO can look at the application and decide to keep it in the "top secret" category. A fourth option is to tell the Applicant that the application will only be released when a bribe is paid directly to the DRDO. This means the DRDO will probably receive some extra cash, but might get trapped and go to jail. Alternatively, the DRDO could use the Controller as a middleman for collecting the bribe. This may reduce both the risk and the revenue for the DRDO. However, a trapped Controller might reduce his sentence by cooperating with the police to trap the DRDO, so it is not clear whether the risk is
One interesting strategy is not included in this model. Sometimes, the DRDO may have influence (or at least an information leak) in the Central Bureau of Investigation, which can be used to prevent any traps against the DRDO or the Controller from being successful. This possibility is not modelled because it depends totally on variations in individual situations: some DRDO officials may have the connections, whereas others may not.

The Applicant has four strategies to choose from. First, he can do nothing, not paying a bribe, just awaiting the DRDO's decision. If the application is detained permanently (at least for a few years), this is very bad news for the Applicant, because it includes a total ban on using or communicating about the invention, there is no appeal possible, and compensation from the government is by no means guaranteed. The second option is to plead with the DRDO to release the application. The third and fourth strategy relate to bribes. If asked for a bribe, the Applicant can trap the DRDO (or their middleman) with the help of the CBI (Central Bureau of Investigation). If the trap works, justice is done and probably the application will be released. Alternatively, the Applicant could also take the initiative to bribe the DRDO and seek the release of the application.

Another interesting option for the Applicant is to use influence relationships to persuade the DRDO to release the application. However, this strategy is not included in the model, because it is totally dependent on variations in individual situations.

As for the Controller, he plays only a marginal role in the level 2 game. He can act as middleman between the Applicant and the DRDO, gaining a percentage of the bribe money, but risking losing his job and going to jail. The only other option is to stay out of the whole issue.

6.5 Level 2 Game Analysis

Because the Controller has only two strategies (to act as a middleman or to do nothing), the analysis will focus on the interaction between the DRDO and the Applicant.

We assume that the Controller acts as a middleman if and only if the DRDO asks him to, because the risks and benefits of this choice are shared between the DRDO and the Controller. This means that the DRDO will only ask the Controller to be the middleman if they expect a successful bribe transaction, which means it is also beneficial and safe enough for the Controller to get involved. Therefore the Controller should always follow the DRDO's lead, but never take the initiative by himself. Here we assume that the DRDO knows (from the relationship or past experience) that the Controller is willing to act as middleman, and that the Controller trusts the DRDO's correct assessment of the situation. (If the Controller has learnt from the level 1 game that it is too risky to ask the Applicant for a bribe, it is in his own interest to bring this information to the attention of the DRDO.).

Note that the Applicant's strategies are not mutually exclusive, because strategy E (plead) may be combined with either strategy F (trap) or strategy G (bribe). However, because the outcome of strategy F and G does not change if they are used after strategy E, we assume that they both include strategy E (plead). The outcomes in row E of the pleading strategy will be reached if the Applicant only pleads and does nothing more. In the same manner, the mutual non-exclusivity of the DRDO's strategies can also be resolved: strategy 4 (ignore) can be followed up by any of the other four strategies.

If the Applicant does nothing (strategy D), it is most beneficial for the DRDO to use their strategy number 4 (ignore the whole report). This leads to certain detainment, which is devastating for the Applicant, who therefore will always choose one of the other strategies (plead, trap, or bribe). If the Applicant chooses one of these active strategies, the DRDO cannot ignore the situation any more. Because of the elementary logic behind this sequence of moves, it can be assumed that both players
will never use their first strategy ("D" for the Applicant and "4" for the DRDO), which can therefore be left out of the further analysis.

Table 3 presents the probable outcomes of the different strategy combinations. The general outcome is summarized in each field of the matrix, without specifying the value of that outcome for the different players (to facilitate the clarity of the overview).

If the Applicant pleads for release, but the DRDO still detains the application (situation E3), there is a small chance that the Applicant succeeds in damaging the DRDO's reputation by involving the media, or that other (legal) investigations may be started (hence the indication "maybe problems for DRDO").

Two strict Nash equilibria can be identified in the matrix: E5 and F5. This suggests that the DRDO will always release the invention and all that the Applicant needs to do is plead with the DRDO and apply some pressure.

However, the difference in value between some outcomes is relatively small (i.e. the difference for the DRDO between "no problems" from E5 and "maybe some problems" from E6, E7 and E8). Therefore, the game could possibly end up in other equilibria, such as G7 or G8. What is needed to bring the game to one of those other "almost-Nash" equilibria, is that one or both players convincingly limit their options, thus forcing the other player to choose, taking into account only the options left over. This type of action will be termed "credible limitations" in the further analysis.

<table>
<thead>
<tr>
<th>Applicant's strategies</th>
<th>DRDO's strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Plead for release (possibly involving media or RTI Act)</td>
<td>Release; DRDO punished</td>
</tr>
<tr>
<td>F. (after pleading) If asked for bribe, Trap</td>
<td>Release; Controller punished; DRDO also in trouble</td>
</tr>
<tr>
<td>G. (after pleading) Bribe to release</td>
<td>Release; bribe shared by Controller and DRDO</td>
</tr>
</tbody>
</table>

Table 3: Outcome matrix for level 2. Cells display the general outcomes of the strategy combinations, in stead of the separate payoffs for each player. Strict Nash equilibria are marked with bold type.

To make the presentation clearer and the analysis easier, the preferences of the players over all options are indicated by positive or negative numerical values (see table 4), roughly indicating the value placed by each player on that result. The values placed under Applicant's strategy G (bribe) exclude any "moral cost" and are appropriate for an Applicant that only has monetary inhibitions against paying bribes (as this is what the DRDO assumes about the Applicant).

The payoff valuations in table 4 were constructed as follows. "-10" denotes the worst case scenario for a player (such as jail, for the DRDO, or permanent detainment of the application, for the Applicant). Positive values correspond to positive net gain in reality: +5 for the Applicant if his application is released, +4 for the monetary value of the bribe. (To keep things simple, it is tacitly assumed that the Applicant and the DRDO both attach the same (emotional) value to the same
nominal amount of money.

The value of the bribe seems relatively high, but actually the value of a released application is kept low (+5, not +10) because this is only the first step of the patent protection process, and the application can still be nullified at later stages.

The value of a released application at the cost of a bribe, is +1, which is appropriate to indicate a mildly positive result. Similarly, a value of -1 is used for the "possible problems" for the DRDO that might arise from continued pleading and investigative actions by the Applicant. In cells F8 and G8, both the threat of jail and the reward of bribes for the DRDO are cut in half (as compared to F7 and G7), because of the use of the Controller as middleman.

The values for the Applicant in cells F7 and F8 are displayed as "x" in stead of +5, because there is a chance that the trap fails and the Applicant loses his application. If the chance of failure is small, the payoff could still be positive (i.e. +3), but high probabilities of trap failure can make this payoff negative (i.e. -5). Section 1.6 explained why there is no estimation for the actual value of "x". Luckily, the exact value of "x" is not important for most of the analysis. For the time being, we will assume that traps are quite effective and "x" takes a value of "+3".

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Plead</td>
<td>+5</td>
<td>0</td>
<td>-10</td>
<td>-10</td>
<td>-10</td>
</tr>
<tr>
<td>F. Trap</td>
<td>+5</td>
<td>0</td>
<td>-10</td>
<td>-10</td>
<td>-10</td>
</tr>
<tr>
<td>G. Bribe</td>
<td>+5</td>
<td>0</td>
<td>-10</td>
<td>+4</td>
<td>+2</td>
</tr>
</tbody>
</table>

Table 4: Payoff matrix for level 2. Numerical values have no direct relation to real world payoffs (only an ordinal relation). Bold type indicates the highest payoffs for each player, conditional on the choice of the other player. (Lower left payoffs relate to the Applicant; upper right to the DRDO)

When analysing the game situation as clarified with numerical payoffs, it is easy to see that for the Applicant, it would be best if the DRDO chose column strategy 5 (release). Conversely, for the DRDO it would be best if the Applicant chose row strategy G (bribe). Now the analysis will focus on how both players can (more or less credibly) limit their own options in order to make the other player choose a less than optimal strategy.

Credible limitations for the DRDO

The Nash equilibrium outcomes (where both payoffs are in bold type) are all in column 5 (release), giving the DRDO a payoff of zero and preventing the higher payoffs associated with bribes. In order to reach those higher payoffs (in G7 and G8), the DRDO must necessarily eliminate the possibility of the Nash equilibria of column 5. This means it must somehow convince the Applicant that there is no way the application would be released straight away (i.e. without a bribe). That case is actually quite hard for the DRDO to make, because no physical or legal barriers to quick release can be erected, as these barriers would also prevent a speedy release when a bribe is paid. The condition that "extra fees need to be paid" is based only on human motivation and therefore not as convincing as a physical limitation. However, the difference is small between the results for the DRDO of releasing the invention (column 5, payoff 0) and permanently detaining it (column 6,
payoff -1), and the possible gains from other strategies are high (+4 and +2). Therefore, the DRDO may be able to convince the Applicant that it will really take its chances (and accept a payoff of -1 if it comes to that) for the prospect of receiving a generous bribe, rather than leaving the Applicant the possibility of an easy way out (column 5).

Assume the DRDO succeeds in convincing the Applicant that it will never use the column 5 strategy (straight away releasing the invention). The matrix is now reduced to the following:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Plead</td>
<td>-10</td>
<td>-10</td>
<td>-10</td>
</tr>
<tr>
<td>F. Trap</td>
<td>-10</td>
<td>x: +3</td>
<td>x: +3</td>
</tr>
<tr>
<td>G. Bribe</td>
<td>-10</td>
<td>+1</td>
<td>+1</td>
</tr>
</tbody>
</table>

Table 5: Payoff matrix at level 2, if the Applicant believes that the DRDO will always rather permanently detain the application, than release it straight away.

It is clear that, in this situation, the Applicant has no reason to stop at only pleading (row E), because within each separate column (thus taking the DRDO's strategy as given), strategies F (trap) or G (bribe) yield the same or better results for the Applicant (moving from -10 to +1 with a bribe or even +3 with a trap). (In game theory such a strategy is called "dominated"). This allows us assume that strategy E will not be used, and to reduce the matrix to the following:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F. Trap</td>
<td>-10</td>
<td>x: +3</td>
<td>x: +3</td>
</tr>
<tr>
<td>G. Bribe</td>
<td>-10</td>
<td>+1</td>
<td>+1</td>
</tr>
</tbody>
</table>

Table 6: Payoff matrix if the Applicant believes the DRDO's limiting statement, and after removing the dominated strategy E (Plead).

In this matrix, the highlighted values are the highest payoff values for the Applicant in each column and the highest payoffs for the DRDO in each row. A Nash equilibrium exists in those cells where both payoffs are highlighted, because that indicates that both players see no reason to change their strategy away from the equilibrium as long as the other player also does not change his strategy.

The highlighted payoffs (in table 6) indicate the very sad fact that the only Nash equilibrium in this situation is a lose-lose situation (in F6), with especially dramatic consequences for the Applicant.

**What if a successful trap would be less probable?**

The lose-lose result hinges upon the way the numerical payoff values were constructed, especially the +3 value of "x" in F7 and F8, which was an intuition-based average between +5 (the result of a
successful trap) and -10 (the result of a failed trap). If we assume the chance of a trap failing is much higher, the payoff for the Applicant may be modelled with a lower or even negative number (denoted by "-2" in table 7). If this number is lower than the +1 in G7 and G8, it becomes worthwhile for the Applicant to pay the bribe, and a new equilibrium opens up in G7.

It must be noted that this change in the value of "x" does not affect any of the previous steps taken in the analysis: it is still worthwhile for the DRDO to try to convince the Applicant that the application will never be released "for free", and it is still not worthwhile for the Applicant to choose strategy E (only plead) over F or G (trap or bribe, respectively).

<table>
<thead>
<tr>
<th>Applicant's strategies</th>
<th>DRDO's strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>F. Trap</td>
<td>-10</td>
</tr>
<tr>
<td>G. Bribe</td>
<td>-10</td>
</tr>
</tbody>
</table>

Table 7: Payoff matrix with a lower value for "x", which relates to the chance that a police trap fails.

**Outcomes with a Zero-bribe Applicant**

Now suppose the Applicant has moral or other strong reasons to never pay a bribe. This changes the whole situation, because now there is no other option left for the Applicant than to try and trap the DRDO (and the middleman if applicable). The DRDO does not necessarily suspect this (thinking that the Applicant will pay the bribe) and therein lies the chance of a successful trap (or sting operation), which leads to the payoffs in cell F7 or F8. However, if the Applicant is well-known for his zero-bribe policy, or if the Controller has found out and warned the DRDO that the Applicant does not bribe, the DRDO can expect a trap and revert to the much safer strategy of simply detaining the application (column 6).

This risky and unfortunate chain of events is not inevitable, since it started from the DRDO making the commitment that a quick and bribe-free release is impossible. What would happen if the Applicant made a credible commitment first?

**Credible limitations for the Applicant**

If the Applicant is incorruptible, he could reveal from the start that he will never pay a bribe, no matter the consequences. However, it is crucial that this commitment is convincing towards the DRDO.

Actually the argument needs to be more than convincing: the Applicant's commitment to abstain from bribery must be stronger than the DRDO's arguments for forsaking column strategy 5 (simply releasing the application). Both arguments cannot be sustained at the same time. Remember that the DRDO argued that it would forego the option of using strategy 5 (releasing straight away) for the chance of receiving a bribe. If the Applicant's argument is believed, there is no chance of receiving the bribe and therefore the DRDO can no longer convince the Applicant that column 5 is out of the question. And in the other direction, if the Applicant accepts the DRDO's assertion that the chance of getting a bribe is substantial enough to justify risking the potential image problems of sustained pleading, the Applicant automatically admits that there is a chance of him paying bribes.
To substantiate his claim of never paying bribes, the Applicant could bring up stories of previous encounters with other Government agencies that show that the Applicant has already gone to great lengths to build a reputation of not paying bribes. Assuming the Applicant is a company, it can show that there are mechanisms in place that customers and other stakeholders actively use to monitor the adherence to the zero-bribe policy. Witnesses can be contacted, and a range of other arguments can be thought of, with the sole purpose of showing the DRDO that the Applicant has a huge vested interest in its zero-bribe identity and should therefore be believed when claiming that bribing is not an option.

It may even be sufficient to prove to the DRDO that the Applicant would always rather organise a trap than pay a bribe, regardless of the risk that the trap could fail. However, even to make this claim in a convincing way is quite difficult for an Applicant that is known to have bribed before.

In any case, if the DRDO believes the Applicant's commitment to never bribing, the original payoff matrix can be reduced to the following (be deleting row G):

<table>
<thead>
<tr>
<th>Applicant's strategies</th>
<th>DRDO's strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Middle-man</td>
<td></td>
</tr>
<tr>
<td>E. Plead</td>
<td></td>
</tr>
<tr>
<td>+5</td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td></td>
</tr>
<tr>
<td>F. Trap</td>
<td></td>
</tr>
<tr>
<td>+5</td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td></td>
</tr>
<tr>
<td>x: +3</td>
<td></td>
</tr>
<tr>
<td>x: +3</td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Payoff matrix agreed upon by both parties, if the DRDO believes that the Applicant will never bribe.

In this situation, it makes no sense for the DRDO to use strategy 7 or 8 (asking for bribes), and the trap (strategy F) can thus never be used either. This reduces the situation to the following choice for the DRDO:

<table>
<thead>
<tr>
<th>Applicant's strategies</th>
<th>DRDO's strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Release 6. Detain</td>
<td></td>
</tr>
<tr>
<td>E. Plead</td>
<td></td>
</tr>
<tr>
<td>+5</td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td></td>
</tr>
</tbody>
</table>

Table 9: Further reduced payoff matrix, after eliminating strategies 7 and 8 (asking for bribes) and F (trap).

In this situation, the DRDO Commission's self-interest dictates the unconditional release of the invention (column strategy 5). Even though the gain for the DRDO (0 over -1) is much smaller than the gain for the Applicant (+5 over -10), there is no alternative for the DRDO through which it could force the Applicant to share some of its gain (i.e. by paying a bribe).

Influence of Human Emotions

One possibility remains to be explored: what happens if serious hostilities have been created, for example in the process of threatening and determining which self-limiting claim was stronger? If the DRDO Commission is revengeful against the Applicant, positive payoffs for the Applicant count as negative for the DRDO and negative payoffs count as positive. Assume for example that the
"hostility discount rate" is at 20%, so that a payoff of +5 for the Applicant adds -1 to the DRDO's payoffs and a result of -10 for the Applicant adds +2 for the DRDO. The new set of payoffs (adjusted for revenge) are shown in the upper right corners of each field in the matrix (see table 10).

(In E5, the original payoff for the DRDO was 0 and the revenge addition was -1 * 20% * +5 = -1, so the new payoff becomes 0 - 1 = -1. Similarly, the payoff in E6 added -1 * 20% * -10 = +2 to the original value of -1, making the total +1.).

According to this new payoff matrix that includes the "satisfaction" of revenge, the DRDO should choose to detain the application (column 6) and classify it as top secret, leading to great loss to the Applicant.

<table>
<thead>
<tr>
<th>Applicant's strategies</th>
<th>DRDO's strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Plead</td>
<td>5. Release</td>
</tr>
<tr>
<td></td>
<td>+5</td>
</tr>
</tbody>
</table>

Table 10: Reduced payoff matrix, adjusted for revengeful feelings, with a hostility discount rate of 20%

**What if one could appeal to the DRDO decision?**

Feelings of hostility or revenge can have such a dramatic impact in this situation because the initial difference in DRDO payoffs between strategy 5 and 6 was so small. That small difference originates from the fact that no appeal is possible when the DRDO wrongfully detains an invention (because it concerns matters that are "top secret"). As discussed before, the scope for the Applicant to cause trouble for the DRDO is severely limited (i.e. involving the media, filing complaints, trying to use the Right To Information Act). If some kind of appeal were possible, the payoffs for the DRDO for using strategy 6 (detain) could become much worse, for example -5 in stead of -1. Simultaneously, the result of detainment would be less harmful for the Applicant, since the application might be released during the appeal process (possibly -3 in stead of -10). These changes are displayed in table 11.

<table>
<thead>
<tr>
<th>Applicant's strategies</th>
<th>DRDO's strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Plead</td>
<td>5. Release</td>
</tr>
<tr>
<td></td>
<td>+5</td>
</tr>
</tbody>
</table>

Table 11: Payoff matrix, if there would be an appeal process that could turn back the DRDO's decision.

The possibility of appeals would also cause another change in the situation, as it would make it practically impossible for the DRDO to make a convincing argument for never choosing strategy 5 (unconditional release of the invention). This would increase the chance that the Applicant convinces the DRDO that bribing is not an option, leading to the chain of events that has just been described. The revenge effect would now have to be much stronger to cause the DRDO to choose the detaining strategy, so the patent application would probably be released straight away.
Influence of Starting Positions Inherited from Level 1

Before concluding the analysis of the level 2 game, we need to consider if it makes any difference how the first game started off the second game. The three possible "starting positions" are listed below, along with their respective effects.

1. The Controller simply detains the invention (column 2), which leads immediately to the second game.
   In this case, game 2 is started with a "clean slate".

2. The Controller had asked for a bribe, but the Applicant had neither paid the bribe nor tried to set a trap (Do Nothing), so the Controller was forced to choose between "simply detain" and "simply approve", and chose to detain.
   In this case, the second game is started without serious grudges, but the Controller has gained the information that the Applicant is not likely to pay bribes. This information can be easily passed on to the DRDO, through the existing relationship. However, the only difference this information can make is to strengthen the Applicant's assertion that bribes are out of the question.

3. The Controller asked for a bribe, the Applicant set a trap, but the Controller escaped and then detained the application to get even with the Applicant.
   In this third case, the Controller has learnt that the Applicant can be expected to organise a trap. If this information is passed on to the DRDO Commission, it will only fortify the outcome of the previous analysis that asking for bribes cannot benefit the DRDO.

Apparently, the interactions in the second game are influenced very little by how the first game has been played out.

Level 2 Final Outcomes

The probable outcomes of the level 2 game seem to depend on whether the Applicant is of the zero-bribe type or not, and on whether the DRDO Commission's final move is based primarily on self-interest or on revenge.

If the Applicant has a strong zero-bribe identity, he will probably be able to convince the DRDO that he will never pay bribes (or at least that he will rather take the risk of setting a trap). Consequently, the DRDO will not expect any bribes (and so the Controller has no role to play). Then either the DRDO Commissioners rationally choose what is best for themselves, releasing the patent application to the Applicant, or they badly want revenge and therefore order the detainment of the invention and impose strict secrecy.

If the Applicant is known to occasionally use bribes, it is much more difficult for him to convince the DRDO that bribery is not an option. Probably, the DRDO will succeed in convincing the Applicant that the application will not be released easily, even though that would be the right thing to do. To avoid losing the invention forever, the Applicant will now probably take the easy way out and pay the bribe, in stead of taking the risk of setting a trap. The DRDO may at this point choose to use the Controller as middleman, which is a way of hedging against the small chance of the Applicant choosing to trap the bribe-taker and the trap being successful. Let us assume that the DRDO indeed shares the risks and the benefits with the Controller.

The following table summarizes the possible situations and the payoffs for the three players:
<table>
<thead>
<tr>
<th>Applicant Type</th>
<th>DRDO Condition</th>
<th>Decision</th>
<th>DRDO</th>
<th>Applicant</th>
<th>Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero-bribe</td>
<td>Self-interested</td>
<td>Release</td>
<td>0</td>
<td>+5</td>
<td>0</td>
</tr>
<tr>
<td>Zero-bribe</td>
<td>Revengeful</td>
<td>Lost</td>
<td>-1</td>
<td>-10</td>
<td>0</td>
</tr>
<tr>
<td>Bribe-payer</td>
<td>-</td>
<td>Release for a bribe</td>
<td>+2</td>
<td>+1</td>
<td>+2</td>
</tr>
</tbody>
</table>

Table 12: Probable final outcomes and payoffs, depending on the attitude of the Applicant towards bribery, and whether the DRDO places self-interest first or seeks revenge.

### 6.6 Level 1 Final Analysis

The results in table 12 will now be used to complete the level 1 game matrix and replace the placeholders "Game 2". A separate analysis will have to be made for the Applicant that is a bribe-payer and the Applicant that is committed to a zero-bribe track record. In the latter case it is uncertain which of the two conditions will apply for the DRDO (self-interested or revengeful), so both payoffs are entered into the level 1 payoff matrix as "Release / Lost". ("Lost" means that the DRDO did not release the detained patent application, but decided to keep it in the "top secret" category.).

First, the case of the bribe-paying Applicant will be examined.

**Bribe-Paying Applicant**

Table 13 is created by replacing the "game 2" entries in table 2 with the appropriate outcomes of the second level game (see table 12).

In cell C1, the outcome depends on the decision of the Controller (between simply detaining and simply approving). Because the (bribe-paying type) Applicant has no strong barriers against paying bribes, the outcomes of the second level game are "Zero" if the Controller simply approves and "+ Half Money" for simply detaining. (If we had assumed that the DRDO does not employ the Controller as middleman, both outcomes would be "Zero" for the Controller). Because half the money is better than nothing, the Controller in situation C1 will choose to detain the application and function as middleman in the level 2 game, causing the outcome in C1 to follow the pattern of C2.

As before, cell B1 presents both the results of a successful trap and a failed trap.

The highlighting procedure is used again to find the Nash equilibria, which occur at B2 and C2. The payoffs in the equilibria are suboptimal for both players, but these are the most likely outcomes of the two connected games. (The Controller would prefer to keep the whole amount of the bribe for himself (A1), but is afraid of aiming for this result (with strategy 1), because he might go to jail if the Applicant uses the trap (strategy B), which he will almost certainly do since it dominates his other strategies.)
Table 13: Payoff matrix for level 1. Adapted from table 2 by filling in the results of the level 2 game.

If the Applicant is of the bribe-paying type, the most likely outcomes of the level 1 game are that the Controller simply detains the patent application (forwarding the matter to the DRDO). The Applicant would have trapped the Controller, if he had asked for a bribe.

**Zero-Bribe Applicant**

For the case of the Applicant that never pays a bribe, the payoff matrix is presented in table 14. It concerns the choices to be made in the level 1 game, but with the expected payoffs of the total game (including level 2). One might question whether the players, especially the Applicant, can look ahead this far and take the outcomes of the level 2 game into account when choosing their strategies at level 1. Information about the general procedure is available to the Applicant, and if he is committed to getting his invention patented, he may be assumed to think ahead this far.

In the outcomes that are caused by the level 2 game, the word "Release" has been used to distinguish the release by the DRDO (after detainment by the Controller) from the more immediate "Approval" by the Controller. The word "Lost" is used here to signify the permanent detainment that may be chosen by the DRDO, and to distinguish it from temporary detainment by the Controller.

Because the Applicant is now of the "zero-bribe type", row A (the bribing strategy) could be deleted. However, at the outset the Controller may not yet be aware that the Applicant will never bribe. Therefore, row A has been coloured grey, to signify that it will not be used by the Applicant, but may play a role in the strategising and decision-making of the Controller.

The Applicant would prefer the Controller to simply approve (column 3), or at least to ask for a bribe (column 1). The Controller is very dependent on what the Applicant does when asked for a bribe. The gains of a paid bribe (row A) are considerable, but the possible losses of being trapped (row B) are awful.
### Table 14: Payoff matrix of level 1, including the expected consequences at level 2, for the zero-bribe type Applicant. Row A is made grey because the Applicant will never use it, but included in the matrix because the Controller does not know this (yet).

<table>
<thead>
<tr>
<th>Controller's strategies</th>
<th>Applicant's strategies</th>
<th>1. Threaten to detain and solicit a bribe.</th>
<th>2. Simply Detain</th>
<th>3. Simply Approve</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Bribe</td>
<td>+ Money</td>
<td>Zero</td>
<td>Zero</td>
<td>Zero</td>
</tr>
<tr>
<td></td>
<td>+ Approval - Money</td>
<td>Release / Lost</td>
<td>+ Approval</td>
<td></td>
</tr>
<tr>
<td>B. If asked for bribe, Trap</td>
<td>-- Jail (or Zero)</td>
<td>Zero</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ Approval (or Release / Lost)</td>
<td>Release / Lost</td>
<td>+ Approval</td>
<td></td>
</tr>
<tr>
<td>C. Do Nothing</td>
<td>Zero</td>
<td>Zero</td>
<td>Zero</td>
<td>Zero</td>
</tr>
<tr>
<td></td>
<td>+ Approval (or Release / Lost)</td>
<td>Release / Lost</td>
<td>+ Approval</td>
<td></td>
</tr>
</tbody>
</table>

Table 15: Payoff matrix for level 1, after the credible limitation of the Controller that "simply approving" is not an option.

Notice that the outcome for the Applicant in cell C1 has also changed, because the Controller will never "simply approve" the patent application. Now the Applicant will probably never choose strategy 3, because it will always yield the same or worse payoffs as the other strategies, regardless of the Controller's strategy. The Applicant needs to choose between bribing or trapping. He knows
that bribing is not an option, but his only chance of getting the application approved quickly is to lead the Controller to believe that bribing is a viable option. If this works, the Controller will solicit a bribe (strategy 1) because he is attracted to the payoff in cell A1, but the Applicant will set a trap in stead, leading to the outcomes in cell B1. This may work if the Applicant does not disclose too openly that he is strongly opposed to paying bribes, but in stead conforms to the initial assumption of the Controller (that everybody pays bribes).

The issue here is not only whether or not the Controller believes that bribing is possible for the Applicant, but also whether or not the Controller believes that A1 is a Nash equilibrium. If the Controller believes that the Applicant will rather try the trap than bribe (regardless of whether the Applicant is of the zero-bribe type), the Controller does not expect a Nash equilibrium in A1 and will therefore not risk jail by using strategy 1. So it matters whether the Controller thinks that the Applicant places higher value on the certain outcome of approval but at the cost of a bribe, or on the uncertain outcome of either a "free" approval (with a successful trap) or being left at the mercy of the DRDO (if the trap fails). Therefore, if the Controller thinks that the Applicant thinks that a trap has high chances of success, the Controller should avoid the subject of bribing altogether. This also means that if the Applicant can induce the Controller to think that the Applicant believes that traps have a high chance of failure, this may help to manoeuvre the Controller into the trap. These are the kind of strategic thoughts needed in game situations, although there may not be a practical way for the Applicant to communicate to the Controller that he does not believe in traps. (One can hardly imagine the Applicant sitting in the Controller's office and saying "By the way, I don't think those bribery traps ever work, you know, so I would never go through the hassle of setting one up.").

If the Controller does not believe that A1 can be a Nash equilibrium, the game ends up in situation B2 or C2 (detainment) and progresses to the second level.

Here the warning must be added that the events in this first arena (national security check) can have consequences for the interactions in later arenas, especially arena 2 (pre-grant opposition). The Applicant can make a conscious effort to be friendly with the Controller (but without bribing), which includes no trapping attempts, so that the game doesn't start out with hostilities when the same Controller is encountered again in arena 2 (pre-grant opposition). Another approach is that the Applicant successfully traps the Controller and thus removes him from office. The successor might be less corrupt, is probably less well-connected, and may have learnt from his predecessor that this particular Applicant cannot be messed around with, all of which may benefit the Applicant in arena 2. On the other hand, the successor can now benefit from the knowledge that a trap is likely when he asks for a bribe, and thus the likelihood of another successful trap diminishes.

6.7 Summary and Conclusions

Summary of Game Interactions

The game model devised for this arena consists of two levels. At level 1, the Applicant faces the Controller from the Patent Office, who may choose to forward the patent application to the patent review commission of the Defense Research and Development Organisation (DRDO), with whom the Applicant can interact at level 2.

The outcome of the level 2 game is not influenced by the different ways in which the level 1 game can lead to the level 2 game. Therefore, this summary of the game analysis will start with the second game and use it's expected outcomes in the first game.

If the Applicant is of the bribe-paying type, the Applicant will probably not succeed in convincing the DRDO that bribing is out of the question. In stead, the DRDO will probably convince the Applicant that the unconditional release of the invention is not an option. The final outcome now
depends on the chance of a trap being successful. The Applicant must compare the certain outcome of bribing (value of released application minus the cost of the bribe) with the expected value of setting a trap (value of a released application multiplied with the chance of a successful trap, plus the negative value of an utterly lost application times the chance of a failed trap). If the chances of a successful trap are small, the Applicant will choose to bribe. Alternatively, the Applicant may be strongly risk-averse (placing a high premium on a certain outcome, even if the expected value of other actions with less certain outcomes, is higher). A risk-averse Applicant will also opt for the bribe, whereas a risk-seeking Applicant would choose to try the trap (but only if the chance of a successful trap is high enough). However, if the DRDO Commission expects that the Applicant is inclined to set a trap, they will simply keep the invention detained as "top secret" and close the case.

The situation is very different if the Applicant is committed to a strict zero-bribe policy. This most probably enables the Applicant to convince the DRDO that a bribe will never be paid. This sets in motion a chain of events and evaluations that rules out bribes and traps and leads to a final decision that the DRDO needs to take: to either release the invention (which is very beneficial to the Applicant), or to detain it (which is a disaster for the Applicant and could also cause some minor trouble for the DRDO). The final outcome of this second level game depends on whether the Government acts according to pure self-interest (choosing release), or according to feelings of revenge or retribution (choosing detention). This means that it is very important for the Applicant to be very diplomatic during all the interactions and minimize hurt feelings on the side of the DRDO.

Because the game play of the level 2 game is very different between a zero-bribe Applicant and a bribe-paying one, this distinction is carried over into the analysis of the level 1 game.

In the case of the bribe-paying type of Applicant, Nash equilibria indicate that it is very likely that the Controller simply detains the invention and the game plays out in the second level as described above. The probable outcomes for the Applicant are that either the application is released, but for a fee, (if the chance of a successful trap is small or the Applicant is risk-averse), or that the application is released without a bribe (in case of a successful trap), or that the application is lost to the secret archives (if the trap fails or if the DRDO expects the Applicant to try setting a trap).

If the Applicant is committed to his zero-bribe track record, the irony of the situation is that his success depends on keeping this a secret in the level 1 game. The Controller can easily rule out the possibility of approving the invention "for free". This means that the application will be detained, unless the Applicant successfully traps the Controller with the help of the police, since bribery is not an option for the Applicant. A successful trap is possible, but only if (1) the Controller does not know about the Applicant's zero-bribe commitment, and also (2) the Controller believes that the Applicant thinks that traps have too small chances of succeeding. Of course, the trap should also actually turn out successfully, which means the actual chances of a successful trap should be reasonably high. (This depends on the level of corruption within the Anti Corruption Bureau of the Police, the specific sting operation techniques used, the chance of small mistakes made by everyone involved, etc.). The outcome of successfully trapping the Controller is the approval of the application, but the outcome of a failed trap (or a suspicious Controller) is that the DRDO will make the final decision as described above, the outcome of which depends on whether hostilities have developed between the DRDO and the Applicant in the second level game.

Conclusions and Recommendations

What does "patent protection" mean in practice, in this arena?

Patent protection, in this arena, means that the patent application passes the initial step of the "national security check" without being detained by the Controller, or, if detained, by being released by the patent review commission of the DRDO (Defense Research and Development Organisation).
Corruption influences patent protection through the general pattern of the government employee who will do his job only if bribes are paid. Especially the absence of any kind of procedure for appeal to the DRDO's decision, makes this pattern all the more lucrative for the government officials. Another factor that appears to have significant influence on the outcome, is the chance of success of a sting operation (called a "trap") against a bribe-taking official. If the amount of corruption is high within the Anti Corruption Bureau and / or the Central Bureau of Investigation, this directly diminishes the chances of a successful trap (since a corrupt investigator may warn the target beforehand). For the outcome of the strategic interactions between the Applicant and the Controller and DRDO, it is beneficial for the Applicant if the real chance of a successful trap is high. However, it is also important for the Applicant that the DRDO (in case of a bribe-paying type Applicant) or the Controller (for a zero-bribe Applicant) estimates the chance of a successful trap as very small or believes that the Applicant estimates the chance of a successful trap as very small (or both).

How can small and medium-sized enterprises deal with the corruption and protect their inventions?

The recommended approach depends on the type of Applicant: zero-bribe or bribe-paying. For the Applicant that is open to paying bribes, it is best to reinforce the initial assumptions of the Controller and the DRDO, that bribes are a good option, possibly by recalling earlier encounters with government officials and using phrases such as "would like to give you a token of my gratitude". After the Applicant agrees with the government official to pay the bribe, it is easiest for him to just pay the bribe, but he still has the option of setting a trap.

For the zero-bribe Applicant, it is important to hide his rejection of bribery for the Controller. The Applicant should lead the Controller to believe that he can expect a decent amount of money, and at the same time set a trap for him. If the trap fails, or if the Controller simply detains the application because he estimates a high chance of success for traps, the game moves to the second level with the DRDO. The Applicant is advised to convince the DRDO that there is no way that a bribe will be paid. Arguments that can be used are a long track record of never paying bribes or a corporate accountability structure that makes bribes impossible, but also the fact that the Controller was almost trapped in the lower level game. (In the rare case that the DRDO can not be convinced that the Applicant is strongly committed to a zero-bribe policy, he can still set a trap.). However, it is of utmost importance that the Applicant does not offend the DRDO in any way, because the final decision of the DRDO (to release or detain the invention) may depend for a large part on their feelings towards the Applicant.

Is there a difference in outcomes between the zero-bribe type Applicant and the bribe-paying type?

The models indicate that both types of Applicants have more or less the same chances of experiencing the whole spectrum of possible outcomes, from getting a quick approval by trapping the Controller, to losing the whole invention because the DRDO detains it. There is not enough evidence from the model structure, nor from empirical data, to suggest that one of the two types of Applicants is structurally better off in arena 1.

However, the zero-bribe type Applicant appears to have more control over the situation, at least in the level 1 game with the Controller. In the level 2 game, he can also severely limit the options of the DRDO, but this still basically leaves him at the mercy of the DRDO. The bribe-paying Applicant has less control over the situation in level 1, where the Controller will most probably just forward the application to the DRDO. However, in level 2, the fact that bribery is an option, helps to avoid extreme outcomes (such as ultimate detainment or unconditional release of the invention). This can be highly valued by the bribe-paying Applicant, especially if he is risk-averse.

What other interesting conclusions can be drawn from this model?
If a formal appeal would be possible after the DRDO's decision, this would greatly benefit the Applicant. The hassle and possibly punishments involved with the appeal procedure, would make the DRDO much less inclined to detain the Application. At the same time, even if the application would be detained, this is no longer a total disaster for the Applicant, as there is a chance that the appeal procedure overturns the DRDO's decision and releases the patent application for further processing. The end result is that the Applicant can be much more confident in refusing to pay bribes, on level 2, but also towards the Controller at level 1.
7 Arena 2: Court Ruling in Patent Infringement Case

First, a description is given of the real situation in all its complexity, so the reader may better understand why and how simplifications have been made. This description will start with all the actors involved in an infringement court case, and their interests, which sets the stage for all the possible interactions between them. At this point also an overview will be given of the various ways in which corruption can influence the decisions and outcomes of the whole litigation process.

At the start we can already make the assumption that the Patent Holder's patent was rightfully granted to him by the Patent Office, and that the Infringer is really infringing on that patent. We make this assumption because this research project is concerned with the protection of patents, not the defence of wrongfully granted patents or patent holders that falsely accuse someone of infringing.

7.1 Description of the Complex Reality

Actors

The two opposing parties of an infringement situation are the Patent Holder and the Infringer. Because we are dealing with infringement litigation, both parties also have their own lawyers. When the Patent Holder sues the Infringer, the court case starts at the level of District Judge. However, if the Infringer files a counter claim that the Patent Holder's patent wasn't valid in the first place, the case is automatically transferred to the High Court Judge of the State. An appeal to his judgement will bring the case before the High Court Bench, which means two or more High Court judges will deliver the verdict together. If the High Court Bench is divided in its judgement, or if further appeals are filed, the case goes to a Supreme Court Judge and after that to a Supreme Court Bench. Each level of courts (District, High and Supreme Court) has its own Court Administration System that takes care of all the files and documents and communication of the official dates of court hearings.

The main goal of the Patent Holder is of course to protect his patent rights and stop the Infringer from infringing on his patent. The Judge may also calculate the amount of "damages" to be paid by the Infringer to the Patent Holder as compensation. An injunction can be granted by the Judge at the beginning of the court case, which prevents the Infringer from continuing his infringing activities. If an injunction is not granted, the duration of the court case (in number of years) is crucial to the Patent Holder, because he needs to compete with the infringer all that time. However, some Patent Holders may be more wary of the costs of litigation, both in time (man hours) and in money (travelling expenses, lawyer's fees, court fees). Apart from differences in priorities, there can also be differences in experience. Some Patent Holders have many patents and have considerable experience with infringement suits, whereas other Patent Holders may be defending their first or only patent.

The interests of the Infringer are diametrically opposed to the interests of the Patent Holder, where the outcome of the Judge's decision is concerned (i.e. he desires refusal of injunction and, in the end, revocation of the patent). If the final outcome of the trial (and possibly appeals) is that the Patent Holder keeps his patent rights and the Infringer needs to pay damages, it is best for the Infringer if this decision can be delayed as much as possible (contrary to the Patent Holder's desires). However, some of the interests of the Infringer are similar to those of the Patent Holder, namely the undesirability of high fees for lawyers and courts, and man hours lost sitting in court. As with the Patent Holder, the Infringer may have considerable experience with infringement court processes, or no experience at all.
The lawyers defending the Patent Holder and the Infringer in court, do not necessarily have the same interests as their clients. There is always a balance between the interests of the client and of the lawyer himself. In the end, the lawyer wants to earn money, primarily from lawyer fees, but if he is corrupt, bribes could add to his income. A corrupt lawyer could try to prolong or complicate the trial, because he can charge the client for every day spent in court. He could also come to an uneven settlement with the other side, and pocket a bribe for convincing his client that this is all he could possibly get out of the negotiations. However, a corrupt act, if exposed, could severely harm the lawyer's reputation and thus diminish future business. On the other hand, a corrupt lawyer could present himself as one with whom "anything is possible". Besides the issue of corruption and loyalty to the client, lawyers can differ significantly in their experience and ability to use the details and loopholes of legal processes for the advantage of their client (or their own advantage of course).

Some judges may be corrupt, whereas others are absolutely incorruptible. Their goals vary accordingly, from gathering as many bribes as possible to solely administering justice. This research found that, in India, the level of corruption probably decreases with increasing levels of judicial authority (see section 3.2). High Court and Supreme Court Judges are probably of much higher integrity than those of the District Courts. Judges in a "Bench" have less opportunity to let corruption or other influences affect the outcome of the judgement, than do single judges, since in a bench the decision depends on two or more judges, some of whom may be incorruptible. Also, several interviewed lawyers have indicated that it is far too risky for a Judge to change their final verdict because of a bribe. If a Judge acts corruptly, it is often in smaller decisions about bail releases, adjournments, and the like (see section 3.2). Apart from integrity, the technical proficiency of the Judge is relevant in patent infringement cases, since the line between infringement or not is ambiguous and its correct interpretation depends on knowledge of patents in particular and technology in general. At the present moment, there have not yet been many infringement lawsuits in India, nor have special courts been established to deal with cases relating to intellectual property. Sometimes "experts" are used to explain a specific point in a case (just as forensic experts often appear before a court to explain certain details). However, there are indications that the task of explaining the nuances of patent law often falls to the lawyers of the patent holder and the infringer. Moreover, a forensic detail is not always central to a criminal trial (as there are also the issues of motive, alibi, and other evidence), but the interpretation of whether a certain act is or is not technically an infringement of a patent, is the core of infringement litigation. If the average judge has to rely on experts or on both parties' lawyers, this increases the scope for injustice.

The Court Administration Systems are made up of a number of different human beings, each with their own level of integrity, and of course the physical and / or electronic parts of the system. The clerks' interests can be either to simply to their job, or to add bribes to their income. The administration system is considered to be a more "passive" actor than the other actors, since it consists of many people with relatively simple jobs that are less intimately involved with the whole infringement litigation. If corruption is prevalent or pervasive in the Court Administration System (at a particular level of judicial authority), there is some opportunity to get files lost or miscommunicate the dates of court appearances, which leads to delay. Because the administration systems of the High Court and the Supreme Court are almost fully automated or computerized (see section 3.2), corruption can only have real effects in the court administration system at the level of the District Courts.

Structure and sequence of decision processes

An infringement case starts at the level of District Courts (Indian Patent Act, section 104), when a Patent Holder sues a (suspected) Infringer and demands an injunction. Within only a few days, the District Judge can issue a temporary injunction, which lasts until the first hearing (which is within a month). At the first hearing, the Judge will decide if the temporary injunction is turned into a
"permanent" injunction (for the duration of the court trials) or if the injunction is to be lifted. This decision depends on whether the case for proving infringement is very clear ("prima facie") and how the "balance of convenience" lies (i.e. how much the Patent Holder's business will suffer if injunction is not granted). The District Judge can also decide whether the Infringer has to keep accurate accounts of all his activities, which can later be used to make a fair calculation in case the final verdict includes damages to be paid to the Patent Holder.

If and when the Infringer files a counter claim for revocation of the patent (thus challenging its validity), both issues are jointly transferred from the District Court to the High Court. The Patent Holder can take the route of civil courts or of criminal courts, whichever seems more advantageous to him (the main difference being speed). During the trials, evidence is brought forth, witnesses can be called to the stand, arguments are debated, and all kinds of appeals and petitions can be made. Because of this (and the backlogs in the courts at all levels), an average court trial takes around 7 years to be decided. Especially an appeal to a higher court can delay the final outcome considerably, because all the evidence needs to be re-examined by the new Judges.

At the end, either the patent is revoked or the infringing activities are permanently shut down, possibly with damages to be paid to the Patent Holder as compensation. A civil lawsuit is concerned with a dispute between two individuals, whereas criminal law is about a conflict between an individual and the principles on which the community (or society or state) is founded. In a criminal lawsuit (as opposed to civil), the possible punishment for the infringer is a fine or even jail, in stead of damages. Thus the Patent Holder may take the route of criminal law in stead of civil law, if not much infringement has taken place yet and the main goal is to shut down the Infringer's operations. To get damages awarded, the Patent Holder will have to file a suit under civil law. At every stage of the proceedings, the two parties may come to a settlement, which ends the court case (at least in civil law).

Strategies and Interactions

When a client (Patent Holder or Infringer) wants to get something done in the court, his lawyer is the obvious person to ask to get it done. The lawyer knows how the courts function, and might have existing relations with either judges or administrative personnel. Therefore, lawyers can also function as middlemen between their clients and the court system, when a bribe needs to be paid or a corrupt request needs to be made. The Infringer can tell his lawyer to bribe the Judge(s) to refuse or cancel the injunction, to not order the keeping of accurate accounts, to adjourn as often as possible, and / or to set the damages at a low amount when the verdict is delivered. His lawyer can bribe the Patent Holder's Lawyer to make more mistakes in defending the Patent Holder's rights and / or to accept an unfair settlement (which favours the Infringer) and convince his client (the Patent Holder) to accept the settlement. He could also bribe the District Court Administration System to let files get "lost", make mistakes in the court hearing schedule, or in other ways delay the proceedings. The Patent Holder can use his lawyer to do exactly the same, but he will benefit less from some actions (i.e. those that cause delays).

If the lawyers propose a settlement, the client (for example the Patent Holder) can't be sure that the settlement is a fair one. Maybe the other party has bribed the Patent Holder's lawyer to "settle for less". The Patent Holder could ask a Judge or another lawyer for a second opinion before agreeing to the proposed settlement. (The same situation may arise for the Infringer, who then can also get a second opinion somewhere). If several settlements are proposed over the course of time, the client will need a second opinion for each one of them, since he cannot be sure which ones are based on reality and which ones on bribes.

If the Patent Holder and the Infringer arrange a settlement (with or without the help of their lawyers), there is a whole range of options, because of the possibility of a license structure between
the Patent Holder and the Infringer (possibly even with royalties). The abundance of different modes of settlements, and the possibility of a win-win situation, makes it easier for the parties to settle the case and prevent the extra costs of a (prolonged) trial.

The lawyers of both sides could secretly collaborate to complicate the case, increasing their work and thus collecting more fees from their clients. The Lawyers could also work together to try to prevent a settlement, in order to prolong the court case and collect more fees.

The lawyers may come up with ideas for their clients to pay bribes, of which they may keep a commission for their services as middlemen.

Both the Patent Holder and the Infringer can, theoretically, fire their lawyers if they don't trust their actions. However, this costs the client a lot of money and time, since there is a business contract with the present lawyer that needs to be dissolved, and because the new lawyer would have to first familiarize himself with all the details of the case.

If the decision of the District Court or the High Court does not satisfy the Patent Holder, he can appeal to higher courts. The Infringer could also appeal, but this is not in his favour since the higher the court, the less scope for corruption and the more expertise, which both significantly increase the chances of justice being done (and thus the Infringer being punished).

Personal influence relations can play a role between all pairs of actors, depending on the specific case. For example, one of the Infringer's employees might have an uncle, whose business partner is a local politician that frequently has lunch with some of the district judges, one of whom happens to be presiding over the present infringement case. These kind of personal and / or familial relations could have a profound influence on the handling and outcome of court cases.

If the quality of lawyers is taken into account, a distinction must be made between the early stages of the trial and the later ones. After some initial "battles" in court, the quality or ability of both the lawyers becomes known to all the involved parties. This information can be used in the later stages of court proceedings, for example in opting for a settlement as opposed to continuing the "fight".

If one party wants a settlement, but the other party chooses to "fight", the first party does not necessarily have to also continue in the legal battle. They can also just give up, leading to a less favourable verdict, but saving on litigation costs.

There aren't many "active" strategies open to the Judge(s), since they are under the scrutiny of their rivals and the media. However, a corrupt Judge can "passively" wait for one or both of the parties to offer bribes in exchange for minor favours. If the Judge is not corrupt and he realises that the lawyers try to unnecessarily complicate and prolong the case, he could prevent this from happening.

7.2 Questions Worth Asking

In this complicated and important "arena", there is a whole list of questions that are worth investigating. In line with the research question, the following questions will be addressed:

- Does it make a difference if the Judge is corrupt?
- Does the (in)corruptibility of the Lawyers have any consequence?
- Does it matter if the Patent Holder is of the zero-bribe or bribe-paying type?

The following questions have arisen during this research, but can not be answered here:

- Would the game play and the outcome be different if there were less backlogs than at present?
- What is the difference in game play between Patent Holders with different priorities (one for...
which the economic cost of infringement is high and therefore injunction and speedy justice
is paramount, the other for which there is a trade-off between economic costs and litigation
costs)? The same difference in priorities for Infringers could also influence the decisions and
outcomes for the Patent Holder.

- Does the ability or quality of the Lawyers make any difference?

7.3 Simplifications of Reality

The game analysis can not take into account all the issues and possibilities of the "complex reality"
described above. A selection of questions has already been made above, but more simplifications
are necessary to come up with a comprehensible game model. These paragraphs point out some
more simplifications that have been made, before going into the game setup and analysis.

Because of the assumption that settlement is possible at any stage, we do not need to include
separately the decision of the Patent Holder on whether to sue or settle, before the lawsuit is started.
We can just assume that court proceedings are started. If a settlement is reached in the early stages
of the court proceedings, not many costs have been incurred yet, and can be offset by a stronger
negotiation position because the initiation of judicial processes shows that the Patent Holder is
serious about his patent.

Although the effect of influence relations between the actors is very interesting, the chance that
such an influence relationship exists is generally quite small in the big cities (where most of the
patent-holding firms are based). In remote villages, it is a different story altogether, but for our
present case we can leave influence relations out of the model.

The game models do not specify at what level of courts the legal battle is fought. In practice, almost
all infringement cases quickly progress from the District Court level to the High Court level. The
most significant difference between these two levels, for the present research, is that there is much
less corruption in the High Court (although it is not entirely absent, viz. The Times of India, July 18,
2008). Because in reality not every case goes to the High Court, and because the High Court may
not be totally corruption-free, the game analysis will investigate two situations, one with a corrupt
Judge, and one with an incorruptible one.

The processes involved at the Supreme Court are similar to those at the High Court, and therefore
the game analysis will not explicitly include the possibility of an appeal to the Supreme Court.

In the description of the "complex reality", it was mentioned that Judges in a division bench have
less opportunity to let corruption or other influences affect the outcome of the judgement, than do
single judges. However, in the model, no distinction will be made between a single Judge or a
bench of Judges.

The administration systems of the courts will not play a role in the game models. The
administration system of the High and Supreme Courts can be assumed to be corruption-free, since
it is extensively automated (which is not the case in the District Courts). Because we assumed
above that the trial takes place at the High Court, the court administration system has little influence
in the outcome of the game.

The game setup will assume that both the Patent Holder and the Infringer each have only one
person as their Lawyer. In reality, several different kinds of law firm employees may be involved,
but we assume there is only one key figure that makes all the decisions.

A settlement with a licensing agreement especially makes sense if the Infringer is serving a totally
different market (segment) than the Patent Holder's company, and in which the Patent Holder is not
interested (also for the future). This way, high litigation costs may be avoided and the Patent Holder
can share in the profit from the Infringer's activities. We assume this is not the case, since then the

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conflict would easily be solved. However, a settlement in general will still be included in the model, as it is a distinct option that allows the Patent Holder and Infringer to limit litigation expenses.

In arena 1 (national security check) the ACB (Anti Corruption Bureau) played an important role in the game because they could be used to set a trap for bribe-taking government officials. In the present arena, the ACB is not included in the model, because now there is no situation where a government official forces someone to pay a bribe (by threatening to refuse service). Rather, the civilians involved are the initiators of the bribes, and it is much harder to use the ACB against an opponent who bribes a third party.

7.4 Game Setup

This arena is the most complex of the three analysed arena's. Actually, several games are played out at the same time. In court, the outcome depends for a large part on the decision of both parties (and their lawyers) to either enter into a bilateral agreement and settle the matter, or to unilaterally decide to fight out the case in court. Apart from the "battle" or "cooperate" choice between the Patent Holder and the Infringer, both parties are also involved in a principal-agent game with their respective lawyers.

The Players

This game consists of the interactions between five players: The Patent Holder, his Lawyer, the Infringer, the Infringer's Lawyer, and the Judge. Only the first four are active players, as the Judge is assumed to have no active strategies and can only passively accept or refuse bribes.

Similar to the analysis of arena 1, it is assumed here that the Patent Holder is the rightful owner of the patent, which means he is the inventor himself or his legal entity. We also assume that the Infringer has indeed infringed upon the patent. Because of this illegal act, we will also assume that the Infringer has no moral objections to paying bribes. As for the Lawyers, three different kinds of Lawyers will be included in the analysis.

Three Types of Lawyers

In general, two different kinds of integrity are possible: universalist and particularist integrity. Universalism is, according to Riding the Waves of Culture by Trompenaars and Hampden-Turner, "to adhere to standards which are universally agreed to by the culture in which we live" (p.31). Particularism focuses on the "exceptional nature of the present circumstances" (p.31). If the person involved is a relative or friend, "I must therefore sustain, protect or discount this person no matter what the rules say." (p.31, emphasis original). For the purposes of this game analysis, a distinction is made between three different "types of integrity" that lawyers might have towards their respective clients.

Universalist integrity means that the lawyer is first and foremost loyal to his professional code, which prohibits all kinds of unfair or corrupt behaviour. He is loyal to his client and will do his "level best" (as the Indians say), staying within the law.

Particularist integrity is of a different logic, because the lawyer will do anything to serve his client, including any kind of corrupt activity. However, he will never use these for personal gain at the expense of his client, because he has a particularist loyalty towards him.

No integrity at all is the third possibility. This means that the lawyer is only interested in personal gain and is not loyal to his client. The only reason for realizing the clients' interests is that the client is paying him to do so. "No integrity" also means that this type of lawyer has no problem with corrupt or unfair practices and includes them in the range of options he can choose from.
Structure and Sequence of Decisions

The strategic interactions that take place in and around the courts, are modelled with as two stages. First, the Judge will decide whether an injunction is imposed upon the Infringer, and the other players will have opportunities to influence this decision. After that, the rest of the trial takes place, a settlement may be reached, delays may be caused, and the final outcome of the litigation process is determined.

The structure of two stages is different from the two level game that was used to model the first arena. One essential element of a two level game (as conceptualised by Putnam, 1988) is that one of the players is involved in both levels, but encounters different "opponents" on each level. In the present game model, the two stages are played between the same players, but are consecutive in time.

Factors of Interest

The game situation has been simplified to contain only four factors that are of interest to most players. The first is whether or not an injunction is imposed by the Judge on the Infringer. Secondly, the ultimate outcome or final verdict of the case, which includes the possibility of (1) an injunction until the patent expires, and (2) a sum of money to be paid to the Patent Holder as compensation for profits lost due to infringement. These two components of the final verdict are modelled as a single variable, which can be "fair", "unfairly favouring the Patent Holder", or "too much in favour of the Infringer". The third factor is the time span between the start of the case and stage 1, and the final verdict that concludes stage 2. The fourth and final factor are the sums of money paid in bribes and the costs of litigation, the latter of which depends on the time factor.

Rules and Strategies in Stage 1

The game play of the first stage, concerns the decision of the Judge on whether to impose an injunction on the Infringer. Although the exact effects of an injunction will only be clear after analysing the second stage, it is already clear that in general, the Patent Holder prefers the injunction whereas the Infringer does not.

For either player it is possible to bribe the opponent's Lawyer, so that he will make some mistakes and thus increase the chance that the Judge will decide in favour of the bribe-giver. It is also possible to directly bribe the Judge, if the Judge is corrupt. If one player bribes the other's Lawyer, but the other bribes the Judge, we assume the Judge will decide according to the received bribe, thus nullifying the effect of the Lawyer's intentional incompetence. The rationale for this assumption is that the bribe to the Judge is a more direct influence on the outcome of his decision. (Of course the Judge is risking his career by accepting a bribe, but the decision about the injunction can be seen (although just barely) as a "minor" decision, for which the risk of detection is acceptable.). If no-one is offered a bribe, the judge is assumed to impose the injunction, whether he is corrupt or not.

First, the two stages of the game will be analysed with a corrupt Judge. The effect of an incorruptible Judge is that certain options (such as bribing the Judge) are no longer possible. What this means for the outcomes of the game, will be analysed separately.

The outcome of this first stage has an effect on the payoffs of certain actions in the second game, primarily by altering the value of delays. If an injunction is "awarded", the infringing activities are halted (enforcement problems are ignored here), and the Infringer has no benefit from delaying the proceedings. However, if the injunction is not imposed, the Infringer can continue to earn money from the infringing activities as long as the final verdict is not reached. In India, many court cases take a very long time to reach completion (see section 3.2), especially if some of the players
involved try actively to delay the final verdict. Before the actions in stage 1 can be analysed further, the outcomes of stage 2 are needed.

**Rules and Strategies in Stage 2**

In stage two, the legal battle revolves around two issues: the outcome of the settlement or the final verdict, and the amount of time it takes until that outcome is reached. A third issue that all players will keep in mind when choosing their strategies, is the amount of money spent (or earned) through bribes and legal fees.

Both parties can either enter into an agreement to settle the matter, or unilaterally decide to "fight" until the Judge gives the final verdict. A settlement makes most sense to both parties at the beginning of the trial, because then it can still save the most money on legal fees for the Lawyers. However, normally it will occur after stage 1 (possible injunction), because the outcome of stage 1 determines the relative importance of a short or long court procedure. In this model, settlement is therefore presented as a one-time choice. Either party may decide to "fight", which leads to a certain amount of time and money spent in court. We assume that the lawyers of both parties have quite a lot of influence in the choice between settling or fighting, partly because they have experience with patent litigation and can therefore tell the Patent Holder and Infringer what their expectations (i.e. of a settlement) should realistically be.

If the path of continued fighting is chosen by either party, both parties have the option of bribing the Judge to delay the final verdict (i.e. by adjourning as much as possible and for long periods of time). In practice, the only one to benefit from such a delay is the Infringer, and then only in the case that an injunction was not imposed in stage 1. The Infringer does not necessarily have to involve his Lawyer as a middleman, but it does not matter much if this is true in reality, because the Lawyer's interests do not deviate much from the Infringer's in this case. As for the Judge's decision, the model assumes it is a "fair" decision, because even a corrupt Judge would not allow bribes to influence the final verdict. Depending of course on the details of the case, this "fair" outcome may be that the Infringer compensates the Patent Holder for the amount of infringement done before and during the court proceedings, but is allowed to continue his operations after the case is closed, with a specified maximum production volume and a royalty per product to be paid to the Patent Holder.

There are three possible settlements. First, a fair settlement may be reached, which has the same outcome as a good Judge would have given. The settlement may also be slanted in favour of either party, if that party bribes the opponent's Lawyer to cooperate in drafting the settlement and convincing his client (the opponent) to agree to the terms. For the Patent Holder, this "unfairly favourable" settlement may include abnormally high damage payments. If the Infringer is "unfairly favoured", the settling terms may stipulate, for example, a free licence for the coming years.

**Stage 2 after Injunction**

The game play of stage 2 is slightly different, depending on whether an injunction was imposed or not in stage 1. Both cases will be analysed separately. The following table gives an overview of the outcomes and preferences for each player, in case an injunction was imposed. Because the Infringer's operations are shut down, he has no incentive to delay the court proceedings, and the option of delay by bribing the Judge is removed from the analysis. The Judge is not included in the rows as one of the players, because there is nothing for him to decide, and we already made the assumption that his final verdict must be "fair". The row "special actions" indicates what actions (i.e. bribes) are needed to end up in each column.
The numbers indicate the final outcome of stage 2, with "2:2" being the fair outcome, "3" an unfair advantage, and "1" an unfairly disadvantageous outcome. A "plus" sign (+) means extra money received, and a minus sign denotes money given. In the "fight" column, the extra payments are not bribes, but perfectly legal wages for both Lawyers. These are modelled as "extra" payments because these fees are much lower if a settlement is reached early on.

For a fair settlement, all four players need to work together. However, for an unfair settlement, agreement is only needed between the favoured party and both lawyers. The decision making process results in the "fight" option if none of the other three "coalitions" can be established.

The preferences of the Patent Holder and the Infringer can easily be seen from the numeric values and "minus" symbols in their respective rows. The question remains, what options do the lawyers prefer? In the game setup, three types of lawyers' loyalties were introduced: universalist loyalty (to fairness), particularist loyalty (to one's client), and no loyalty (thus, only to oneself). If these lawyer types are included in the table above, the result is the following:

<table>
<thead>
<tr>
<th>Lawyer's Loyalty Type</th>
<th>Settle favouring Patent Holder</th>
<th>Settle fairly</th>
<th>Settle favouring Infringer</th>
<th>Fight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Special actions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patent Holder</td>
<td>2 -</td>
<td>3 -</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Infringer</td>
<td>2 -</td>
<td>1</td>
<td>2</td>
<td>3 -</td>
</tr>
<tr>
<td>Patent Holder's Lawyer</td>
<td>+</td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Infringer's Lawyer</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The preferences of the Patent Holder and the Infringer can easily be seen from the numeric values and "minus" symbols in their respective rows. The question remains, what options do the lawyers prefer? In the game setup, three types of lawyers' loyalties were introduced: universalist loyalty (to fairness), particularist loyalty (to one's client), and no loyalty (thus, only to oneself). If these lawyer types are included in the table above, the result is the following:

<table>
<thead>
<tr>
<th>Lawyer's Loyalty Type</th>
<th>Settle favourable Patent Holder</th>
<th>Settle fairly</th>
<th>Settle favourable Infringer</th>
<th>Fight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Special actions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patent Holder</td>
<td>3 -</td>
<td>2</td>
<td>1</td>
<td>2 -</td>
</tr>
<tr>
<td>Infringer</td>
<td>1</td>
<td>2</td>
<td>3 -</td>
<td>2 -</td>
</tr>
<tr>
<td>Patent Holder's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>A</td>
<td>B</td>
<td>X</td>
</tr>
</tbody>
</table>

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The preferences of each lawyer type are displayed in ranked form, with "A" as most preferable and "B", "C" and "D" for decreasing levels of preference. "X" denotes that the action of that column is totally unacceptable, because of the lawyer's loyalty. For example, a Universalist lawyer would never participate in an unfair arrangement (whether or not he receives a bribe), but a Particularist lawyer would only accept a bribe (or act as middleman) if it benefits his client. The monetary gains for Lawyers (the "pluses" from the previous table) are assumed to only have a significant influence on those lawyers that have no loyalty at all to principles of fairness or to their client.

Now that assumptions have been made for all the players' preferences, the model can predict probable outcomes for each combination of lawyer types. These outcomes are displayed in the table below. (This is still the situation that arises from an injunction being imposed).

<table>
<thead>
<tr>
<th>Infringer's Lawyer</th>
<th>None</th>
<th>B</th>
<th>B</th>
<th>A</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>X</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Particularist</td>
<td>X</td>
<td>B</td>
<td>A</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>

To illustrate how these outcomes were determined, one example is detailed here. Take the case where both lawyers are of the Particularist type. We will check for each column if it is the most probable outcome. The first column, with the title "Settle favouring Patent Holder", is not an option, because if we look at the row of the Particularist lawyer under "Infringer's Lawyer", we find an "X" in the column. This indicates that the Infringer's lawyer, because he is a of the Particularist type, will never agree to settle in favour of the Patent Holder and convince the Infringer that this is the best option available. Similarly, the column "Settle favouring Infringer" is also not an option because the Patent Holder's lawyer is a Particularist, too. The option to "Settle fairly" will become reality only if all four players prefer this option to the option to "Fight", which is in the last column. Luckily, because the lawyers are Particularist, their preferences are basically identical to those of their clients, who prefer "Settle fairly" (value "2") to "Fight" (value "2-"). (For the lawyers, their preference is indicated by the "B" for the fair settlement, which comes before the "C" of fighting.). In this case, out of the two options that are left, every player prefers the settlement, which then is the most probable outcome and is listed at the centre of the table above (where both the row and the column indicate "Particularist").

The "Fight" outcome needs a little more explanation in the case of a Particularist Patent Holder's Lawyer and a Non-loyal Infringer's Lawyer (upper right table cell). The outcome caused by the fact that the Infringer's Lawyer can sabotage a settlement if the Patent Holder's Lawyer does not actively oppose him (putting in some extra effort to make the settlement work). The assumption is that a
Particularist Lawyer will really want to make the settlement work, if that is better for his client, whereas a Universalist Lawyer is indifferent about settling or fighting in court. A Non-loyal Lawyer will probably even cooperate in sabotaging the settlement, because the "fight" option brings in more employment and fees for the Lawyers.

**Stage 2 with No Injunction**

The analysis above has also been done for the slightly different situation that arises when the injunction was not imposed in stage 1. Because no injunction is in effect, it is now possibly advantageous for the Infringer to prolong the judicial process. This adds another column to the table of possible outcomes of stage 2.

<table>
<thead>
<tr>
<th>Lawyer's Loyalty Type</th>
<th>Settle favouring Patent Holder</th>
<th>Settle Fairly</th>
<th>Settle favouring Infringer</th>
<th>Fight</th>
<th>Fight and Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Special actions</strong></td>
<td>Patent Holder bribes Infringer's Lawyer</td>
<td>(no special actions, but all four players must agree)</td>
<td>Infringer bribes Patent Holder's Lawyer</td>
<td>Either Patent Holder or Infringer chooses to fight</td>
<td>Infringer bribes the Judge to delay</td>
</tr>
<tr>
<td>Patent Holder</td>
<td>3 -</td>
<td>2</td>
<td>1</td>
<td>2 - -</td>
<td>2 - - -</td>
</tr>
<tr>
<td>Infringer</td>
<td>1</td>
<td>2</td>
<td>3 -</td>
<td>2 - +</td>
<td>2 - - + +</td>
</tr>
<tr>
<td><strong>Patent Holder's Lawyer</strong></td>
<td>Universalist</td>
<td>A</td>
<td>X</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>B</td>
<td>X</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td><strong>Infringer's Lawyer</strong></td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>X</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>D</td>
<td>A</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

The delay of the final outcome in the options "fight" and "fight and delay", is valued positively by the Infringer, hence the "+" signs. For the Patent Holder, this delay is negative (extra "-" signs) because the infringing activity continues every day. If the Infringer has to make a choice between a fair settlement (outcome "2") and fighting (outcome "2 - +"), we assume he prefers the fight, and even more the "fight and delay" options (outcome "2 - - + +"). The relatively high value placed on the delay has to do with the revenue the Infringer from using the lack of injunction for as long as possible (a considerable "investment" he already paid to the judge in stage 1).

The probable outcomes of this four-player decision making game can be derived in the same way as is shown before, in the situation where there was an injunction. The result is the following table.
As is shown in the table, the outcome is almost always "Fight and Delay", because the Infringer has this as his second best option and there is not much the Patent Holder can do to prevent him from making this unilateral decision.

### 7.5 Detailed Analysis of Stage 1

Now that it is known what the effects are of having an injunction or not, the players' decisions in stage 1 can be analysed more precisely. At stage 1, the lawyers do not play a role yet, and we assume the Infringer and the Patent Holder do not really need their lawyers in order to deliver a bribe to the Judge. First, the goals of both players will be determined by comparing the value of the outcomes of stage 2 for both options (with injunction or without). In general, the Patent Holder should be in favour of an injunction, whereas the Infringer prefers not to have an injunction. However, there are some cases where one or both players may be indifferent about the result of stage 1. The comparison is made for all nine possible combinations of Universalist, Particularist and Non-loyal Lawyer types, and presented in the table below.

#### Comparison between injunction or no injunction in terms of payoffs

<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Universalist's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>Non-loyal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universalist</td>
<td>Fight and Delay</td>
<td>Fight and Delay</td>
<td>Fight and Delay</td>
<td></td>
</tr>
<tr>
<td>Particularist</td>
<td>Fight and Delay</td>
<td>Fight and Delay</td>
<td>Settle favouring Patent Holder</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Fight and Delay</td>
<td>Settle favouring Infringer</td>
<td>Fight and Delay</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Infringer's Lawyer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universalist</td>
<td>(Injunction / No Inj.)</td>
</tr>
<tr>
<td></td>
<td>2 / 2 - ++</td>
</tr>
<tr>
<td></td>
<td>2 / 2 - -</td>
</tr>
<tr>
<td>Particularist</td>
<td>(Injunction / No Inj.)</td>
</tr>
<tr>
<td></td>
<td>2 / 2 - ++</td>
</tr>
<tr>
<td></td>
<td>2 / 2 - -</td>
</tr>
<tr>
<td>None</td>
<td>(Injunction / No Inj.)</td>
</tr>
<tr>
<td></td>
<td>2 - / 2 - ++</td>
</tr>
<tr>
<td></td>
<td>2 - / 2 - -</td>
</tr>
</tbody>
</table>
The values for the Infringer are displayed in the upper right corners of every cell and for the Patent Holder in the lower left corners. For example, in the case of two Universalist Lawyers, the Patent Holder would value the result (in stage 2) of an injunction as "2" and of lacking an injunction as "2 - - -". The Infringer values the result of an injunction as "2" (from the Fair Settlement), but the result of lacking the injunction is worth "2 - - + +" to him (because the probable outcome that was derived, was "Fight and Delay").

For each player, the difference in outcomes indicates the room for bribery: if there is a big difference, such as between "2" and "2 - - -" for the Patent Holder, that player is probably more than willing to pay bribes to get his preferred result. (The effect of a zero-bribe player, who does not use bribes, will be analysed after this basic analysis).

The table can be summarized as follows: The Patent Holder practically always faces much trouble in stage 2 in he is unable to get an injunction imposed. The Infringer generally prefers to prevent the injunction. The only exceptions are when one of the Lawyers is of the Particularist type and the other Lawyer is Non-loyal (only to himself). In that case, there is no difference in outcome between the case with or without an injunction. The reason for presenting the table here, is that it may look very different if some strategies in stage 2 are disabled because of a non-corrupt Judge or Patent Holder.

The respective goals of the Patent Holder and the Infringer, remain constant for each of the nine possible situations, and the motivation for reaching their goals also shows little variation. (Except the two exceptions where the issue of injunction makes no difference for both players). Therefore the rest of the analysis will focus on the available options for each player to pursue his goal of ensuring or preventing the injunction.

For the Infringer, there is the option of bribing the Judge and the (less effective) option of bribing the Patent Holder's Lawyer. The Patent Holder has the same options at his disposal: bribing the Judge or the Infringer's Lawyer. The last option for both players is the option to "do nothing", thus influencing no-one but saving money. If a Lawyer has Universalist or Particularist loyalty, he cannot be bribed by the opposing party. Because the set of available options is exactly the same for the four combinations in the upper left side of the table, these have been grouped together into one table cell. The options that are available and relevant, are displayed in the table below, the Infringer's options in the upper right corners and the options for the Patent Holder in the lower left corners.

<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infringer's Lawyer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universalist</td>
<td>br. Judge</td>
<td>br. Judge</td>
<td>br. Judge</td>
</tr>
<tr>
<td>Particularist</td>
<td>br. Judge</td>
<td>br. Judge</td>
<td>br. Judge</td>
</tr>
<tr>
<td>None</td>
<td>br. Judge</td>
<td>br. Judge</td>
<td>br. Judge</td>
</tr>
</tbody>
</table>
The option of bribing the opponent's Lawyer is always placed below the option to bribe the Judge, because the effect of the latter is assumed to be stronger than the effect of the former. (So if one bribes the other's Lawyer, but the other bribes the Judge, then the Judge decides in favour of the one who bribed him).

If both players bribe the Judge, we assume for the sake of simplicity that the Judge will ignore both bribes, follow the guidelines of justice and impose an injunction (because the Infringer actually does infringe).

The only question that remains now is what the probable outcomes are of stage 1. Two factors are used to determine this outcome: the incentive of each player to take action in stage 1, and the availability of options in stage 1.

It cannot be assumed that the players know exactly what the loyalty type is of their (and the opponent's) Lawyer. Therefore, the players cannot distinguish exactly in which of the nine possible cases they are, and will have to choose a strategy that works reasonably well in most cases. The overall incentive for a player to take action, pay bribes, and not just await the decision of the Judge, depends on the difference between the outcomes (in stage 2) with and without an injunction.

Because the payoffs have been given numerical values, an average difference can be calculated for each player. A "plus" (+) for the Infringer has more value than a minus, because we assumed that the Infringer values "fighting" (payoff "2 - +") more than a fair settlement (payoff "2"). For this calculation, we will assume that one "plus" cancels two "minuses". This yields a difference of $17 / 9 = 1.9$ "minuses" for the Infringer and $18 / 9 = 2.0$ for the Patent Holder. The differences for each player consistently point in the same direction. For the Patent Holder, it is always better to get the injunction imposed, for the Infringer it is always better to prevent it.

Another factor that can be used to derive the probable outcomes, is the number of options available to a player. There may be all kinds of reasons why an option that is available in theory, fails in practice. For example, the Judge who otherwise gladly accepts bribes, may happen to be extremely cautious during this particular court case, because the ACB has recently started watching his colleagues more closely. Another reason to value two options above one, is that if both parties bribe the Judge, but one of them also bribes the other party's Lawyer to poorly defend his case, the Judge will probably decide the injunction matter in favour of the one who also bribed the Lawyer.

With these factors the probable outcomes of stage 1 can be estimated. The incentives for action are relatively high for both players (2 "minus" points), if compared to the cost of bribing the Judge or the opponent's Lawyer (cost 1 "minus"). This means that each player will use at least one of his available options, but also that it is improbable that someone would bribe both the Judge and the opponent's Lawyer (as two bribes cost 2 "minus" points). Now that a simple model has been constructed for the way each player makes his decisions, the outcome of those actions can be modelled. If both players bribe the Judge, he will ignore both bribes, look at the facts (that infringement is really happening) and decide to impose an injunction. The same thing happens if both players bribe each other's Lawyers. If one player bribes the other player's Lawyer, but the other player bribes the Judge, the Lawyer bribe will be ineffective and the Judge will decide in favour of the one who bribed him. In the case that only one player pays a bribe, either to the Judge or to the opponent's Lawyer, the outcome will be in favour of that player. The full range of possible combinations and their outcomes is displayed in a table in the appendix. The combination of incentive for action and availability of options, determines to the outcomes of stage 1.
**Outcomes of Stage 1**

In this case, both players bribe the Judge but not the Lawyer, in all nine cases. The result is a draw in every case, leading the Judge to decide according to the facts and impose an injunction. The bribes cost both players one "minus" for the final payoff, which is shown in the table below.

<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universalist</td>
<td>Injunction</td>
<td>Injunction</td>
<td>Injunction Fight</td>
</tr>
<tr>
<td></td>
<td>Fair Settlement</td>
<td>Fair Settlement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 -</td>
<td>2 -</td>
<td>2 -</td>
</tr>
<tr>
<td></td>
<td>2 -</td>
<td>2 -</td>
<td>2 -</td>
</tr>
<tr>
<td>Particularist</td>
<td>Injunction</td>
<td>Injunction</td>
<td>Injunction Settlement favouring Patent Holder</td>
</tr>
<tr>
<td></td>
<td>Fair Settlement</td>
<td>Fair Settlement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 -</td>
<td>2 -</td>
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<td></td>
<td>2 -</td>
<td>2 -</td>
<td>3 -</td>
</tr>
<tr>
<td>None</td>
<td>Injunction</td>
<td>Injunction</td>
<td>Injunction Fight</td>
</tr>
<tr>
<td></td>
<td>Fight</td>
<td>Settlement favouring Infringer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 -</td>
<td>3 -</td>
<td>2 -</td>
</tr>
<tr>
<td></td>
<td>2 -</td>
<td>1 -</td>
<td>2 -</td>
</tr>
</tbody>
</table>

*Table 18: Final outcomes and payoffs (in the case of a corrupt Judge and Patent Holder).*
7.6 Answering the Research Questions

The central question of this research project is: "How does corruption influence patent protection in India?". In line of this general research question, the following three questions were selected for the game analysis of this arena:

- Does it make a difference if the Judge is corrupt?
- Does the (in)corruptibility of the Lawyers have any consequence?
- Does it matter if the Patent Holder is of the zero-bribe or bribe-paying type?

The answer to the second question will be greatly facilitated by the categorization of Lawyers according to three distinct types of loyalty, which has already shaped the tables presented above. A similar table structure can be used to compare the cases of a corrupt or incorruptible Judge and of a zero-bribe or bribe-paying Patent Holder. The table below outlines the form in which these cases will be compared.

<table>
<thead>
<tr>
<th>Bribe-paying Patent Holder</th>
<th>Corrupt Judge</th>
<th>Incorruptible Judge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Zero-bribe Patent Holder</td>
<td>III</td>
<td>IV</td>
</tr>
</tbody>
</table>

Table 19: Four "quadrants" that are analysed separately in order to compare the results.

For the upper left quadrant (number I) the analysis has already been performed (see the table with final outcomes and payoffs). The same analysis has been performed to construct similar tables for each of the other quadrants, so that they can be compared to each other. (The step by step analyses can be found in the appendices.). The following table summarizes the outcomes of all four quadrants for easy comparison.
Table 20: Probable outcomes of arena 3 according to the degree of corruptness of the Judge, the Patent Holder and the Lawyers.

"U", "P" and "N" stand for the three types of lawyers according to their loyalty, which are Universalist, Particularist and None, respectively. Within each table cell, the payoff for the Infringer is placed in the upper right corner and the lower left corner shows the result for the Patent Holder.

With this overview of outcomes, the questions for this arena can finally be answered. However, it is always good to define (again) what patent protection actually means.

What does "patent protection" mean in practice, in this arena?

In arena 2, the setting is a patent infringement court case. According to the model's assumptions, the Patent Holder is the rightful owner of the patent, and significant infringement has really taken place. In this context, "patent protection" means that the Infringer is punished and the Patent Holder is paid compensation, all in due time and without very high costs of lawyers and courts.

Does it make a difference if the Judge is corrupt?

To answer this question, the right and left halves of the table of outcomes are compared. An incorruptible Judge often has a positive result on payoffs when comparing with the case of a corrupt Judge. The main reason is that an incorruptible Judge does not accept bribes, thus not giving the players a chance to spend money (and by doing so, lower their total payoffs).

One way of "measuring" the improvement of an incorruptible Judge over a corrupt one, is to calculate the sum (over all lawyer types) of the differences between outcomes under a corrupt versus an incorruptible Judge. It must be noted that this is a very crude method, because it is unlikely that every combination of lawyer types is equally likely to occur. Therefore, only the most general conclusions can be drawn from such a "measurement". For the Infringer, having an incorruptible Judge leads to "savings" of 9 "points" but also to the loss of 6 points, making the overall results mildly positive. The Patent Holder, if he is corrupt, profits 5 points from having an incorruptible Judge. However, the difference for the zero-bribe Patent Holder is 21 points. Thus it seems essential for a zero-bribe Patent Holder to somehow make sure that the Judge presiding over the infringement case, is incorruptible. On the whole, an incorruptible Judge helps to yield higher payoffs (for both players) than a corrupt Judge.

Does the (in)corruptibility of the Lawyers have any consequence?

In stead of defining a lawyer as corrupt or incorruptible, a distinction has been made between three types of lawyers, according to their loyalty.

For both types of players, the most problems arise from a Non-loyal Lawyer (which was to be
expected). The outcomes with Universalist or Particularist Lawyers are very similar in most cases. However, because the Particularist values the interest of his client above any universal rules, the average outcomes for an individual player are higher if he has a Particularist Lawyer.

In theory, it may be better for both players if both Lawyers are Universalist, because this may facilitate cooperation and limits the options for opportunistic behaviour. For the way this game model has been set up, win-win situations come only in the form of the "fair settlement", which can only be reached if both players have either a Universalist or a Particularist Lawyer. In this case, it makes no difference if the Lawyer is Universalistically or Particularistically loyal.

Lastly, an interesting twist in all the possible combinations is that of a zero-bribe Patent Holder with a Particularist Lawyer. Although the Lawyer would like to bribe the Infringer's Lawyer and arrange a settlement with unfair advantages for the Patent Holder, the latter will not approve of such corrupt methods.

Does it matter if the Patent Holder is of the zero-bribe or bribe-paying type?

A few differences between a zero-bribe and a bribe-paying Patent Holder have already been discussed in the answers to the other questions.

If the Judge is incorruptible, the zero-bribe Patent Holder is sometimes better off than the bribe-paying one, because of money saved by not paying bribes. In these cases, the bribe-paying Patent Holder would pay the bribe in stage 1 without knowing for sure whether it would have an effect in the outcome of stage 2.

If the Judge is corrupt, the bribe-payer will do alright, but the zero-bribe Patent Holder seems to get bad results in all the possible cases. The reason for this is that the Judge offers plenty of opportunity for influencing the outcome of stage 1, but the zero-bribe Patent Holder must refuse to use them. Instead, the Infringer can now use bribes to dominate the game play irrespective of the kind of Lawyers present. These findings serve to caution serious zero-bribe patent holders that they may not be able to defend their rights, and that it is essential to find judges that are incorruptible. There are procedures for requesting transfer to a different Judge, which could be studied in further research.

It must be noted however, that the gravity of the situation is caused in part by the assumptions made during the game setup. Had the game setup included a mechanism with which a Patent Holder could discourage bribery between other parties, then the Infringer would not be able to take full advantage of the Patent Holder's honesty.

What course of action is recommended for SMEs?

For the zero-bribe type SME (as Patent Holder), it is crucial to make sure the case is handled by an incorruptible Judge. At the beginning of the legal process, the Patent Holder normally has some influence on this matter, by deciding in which jurisdiction to file the infringement lawsuit. The Patent Holder can probably choose between jurisdiction in which his own company is registered or has business activities, and the areas where the infringing party is registered or active. Some jurisdictions are known to be less corrupt than others, as reported by the Centre for Media Studies in Corruption in Judiciary (2005), or by Transparency International in their Annual Corruption Report (2007). (TODO: check references and find page numbers). If the legal process is already under way, and the Judge is discovered to act corruptly, there are official procedures the Patent Holder can use to request a transfer of the case to a different judge or court.

Most of the attitude or communication related issues of arena 1, are no longer important in this arena. For example, the possibility of trapping a corrupt official plays a negligible role in the courts, and so does the related issue of presenting oneself as a zero-bribe hardliner or a flexible bribe-payer.
This is because there are pretty good appeal procedures, and corruption seems to diminish as one moves up higher on the judicial ladder. The only problem with appeals is that it may delay the final outcome, since all courts at all levels have a large backlog of cases that are "in progress". On the other hand, a quicker final outcome that is unjust (because of corruption) would still need an appeal to rectify it.

What is important for the Patent Holder, regardless of his attitude towards bribery, is to hire a lawyer that is loyal to him as a person (particularist) or at least to general principles of fairness (universalist). How to go about such a selection process, is not within the scope of this research project.
Conclusions and Recommendations

The research question that has guided this research project, was:

*How is patent protection in India threatened by corruption, and how can small and medium-sized enterprises in India deal with it?*

To answer this question, the research first looked into the workings of corruption, Indian society, patents, and justice (see chapters 2 and 3). This paved the way for modelling the total patent protection process in the form of twelve steps or "arenas" (chapter 4). Two of the most important arenas were selected for further modelling with game theory. The first arena occurs right after the submission of a patent application at the Patent Office, when the application is checked for any relevance to national security (chapter 5). The second selected arena occurs after the patent has been granted, someone has infringed upon the patent, and a legal battle ensues between the patent holder and the infringer (chapter 6). This chapter synthesizes general conclusions from the separate conclusions of the two arenas, and derives recommendations for SMEs dealing with patents in India.

**What does "patent protection" mean in practice, for the entire process?**

A patent is protected during the entire "patent protection process" (outlined in chapter 4), if the patent is granted to the rightful owner of the patent rights (the inventor or someone to whom he transfers the rights), and these patent rights are upheld in infringement court cases. The granting and upholding of the patent rights should take place without extra or unreasonable costs, delays or difficulties to the patent applicant.

**How is patent protection in India threatened by corruption?**

From the overall patent protection process of chapter 4, two situations ("arenas") were selected for further modelling (with game theory) because at those points the protection of patents seemed to be most vulnerable to corruption.

The first arena is centred around the fact that a patent application can be stopped right at the beginning, if it is flagged as "sensitive for national security" successively by the Controller from the Patent Office and the patent review commission from the Defense Research and Development Organisation (DRDO). This is an important hurdle for the patent applicant, because there is no official appeal possible to the DRDO decision, and because withholding of the patent application would include an order for total secrecy, which means the applicant cannot even patent the invention in other countries. This first arena is not a problem if it can be clearly shown that the invention has already been published, and therefore is not worth keeping secret any more. However, a published invention may attract much more (ungrounded) opposition from competitors (before or after the grant), and may also facilitate infringement, both of which are not unlikely occurrences in India. An important, but difficult to quantify, factor in this first arena is the chance of successfully "trapping" a government official when he accepts a bribe. Equally important are each player's personal estimations of this chance.

The second selected arena the infringement case before the regular courts. Often, the accused infringer will immediately counter the accusation by claiming that the patent should never have been granted in the first place. If the counter-claim is made, the matter automatically moves from the District or City Courts to the High Court of the relevant State or Union Territory. The High Courts seem to be relatively corruption-free, but it is possible that one may still encounter a corrupt judge. The suing parties also have their lawyers, whose possible corruptness has been modelled with three different types of loyalty.
In summary, patent protection is threatened if controllers, DRDO commission members, judges and / or lawyers are corrupt. The main mechanism in the check for national security is the direct "extortion" of bribes from the patent applicant, by government officials who can hinder the registration of the patent. In the infringement court case, corruption operates differently, because the infringer could bribe the judge and the patent holder would never even know if a bribe was paid somewhere. The matter is further complicated by the lawyers of both parties, who can also be corrupt and can try to bribe each other and / or collude against their own client. In addition to the mechanisms of how corruption works, it is also worthwhile to look at the main failures in countermeasures against corruption. Failing countermeasures are the lack of appeal procedures and unknown (possibly low) chances of success for setting bribery traps in the national security check situation. In the infringement court case, the reduction of corruption relies less on institutions and more on the character of individuals.

A surprising finding of this research project, is that the police is absent in the list of factors causing corruption to threaten patent protection, although surveys and interviews indicate that it is by far the worst public service in terms of corruption (see section 2.3). The police plays a role in the patent protection process in two distinct ways. First, the final steps of the patent protection process concern the implementation of judicial orders after the (rightful) patent holder has won an infringement court battle. Although the police may generally be corrupt, the imperative of self-interest causes the police to do exactly what the judge has decided (i.e. to close down infringing operations), because violations of judicial orders appear to be punished very quickly (see section 4.3). The second role of the police in patent protection is to help the patent applicant to trap government officials in sting operations for accepting bribes. However, this is done by special Anti Corruption Bureaus of police on lower levels, and by the Central Bureau of Investigation at the national level. It is unclear if corruption is as common in these departments as it seems to be in the rest of the police force.

How can SMEs deal with the threat to patent protection?

First the main recommendations for the two arenas will be summarized, before synthesizing these with findings chapter 4 into general recommendations for the whole patent protection process. The small or medium-sized enterprises (SMEs) play the part of the patent applicant and patent holder.

In the first arena, the patent Applicant (an SME) tries to avoid that the patent application is detained by the Controller and labelled "top secret" by the DRDO. Although a high chance of a successful trap is beneficial for the Applicant, it is also important that the government officials do not expect the Applicant to use a trap. This is the case if the officials estimate the chance of a successful trap as very small or believe that the Applicant estimates the chance of a successful trap as very small, or both. In the interaction with an official, the Applicant might be able to influence the official's perception in this respect.

Another point of interest is the attitude displayed towards bribery. For the Applicant that is open to (or used to) paying bribes, it is best not to deny that he is willing to pay a bribe. Even after agreement about the bribe has been reached, the Applicant still has the option of setting a trap (that is, if the bribe is not to be paid on the spot, but later). For the Applicant with a strong zero-bribe policy, it is important that his categorical rejection of bribery is hidden from the Controller. The Applicant should lead the Controller to believe that he can expect a decent amount of money, and at the same time set a trap for him. If the trap fails, or if the Controller simply detains the application because he estimates a high chance of success for traps, the Applicant faces the DRDO. Now, the strategy is reversed: the Applicant is advised to convince the DRDO that there is no way that a bribe will ever be paid. A proven track record of never paying bribes may help in this respect.

In the interaction with the officials, a third point is to avoid offending the DRDO in any way, but to
rather show respect. This is especially important for the zero-bribe type Applicant, since the final decision of the DRDO (to release or detain the invention) may depend for a large part on their feelings towards the Applicant. The bribe-paying Applicant may get his application released by simply paying some money, so he is slightly less dependent on personal emotions.

In the second arena, the infringement court case, it does make a difference if the SME is of the zero-bribe or the bribe-paying type, but all the other issues mentioned for the first arena are no longer important. What is important for the Patent Holder, regardless of his attitude towards bribery, is to hire a lawyer that is loyal to him as a person (particularist) or at least to general principles of fairness (universalist).

For the zero-bribe type SME (as Patent Holder), it is also crucial to make sure the case is handled by an incorruptible Judge. This matter may be influenced at the beginning, by choosing the right jurisdiction, or later on, by requesting a transfer.

If the Patent Holder is not opposed to paying bribes, he is in more or less the same situation as his corrupt, infringing counterpart, and has fair chances of winning the case, regardless of the (in)corruptibility of the Judge.

The summary above shows that there is no conflict between the recommendations for the two selected arenas (national security check and infringement court case). However, the actions of the patent applicant during the national security check, may have consequences for the steps that follow it in the patent protection process. The representative of the SME can make a conscious effort to be polite to the Controller of the Patent Office, in order to minimize hostilities when the same Controller is encountered again during the patent registration process. An alternative approach is to successfully trap the Controller and thus remove him from office. The Controller's successor might be less corrupt, is probably less well-connected, and may have learnt from his predecessor that this particular SME cannot be messed around with. All of these consequences will probably benefit the SME, but it also means taking the risk that the trap fails.

The recommended strategies for a bribe-paying SME are often different from those recommended for one committed to a zero-bribe policy. The outcome for the bribe payer is often like a compromise (success, but at the cost of a bribe), whereas the zero-bribe patent holder is more likely to cause an all-or-nothing scenario (either complete success or utter failure). Although the way of compromise (by bribing) may seem more advantageous, the costs of bribes should not be underestimated, especially since the amount increases over time. The setup of this research project is too general to provide conclusive evidence that either the path of bribery or that of zero-bribes is significantly more profitable. What can be concluded, is that a strict zero-bribe policy (or identity) is worth maintaining, because it takes quite some time and effort to build up a zero-bribe track record. The preceding arguments are all from the perspective of a single enterprise. If a large number of enterprises would choose to take the zero-bribe path, corruption in general would be forced to decrease, and that would yield benefits for the collective, not limited to, but including, the zero-bribe companies.

**Is game theory a useful tool in this subject area?**

Game theory was chosen as a modelling tool for this research project, because it is suitable for modelling strategic situations, which play an important role in understanding how corruption threatens patent protection. It has also been suggested that the average Indian is particularly good at thinking strategically. The third reason for choosing game theory is that the research question specifically asks for recommendations, and game models by their structure greatly facilitate the formulation of recommendations for the "players" involved. Now the question is: "Has game theory been proven to be useful?"
First of all, game theory has been useful as a modelling tool in this research, because it was found to be possible to actually construct game models that capture important aspects of reality. However, the reality of corruption in the area of patent protection is extremely diverse, and the models constructed in this research project are very general in comparison.

The game models presented here are too general to be of direct use in the specific situation of one small or medium-sized enterprise. An enterprise interested in patenting in India, should build its own game models, taking into account many more factors relating to their specific industry, knowledge about their main competitors, the relative sizes of the companies, known influential relationships of all parties involved, and many other factors. Many entrepreneurs may not even build this type of game models for their own situation, but still be able to make good decisions by combining their own capacity of strategic thought with the lessons from this research project. Of special interest in this respect, are the descriptions of the "arenas" and the threats and opportunities mentioned in the twelve-step patent protection process. The research report as a whole can be very useful as an introduction for those who are starting to get involved with patents and corruption in India.

**Recommendations for Further Research**

The whole subject of patents and their protection is still in its infancy in India, but rapidly growing towards adolescence (see section 3.3). As patents become more influential in the Indian economy, more research will be directed towards the subject of patents, including the threat of corruption. Some suggestions for further research are presented here.

A question that has been completely ignored in this research question, is under what circumstances a company should apply for a patent in the first place. It would be interesting to find out what the costs, risks and benefits are of alternative invention protection ideas, such as massive market entry or keeping long term trade secrets. With this information, a scorecard could be used to identify the best alternative, depending on specific data about the type of invention, company, industry, and region within India.

The game models could also be detailed further. Especially in the analysis of the patent infringement court case, a great number of assumptions had to be made to keep the game model small and comprehensible. Would the game play and the outcome be different if there were less backlogs (delays) in the court system than at present? Would it matter if the patent holder values time more than money, or vice versa? Does the "technical" ability or quality of the lawyers have any influence on the strategic interactions and outcomes of infringement court cases?

The analysis of the infringement court case also revealed that it is crucial for a zero-bribe type patent holder to make sure that his infringement cases come before a judge that is incorruptible. Further study could explore the methods currently available to the patent holder (i.e. choice of regional jurisdiction, or petitions for transfer), and give recommendations on how to use these methods exactly.

Last, but certainly not least, the influence of cultural mindset can be explored much further. If clear characterisations can be given for "Western" and "Indian" culture, one could then investigate the effects of these cultural differences on behaviour related to patenting, corruption, and patent protection in India. For example, what are differences in expectations, available strategies, and ultimate goals for Western companies in India as compared to Indian companies?
References

The references or sources have been divided into three categories: "Books and Articles", "Websites, News, Working Papers, and Other Publications" and "People Interviewed". Some scientific or legal articles were retrieved from websites, but are listed under "Books and Articles". Even a few reports, though technically a news item and retrieved from a website, have been treated as an article because of their size and/or recognition in the field.

Books and Articles


Hulten: see "Van Hulten".


Mahabharata. Ancient Hindu sacred text. Translations are widely available, for example at About.com website: http://hinduism.about.com/library/weekly/extra/bl-mahabharata1.htm


Websites, News, Working Papers, and Other Publications

Business Today, 29 June 2008. (This is a local business magazine).


Economic Times: see "The Economic Times".

E-Voice of Human Rights Watch. E-news weekly maintained by M. R. Nagaraj, who combines and comments on information from several news sources and human rights organisations.


International Property Rights Index: see "Property Rights Alliance"


Katju, Markandey: see "Lawyers Club India - April 20, 2008".

Krishna & Saurastri, Advocates. Quotes were retrieved September 3, 2008 from their website: http://www.krishnaandsaurastri.com/htmls/faqs_patent.html#1

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  Posted by Yedhulaprakash.

  Posted by Rajendran Nallusamy.

  April 20, 2008. *Contempt of the Court...*
  Posted by Sandeep Jalan.


Right To Information official website (maintained by the Indian government).
  http://righttoinformation.gov.in/


SpicyIP. Authoritative weblog about Indian patents, with a special interest towards corruption, maintained by experts from the field. The posts below were all posted by Basheer, S., Associate at Oxford Intellectual Property Research Center.


The Times of India. One of the larger daily newspapers in India.


Dictionary references


### People Interviewed

Note: Names in accolades (""") are fictional names for real interviewees that insisted on remaining anonymous.

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
<th>Date</th>
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<tr>
<td>Mr. Agrawal, Nitin</td>
<td>Managing Director, Euro Fruits P. Ltd.</td>
<td>4 June 2008</td>
<td>Mumbai</td>
</tr>
<tr>
<td>Mr. Augustine, John</td>
<td>Software Researcher, Tata Consultancy Services</td>
<td>several occasions</td>
<td>Pune</td>
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<td>Mr. Bakker, Frank</td>
<td>Managing Director, CGCE P. Ltd.</td>
<td>ongoing</td>
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</tr>
<tr>
<td>Mr. Baliga, Pankaj</td>
<td>Vice President, Tata Consultancy Services</td>
<td>4 June 2008</td>
<td>Mumbai</td>
</tr>
<tr>
<td>Mr. Bansal, B. B.</td>
<td>Commercial Advisor at the Dutch Consulate in Mumbai.</td>
<td>22 May 2008</td>
<td>Mumbai</td>
</tr>
<tr>
<td>Dr. Mrs. Dole, Bharati S.</td>
<td>Director and lecturer of intellectual property management at Amrutvahini Institute of Management and Business Administration, Sangamner (affiliated to University of Pune).</td>
<td>19 April 2008</td>
<td>Pune</td>
</tr>
<tr>
<td>Mr. Furtado, Taumaturgo</td>
<td>Advocate, Goa.</td>
<td>28 June 2008</td>
<td>Panaji</td>
</tr>
<tr>
<td>IPAB employee</td>
<td>Answer phone number +91-44-24328903 of the IPAB (Intellectual Property Appelate Board).</td>
<td>9 May 2008</td>
<td>Phone, Chennai</td>
</tr>
<tr>
<td>Mr. Kesharwani, Sanjay</td>
<td>Assistant Controller in Mumbai Patent Office.</td>
<td>30 April 2008</td>
<td>Phone, Mumbai</td>
</tr>
<tr>
<td>Mr. &quot;Kumar&quot;</td>
<td>Owner and Manager of a small company for customized software development.</td>
<td>8 May 2008</td>
<td>Pune</td>
</tr>
<tr>
<td>Mrs. Phadke, Manasi</td>
<td>Economic Advisor for Mahratta Chamber of Commerce, Industries and Agriculture (MCCIA).</td>
<td>16 April 2008</td>
<td>Pune</td>
</tr>
<tr>
<td>Miss Prins, Fionna</td>
<td>Consultant for automotive industry.</td>
<td>27 June 2008</td>
<td>Panaji</td>
</tr>
<tr>
<td>Mr. Rengasamy, V.</td>
<td>Head of Chennai Patent Office, Assistant Controller of Patents &amp; Designs.</td>
<td>8 July 2008</td>
<td>Chennai</td>
</tr>
<tr>
<td>Mr. Somandy, Burzin</td>
<td>Advocate, Mumbai.</td>
<td>16 June 2008</td>
<td>Mumbai</td>
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<tr>
<td>Mr. Tideman, Kasper</td>
<td>Independent Consultant for NGOs and multinational businesses. Dutchman living in India for 14 years and married to an Indian lady.</td>
<td>19 June 2008</td>
<td>Pune</td>
</tr>
<tr>
<td>Mr. Usgaonkar, Sudin</td>
<td>Advocate, Goa.</td>
<td>28 June 2008</td>
<td>Panaji</td>
</tr>
<tr>
<td>Mr. Venugopal, Premnath</td>
<td>Head of Patents Cell, National Chemical Laboratory.</td>
<td>3 July 2008</td>
<td>Pune</td>
</tr>
<tr>
<td>Mr. Zende, Kshitij</td>
<td>Managing Director, CGCE P. Ltd.</td>
<td>several occasions</td>
<td>Pune</td>
</tr>
</tbody>
</table>
Appendix A: International Property Rights Index

The International Property Rights Index 2008 (made by the Property Rights Alliance), gives India average scores in the categories of "Corruption" and "Intellectual Property Rights Protection", which means that India is not doing much worse than many other countries, but still has a lot to improve. A selection of the index data is presented in the table below.

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
<th>World Rank</th>
<th>Regional Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence in Courts</td>
<td>7.5</td>
<td>10 of 115</td>
<td>3 of 18</td>
</tr>
<tr>
<td>Corruption</td>
<td>3.3</td>
<td>59 of 115</td>
<td>10 of 18</td>
</tr>
<tr>
<td>IP Rights Protection</td>
<td>5.8</td>
<td>34 of 115</td>
<td>9 of 18</td>
</tr>
<tr>
<td>Strength of Patent Rights</td>
<td>3.8</td>
<td>40 of 98</td>
<td>8 of 18</td>
</tr>
<tr>
<td>Copyright Piracy</td>
<td>4.1</td>
<td>43 of 115</td>
<td>8 of 18</td>
</tr>
</tbody>
</table>

Table 21: Property Rights Index data for India. (source: International Property Rights Index. 2008 country data for India)

Several remarks are needed as explanation of these data:

These are five categories out of a total 10 for property rights (and an extra five categories to measure gender equality in property matters).

The scale is from 0 to 10, with countries scoring between roughly 2 and 8.5 (depending on the category). A higher score means better protection of property rights, and a low rank number means relatively strong property rights as compared to other countries.

"Confidence in Courts" was measured by The World Bank for the 2007 World Development Indicators report, by surveying business managers on their confidence that the courts would uphold their property rights.

"Corruption" includes both petty and grand corruption and reflects the degree of informality in the economy. The score is based on the World Bank Institute’s 2007 Governance Matters.

The category "IP Rights Protection" is adapted from an expert survey conducted by the World Economic Forum, and is meant to measure the general level of protection of intellectual property rights (which includes patents, trademarks, copyright, etc.).

"Strength of Patent Rights" is a measure of the degree of protection provided for patents by a country's laws (such as the Indian Patent Act).

"Copyright Piracy" is based on hard data about the amount of software, music, and video is copied illegally in the country (with much piracy resulting in a low score). (International Property Rights Index 2008 Report, p.18-19).

India scores OK on confidence in courts, but quite low on the corruption category. When examining the rankings presented above, India scores slightly above average. Thus, according to these scores and rankings, India is not doing very bad, but still has much to improve.

Actually the high score on "Confidence in Courts" is higher than the author expected, after hearing several people in India complain about the judicial system. Maybe those complaints were more about the extremely low speed of justice (and possibly petty corruption in the court system), and not caused by fundamental doubts whether or not the courts would uphold people's property rights (which is how "confidence" was defined in the International Property Rights Index study).
## Appendix B: Table of Interactions and Outcomes as Modelled for the First Stage of the Infringement Court Trial

<table>
<thead>
<tr>
<th>Patent Holder's action</th>
<th>Infringer's action</th>
<th>Winner in influencing the Judge's decision</th>
<th>Outcome: Injunction is...</th>
</tr>
</thead>
<tbody>
<tr>
<td>bribe Judge</td>
<td>bribe Judge</td>
<td>Draw</td>
<td>Imposed</td>
</tr>
<tr>
<td>bribe Judge</td>
<td>bribe Lawyer</td>
<td>Patent Holder</td>
<td>Imposed</td>
</tr>
<tr>
<td>bribe Lawyer</td>
<td>bribe Judge</td>
<td>Infringer</td>
<td>Prevented</td>
</tr>
<tr>
<td>bribe Lawyer</td>
<td>bribe Lawyer</td>
<td>Draw</td>
<td>Imposed</td>
</tr>
<tr>
<td>bribe Judge</td>
<td>bribe no-one</td>
<td>Patent Holder</td>
<td>Imposed</td>
</tr>
<tr>
<td>bribe Lawyer</td>
<td>bribe no-one</td>
<td>Patent Holder</td>
<td>Imposed</td>
</tr>
<tr>
<td>bribe no-one</td>
<td>bribe Judge</td>
<td>Infringer</td>
<td>Prevented</td>
</tr>
<tr>
<td>bribe no-one</td>
<td>bribe no-one</td>
<td>Draw</td>
<td>Imposed</td>
</tr>
<tr>
<td>bribe Judge and Lawyer</td>
<td>bribe Judge</td>
<td>Patent Holder</td>
<td>Imposed</td>
</tr>
<tr>
<td>bribe Judge and Lawyer</td>
<td>bribe Lawyer</td>
<td>Patent Holder</td>
<td>Imposed</td>
</tr>
<tr>
<td>bribe Judge and Lawyer</td>
<td>bribe no-one</td>
<td>Patent Holder</td>
<td>Imposed</td>
</tr>
<tr>
<td>bribe Judge</td>
<td>bribe Judge and Lawyer</td>
<td>Infringer</td>
<td>Prevented</td>
</tr>
<tr>
<td>bribe Lawyer</td>
<td>bribe Judge and Lawyer</td>
<td>Infringer</td>
<td>Prevented</td>
</tr>
<tr>
<td>bribe no-one</td>
<td>bribe Judge and Lawyer</td>
<td>Infringer</td>
<td>Prevented</td>
</tr>
<tr>
<td>bribe Judge and Lawyer</td>
<td>bribe Judge and Lawyer</td>
<td>Draw</td>
<td>Imposed</td>
</tr>
</tbody>
</table>

*Table 22: All possible combinations of actions of the infringer and the patent holder (in the first stage of the infringement court trial), and the results of those actions.*
Appendix C: Step by Step Analyses for the Game Model of the Infringement Court Trial

The game analysis of the infringement court trial has been already performed once in chapter 6, for the case of a corrupt Judge and a bribe-paying Patent Holder. The same analysis can be conducted to "calculate" the outcomes of the game model for the cases of an incorruptible Judge and / or a Patent Holder with a strong zero-bribe policy. These conditions apply to the quadrants II through IV in the table below. For each of these three combinations, the probable outcomes will be calculated and presented in this appendix.

<table>
<thead>
<tr>
<th>Bribe-paying Patent Holder</th>
<th>Corrupt Judge</th>
<th>Incorruptible Judge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero-bribe Patent Holder</td>
<td>III</td>
<td>IV</td>
</tr>
</tbody>
</table>

Table 23: Four "quadrants" that are analysed separately in order to compare the results.

Quadrant II: Incorruptible Judge and Bribe-paying Patent Holder

If the Judge is incorruptible, this causes a few changes to both stages of the game. In stage 1, neither player can bribe the Judge. In stage 2, if the injunction was not imposed, the Infringer can no longer delay the outcome of the court proceedings by bribing the Judge.

Following the structure of the analysis performed before, first the case with the imposed injunction is presented. The fact that the Judge is now no longer bribleable, does not change anything in this situation. For easy reference however, the table of payoffs and preferences is displayed here again.

<table>
<thead>
<tr>
<th>Lawyer's Loyalty Type</th>
<th>Settle favouring Patent Holder</th>
<th>Settle Fairly (no special actions, but all four players must work together)</th>
<th>Settle favouring Infringer</th>
<th>Fight Either Patent Holder or Infringer chooses to fight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patent Holder</td>
<td>3 -</td>
<td>2</td>
<td>1</td>
<td>2 -</td>
</tr>
<tr>
<td>Infringer</td>
<td>1</td>
<td>2</td>
<td>3 -</td>
<td>2 -</td>
</tr>
<tr>
<td>Patent Holder's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>X</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Infringer's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>X</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>
Table 24: Payoffs and preferences in stage 2, after an injunction is imposed.

In the case with the injunction, the table with the most probable outcomes has also not changed and is displayed below.

<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universalist</td>
<td>Settle Fairly</td>
<td>Settle Fairly</td>
<td>Fight</td>
</tr>
<tr>
<td>Particularist</td>
<td>Settle Fairly</td>
<td>Settle Fairly</td>
<td>Settle favouring Patent Holder</td>
</tr>
<tr>
<td>None</td>
<td>Fight</td>
<td>Settle favouring Infringer</td>
<td>Fight</td>
</tr>
</tbody>
</table>

Table 25: Probable outcomes of stage 2, after an injunction is imposed.

Now the case of the prevented injunction will be analysed. Because the Infringer no longer has the option of delaying the courts in stage 2, there is now less difference between the situation with or without the injunction. The table for the situation without injunction is shown below, with the option of delaying in grey because it is no longer possible.

<table>
<thead>
<tr>
<th>Lawyer's Loyalty Type</th>
<th>Settle favouring Patent Holder</th>
<th>Settle Fairly</th>
<th>Settle favouring Infringer</th>
<th>Fight</th>
<th>Fight and Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special actions</td>
<td>Patent Holder bribes Infringer's Lawyer</td>
<td>(no special actions, but all four players must agree)</td>
<td>Infringer bribes Patent Holder's Lawyer</td>
<td>Either Patent Holder or Infringer chooses to fight</td>
<td>Infringer bribes the Judge to delay</td>
</tr>
<tr>
<td>Patent Holder</td>
<td>3 -</td>
<td>2</td>
<td>1</td>
<td>2 - -</td>
<td>2 - - -</td>
</tr>
<tr>
<td>Infringer</td>
<td>1</td>
<td>2</td>
<td>3 -</td>
<td>2 - +</td>
<td>2 - - + +</td>
</tr>
<tr>
<td>Patent Holder's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>X</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>A</td>
<td>B</td>
<td>X</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Infringer's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>X</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>X</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

Table 26: Payoffs and preferences in stage 2, after the injunction is prevented.

Because the last column is now disabled, the rank letters representing the Lawyers' preferences, also
change (only in the row with the Infringer's Particularist Lawyer). If this new table is compared to that of the situation with injunction, we see that the only remaining difference is that the Infringer prefers the fight over the settlement in the (present) case of no injunction, as opposed to preferring the settlement over the fight if there was an injunction. If the Infringer's Lawyer is Particularist, he follows this preference of his client, but the other Lawyer types have exactly the same preference pattern in both tables.

For the case without an injunction, all the outcomes that used to be "fight and delay", have now been replaced by the "fight" option, because the former is no longer possible and to "fight" is the next best option for the Infringer.

<table>
<thead>
<tr>
<th>Infringer's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patent Holder's Lawyer</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universalist</td>
<td>Fight</td>
<td>Fight</td>
<td>Fight</td>
</tr>
<tr>
<td>Particularist</td>
<td>Fight</td>
<td>Fight</td>
<td>Settle favouring Patent Holder</td>
</tr>
<tr>
<td>None</td>
<td>Fight</td>
<td>Settle favouring Infringer</td>
<td>Fight</td>
</tr>
</tbody>
</table>

*Table 27: Probable outcomes of stage 2, after the injunction is prevented.*

The next step in the analysis was to compare the results for both players of getting the injunction or preventing it, shown in the updated table below. The main change compared to the situation of a corrupt Judge, is that the difference in outcomes is reduced for both players. Because the delay option was no longer available for the Infringer in stage 2, the benefit of preventing an injunction has been reduced for the Infringer, whereas the loss caused to the Patent Holder is also reduced.

<table>
<thead>
<tr>
<th>Infringer's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patent Holder's Lawyer</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universalist</td>
<td>(Injunction / No Inj.)</td>
<td>(Injunction / No Inj.)</td>
<td>(Injunction / No Inj.)</td>
</tr>
<tr>
<td></td>
<td>2 / 2 - +</td>
<td>2 / 2 - +</td>
<td>2 - / 2 - +</td>
</tr>
<tr>
<td></td>
<td>2 / 2 - -</td>
<td>2 / 2 - -</td>
<td>2 - / 2 - -</td>
</tr>
<tr>
<td>Particularist</td>
<td>(Injunction / No Inj.)</td>
<td>(Injunction / No Inj.)</td>
<td>(Injunction / No Inj.)</td>
</tr>
<tr>
<td></td>
<td>2 / 2 +</td>
<td>2 / 2 +</td>
<td>1 / 1</td>
</tr>
<tr>
<td></td>
<td>2 / 2 -</td>
<td>2 / 2 -</td>
<td>3 / 3 -</td>
</tr>
<tr>
<td>None</td>
<td>(Injunction / No Inj.)</td>
<td>(Injunction / No Inj.)</td>
<td>(Injunction / No Inj.)</td>
</tr>
<tr>
<td></td>
<td>2 - / 2 +</td>
<td>3 - / 3 -</td>
<td>2 - / 2 - +</td>
</tr>
<tr>
<td></td>
<td>2 - / 2 -</td>
<td>1 / 1</td>
<td>2 - / 2 -</td>
</tr>
</tbody>
</table>

*Table 28: Comparison of payoffs for the case with and without an injunction.*
The average incentive for the Patent Holder to get the injunction is $11 / 9 = 1.2$ "minus points". The incentive for the Infringer to prevent the injunction is $10 / 9 = 1.1$ on average. This means that both players find it only barely worth the cost to bribe someone in stage 1.

In stage 1, the non-bribeability of the Judge makes many of the options unavailable for the Patent Holder and Infringer. The options that are still available are displayed in the table below.

<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universalist</td>
<td>(none)</td>
<td></td>
<td>br. Lawyer</td>
</tr>
<tr>
<td>Particularist</td>
<td></td>
<td></td>
<td>br. Lawyer</td>
</tr>
<tr>
<td>None</td>
<td>br. Lawyer</td>
<td>br. Lawyer</td>
<td>br. Lawyer</td>
</tr>
</tbody>
</table>

Table 29: Available options for influencing the Judge's decision in stage 1.

Although there is only a slight advantage, on average, in using a bribe in stage 1, we have to assume either that players with still bribe, or that players will not bribe. The current game theory model assumes the former, because the net gain for the player, though small, is still positive. With this approximation of the players' behaviour, the results of stage 1 are as displayed in the table below.

<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universalist</td>
<td>Injunction</td>
<td></td>
<td>Injunction</td>
</tr>
<tr>
<td>Particularist</td>
<td></td>
<td>Injunction</td>
<td>Injunction</td>
</tr>
<tr>
<td>None</td>
<td>No Injunction</td>
<td>No Injunction</td>
<td>Injunction</td>
</tr>
</tbody>
</table>

Table 30: Probable outcomes of stage 1.

With this information, the final outcomes after stage 2 are also known, and displayed in the table below.
<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Universalist</strong></td>
<td>Injunction Fair Settlement 2</td>
<td>Injunction Fair Settlement 2</td>
<td>Injunction Fight 2 -</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2 -</td>
</tr>
<tr>
<td><strong>Particularist</strong></td>
<td>Injunction Fair Settlement 2</td>
<td>Injunction Fair Settlement 2</td>
<td>Injunction Settlement favouring Patent Holder 1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>3 -</td>
</tr>
<tr>
<td><strong>None</strong></td>
<td>No Injunction Fight 2 - +</td>
<td>No Injunction Settlement favouring Infringer 3 -</td>
<td>Injunction Fight 2 -</td>
</tr>
<tr>
<td></td>
<td>2 -</td>
<td>1</td>
<td>2 -</td>
</tr>
</tbody>
</table>

*Table 31: Final outcomes and payoffs for quadrant II (Incorruptible Judge, Bribe-paying Patent Holder).*

The numerical payoff values in the table include the cost of bribes paid in stage 1.
Quadrant III: Corrupt Judge and Zero-bribe Patent Holder

The third setting that is to be examined, is characterised by a corrupt Judge, but a Patent Holder who will never use corrupt measures. This latter fact is not necessarily known to the other players, and the effect of them knowing or not knowing this, is not investigated explicitly in this model.

As in the previous analyses, we first examine the interactions of the players in stage 2. The results are displayed in two tables, the first for the case with an injunction imposed on the Infringer and the second for the situation without an injunction.

<table>
<thead>
<tr>
<th>Lawyer's Loyalty Type</th>
<th>Settle favouring Patent Holder</th>
<th>Settle Fairly</th>
<th>Settle favouring Infringer</th>
<th>Fight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Special actions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patent Holder</td>
<td></td>
<td>3 -</td>
<td></td>
<td>2 -</td>
</tr>
<tr>
<td>Infringer</td>
<td></td>
<td>1</td>
<td></td>
<td>2 -</td>
</tr>
<tr>
<td>Patent Holder's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Infringer's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>X</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

Table 32: Payoffs and preferences for stage 2, after an injunction is imposed.

The option that the Patent Holder bribes the Infringer's Lawyer is disabled (and marked grey) because the Patent Holder now has a strong zero-bribe policy. In practice, it is possible that his Lawyer could negotiate the corrupt settlement, but the bribe still needs to be paid from the Patent Holder's pocket. If the Patent Holder is serious about his zero-bribe track record, he will be suspicious about any extra fees required by his Lawyer. This model assumes that the Patent Holder can and will sabotage any bribe that is eventually paid with his money. In the displayed table, the preference rankings of the Patent Holder's Particularist Lawyer have been updated to reflect the unavailability of the option to "settle favouring the Patent Holder".

Using the same process as before, the probable outcomes of stage 2 can be derived from the table above. The results are displayed in the table below.
### Table 33: Probable outcomes for stage 2, after an injunction is imposed.

The table of outcomes and payoffs is also constructed for the case without the injunction. Here, too, the first column is disabled because it requires the Patent Holder to act corruptly. As with the situation after an imposed injunction, here the only change within the table cells is the ranking within the row of the Patent Holder's Particularist Lawyer. However, the disabling of one of the settlement options, has a significant influence on the outcomes of this four player decision making process, as will be shown below.

<table>
<thead>
<tr>
<th>Infringer's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patent Holder's Lawyer</strong></td>
<td>Universalist</td>
<td>Settle Fairly</td>
<td>Settle Fairly</td>
</tr>
<tr>
<td>Particularist</td>
<td>Settle Fairly</td>
<td>Settle Fairly</td>
<td>Settle Fairly</td>
</tr>
<tr>
<td>None</td>
<td>Fight</td>
<td>Settle favouring Infringer</td>
<td>Fight</td>
</tr>
</tbody>
</table>

Table 34: Payoffs and preferences in stage 2, after the injunction is prevented.

From this table, the probable outcomes are derived for the case without an injunction.
Table 35: Probable outcomes for stage 2, after the injunction is prevented.

Eight out of the nine situations leads to a "fight and delay", because the Infringer prefers delaying the final verdict as long as possible. There is little a zero-bribe Patent Holder can do about this. If any action is to be taken, it will have to be in stage 1. The values of the results for each player are compared between the case with and without the injunction.

Table 36: Comparison of payoffs for the case with and without an injunction.

The table is basically the same as for the situation with the bribe-paying Patent Holder (quadrant I), the only difference being when the Patent Holder's Lawyer is of the Particularist loyalty type and the Infringer's Lawyer is non-loyal (the middle right cell).

The average incentive for the Patent Holder to get the injunction is $21/9 = 2.3$ "minus points". The incentive for the Infringer to prevent the injunction is $19/9 = 2.1$ on average. This means that both players find it worthwhile to pay at least one bribe in stage 1, and if necessary, even two bribes are affordable.

Although the Patent Holder has a relatively strong incentive to pay bribes and influence the outcome of stage 1, this is not possible because of his zero-bribe policy (or, put stronger, identity). This gives the Infringer a free hand to dominate the game.
Table 37: Available options for influencing the Judge's decision in stage 1.

As the table above indicates, there is always at least one opportunity for the Infringer to use a bribe to influence the outcome of stage 1. Because we assume that, contrary to the Patent Holder, the Infringer has no scruples in using bribes, the probable outcome of stage 1 is "No Injunction" in all cases.

Table 38: Probable outcomes of stage 1.

The final outcomes after stage 2 are displayed in the table below. Basically it does not matter what kind of Lawyers the players have, the injunction is always prevented, no settlement is reached, and the court proceedings are delayed by the Infringer. The only exception is when the Infringer's Lawyer is of Particularist loyalty and the Patent Holder's Lawyer is not loyal at all. In that case, the Infringer can take even more advantage of the Patent Holder than in the other cases.
<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Universalist</strong></td>
<td>No Injunction Fight and Delay</td>
<td>No Injunction Fight and Delay</td>
<td>No Injunction Fight and Delay</td>
</tr>
<tr>
<td></td>
<td>2 - - ++</td>
<td>2 - - ++</td>
<td>2 - - ++</td>
</tr>
<tr>
<td></td>
<td>2 - -</td>
<td>2 - -</td>
<td>2 - -</td>
</tr>
<tr>
<td><strong>Particularist</strong></td>
<td>No Injunction Fight and Delay</td>
<td>No Injunction Fight and Delay</td>
<td>No Injunction Fight and Delay</td>
</tr>
<tr>
<td></td>
<td>2 - - ++</td>
<td>2 - - ++</td>
<td>2 - - ++</td>
</tr>
<tr>
<td></td>
<td>2 - -</td>
<td>2 - -</td>
<td>2 - -</td>
</tr>
<tr>
<td><strong>None</strong></td>
<td>No Injunction Fight and Delay</td>
<td>No Injunction Settlement favouring Infringer</td>
<td>No Injunction Fight and Delay</td>
</tr>
<tr>
<td></td>
<td>2 - - ++</td>
<td>3 - -</td>
<td>2 - - ++</td>
</tr>
<tr>
<td></td>
<td>2 - -</td>
<td>1</td>
<td>2 - -</td>
</tr>
</tbody>
</table>

Table 39: Final outcomes and payoffs for quadrant III (Corrupt Judge, Zero-bribe Patent Holder).
The numerical payoff values in the table include the cost of bribes paid in stage 1.
### Quadrant IV: Incorruptible Judge and Zero-bribe Patent Holder

The fourth and last situation to be analysed, is the combination of an incorruptible Judge and a zero-bribe Patent Holder.

First, the table of payoffs and preferences is constructed for the case when the injunction is imposed.

<table>
<thead>
<tr>
<th>Lawyer's Loyalty Type</th>
<th>Settle favouring Patent Holder</th>
<th>Settle Fairly favouring Infringer</th>
<th>Fight</th>
<th>Special actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patent Holder</td>
<td>3 -</td>
<td>2</td>
<td>1</td>
<td>2 -</td>
</tr>
<tr>
<td>Infringer</td>
<td>1</td>
<td>2</td>
<td>3 -</td>
<td>2 -</td>
</tr>
<tr>
<td>Patent Holder's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>A</td>
<td>X</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Infringer's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>X</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

*Table 40: Payoffs and preferences for stage 2, after an injunction is imposed.*

This table is identical to the one from the analysis of quadrant III, where the Patent Holder was also of the zero-bribe type. The corresponding probable outcomes of stage 2 are listen below.

<table>
<thead>
<tr>
<th>Infringer's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patent Holder's Lawyer</td>
<td>Universalist</td>
<td>Settle Fairly</td>
<td>Settle Fairly</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>Settle Fairly</td>
<td>Settle Fairly</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>Fight</td>
<td>Settle favouring Infringer</td>
</tr>
</tbody>
</table>

*Table 41: Probable outcomes for stage 2, after an injunction is imposed.*

In the case without the injunction, a second column option is also disabled: Delaying the case is no longer possible because the Judge does not approve of bribes.
### Table 42: Payoffs and preferences in stage 2, after the injunction is prevented.

By checking if a sufficient "coalition" of players exists to make a settlement a reality, the probable outcome of this group decision making process can be derived.

<table>
<thead>
<tr>
<th>Lawyer's Loyalty Type</th>
<th>Settle favouring Patent Holder</th>
<th>Settle Fairly</th>
<th>Settle favouring Infringer</th>
<th>Fight</th>
<th>Fight and Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special actions</td>
<td>Patent Holder bribes Infringer's Lawyer</td>
<td>(no special actions, but all four players must agree)</td>
<td>Infringer bribes Patent Holder's Lawyer</td>
<td>Either Patent Holder or Infringer chooses to fight</td>
<td>Infringer bribes the Judge to delay</td>
</tr>
<tr>
<td>Patent Holder</td>
<td>3 -</td>
<td>2</td>
<td>1</td>
<td>2 - -</td>
<td>2 - - -</td>
</tr>
<tr>
<td>Infringer</td>
<td>1</td>
<td>2</td>
<td>3 -</td>
<td>2 - +</td>
<td>2 - - + +</td>
</tr>
<tr>
<td>Patent Holder's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>X</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>A</td>
<td>A</td>
<td>X</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Infringer's Lawyer</td>
<td>Universalist</td>
<td>X</td>
<td>A</td>
<td>X</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Particularist</td>
<td>X</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

### Table 43: Probable outcomes for stage 2, after the injunction is prevented.

As before, the payoff values for each player can now be compared between the case with and without the injunction.

<table>
<thead>
<tr>
<th>Infringer's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patent Holder's Lawyer</td>
<td>Fight</td>
<td>Fight</td>
<td>Fight</td>
</tr>
<tr>
<td>Particularist</td>
<td>Fight</td>
<td>Fight</td>
<td>Fight</td>
</tr>
<tr>
<td>None</td>
<td>Fight</td>
<td>Settle favouring Infringer</td>
<td>Fight</td>
</tr>
</tbody>
</table>
### Table 44: Comparison of payoffs for the case with and without an injunction.

The average incentive for the Patent Holder to get the injunction is \( \frac{13}{9} = 1.4 \) "minus points". The incentive for the Infringer to prevent the injunction is \( \frac{11}{9} = 1.2 \) on average. This means that both players find it worthwhile to pay one (and only one) bribe at stage 1.

There are very few possibilities for paying bribes in stage 1. The Patent Holder does not want to pay bribes because he is of the zero-bribe type. However, the Infringer's options are also limited because the Judge will not accept bribes.

### Table 45: Available options for influencing the Judge's decision in stage 1.

The average incentive for the Patent Holder to get the injunction is \( \frac{13}{9} = 1.4 \) "minus points". The incentive for the Infringer to prevent the injunction is \( \frac{11}{9} = 1.2 \) on average. This means that both players find it worthwhile to pay one (and only one) bribe at stage 1.

There are very few possibilities for paying bribes in stage 1. The Patent Holder does not want to pay bribes because he is of the zero-bribe type. However, the Infringer's options are also limited because the Judge will not accept bribes.
The Infringer can only influence the outcome of stage 1 if the Patent Holder's Lawyer is neither Particularly nor Universally loyal. In most cases, the Judge will simply decide the matter according to the evidence and impose an injunction.

<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Infringer's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universalist</td>
<td></td>
<td>Injunction</td>
<td></td>
<td>Injunction</td>
</tr>
<tr>
<td>Particularist</td>
<td></td>
<td></td>
<td>Injunction</td>
<td>Injunction</td>
</tr>
<tr>
<td>None</td>
<td>No Injunction</td>
<td>No Injunction</td>
<td>No Injunction</td>
<td>No Injunction</td>
</tr>
</tbody>
</table>

Table 46: Probable outcomes of stage 1.

The final outcomes after stage 2 are displayed in the table below.

<table>
<thead>
<tr>
<th>Patent Holder's Lawyer</th>
<th>Infringer's Lawyer</th>
<th>Universalist</th>
<th>Particularist</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universalist</td>
<td></td>
<td>Injunction</td>
<td>Injunction</td>
<td>Injunction Fight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Settle Fairly</td>
<td>Settle Fairly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2 - +</td>
</tr>
<tr>
<td>Particularist</td>
<td></td>
<td>Injunction</td>
<td>Injunction</td>
<td>Injunction Settle Fairly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Settle Fairly</td>
<td>Settle Fairly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2 -</td>
</tr>
<tr>
<td>None</td>
<td>No Injunction</td>
<td>No Injunction</td>
<td>No Injunction</td>
<td>No Injunction Fight</td>
</tr>
<tr>
<td></td>
<td>Fight</td>
<td>Settlement favouring Infringer</td>
<td>3 -</td>
<td>2 - +</td>
</tr>
<tr>
<td></td>
<td>2 - +</td>
<td>3 -</td>
<td>2</td>
<td>2 - +</td>
</tr>
</tbody>
</table>

Table 47: Final outcomes and payoffs for quadrant IV (Incorruptible Judge, Zero-bribe Patent Holder).

The numerical payoff values in the table include the cost of bribes paid in stage 1.