

# Trolls and the Five Forces (White Paper)

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In 1979 Michael E. Porter published his article “How Competitive Forces Shape Strategy” in Harvard Business Review (HBR), thereby revolutionizing the strategy field. Almost 30 years later, in January 2008, he extended the original work in his recent HBR article “The Five Competitive Forces That Shape Strategy”.

The work presented here tries to make use of Porter’s theoretical framework to better understand the impact of intellectual property (IP) on the competition within an industry as well as the emergence of IP holding companies often also referred to as patent trolls.

The tremendous success of Porter’s framework is at least partially due to its power in analyzing an industry and understanding the competitive landscape of that industry by decomposing this complex problem into several entities and their respective relations. Those will be briefly summarized in the following on the basis of Porter’s recent article with some focus on IP aspects.

## **Porter’s five forces shaping industry competition**

The five forces, namely the rivalry among existing competitors the industry, the bargaining power of buyers, the bargaining power of suppliers, the threat of substitute products or services, and the threat of new entrants are the primary forces that shape the competition within the industry. The relative strengths of the five forces may vary across industries. The strongest competitive force or forces finally determine the profitability of the industry.

### ***Threat of new entrants***

New entrants to an industry bring new capacity and a desire to gain market share. As a consequence pressure on prices, cost, and the rate of investment necessary to compete increases in the industry putting a cap on the industry’s profit potential. The threat of entry depends on the height of entry barriers built by the market participants. Besides pure economic barriers, such as supply side economies of scale, network effects, customer switching costs, capital requirements, incumbency advantages independent of size, and unequal access to distribution channels, barriers with IP aspects may also exist. For example, restrictive government policies can hinder or aide new entry. Licensing requirements or expansive intellectual property protection in combination with a strong IP enforcement system may raise the barrier for new entrants considerably. Under a strong IP regime new entrants must expect legal retaliation from the IP owners in the industry in case of infringing their IP rights. This creates a high risk to the new entrant’s very existence because an established competitor can use its IP rights as a blocking means and effectively stop the new entrant’s activities by gaining an injunction against the infringing entrant’s products or services.

### ***Bargaining power of suppliers***

Powerful suppliers capture more of the value for themselves by finally shifting costs to the industry. This may come from price increases or lower quality of the supplied components/products and contributes in the end to a lower profitability of the industry. Supplier groups have a higher bargaining power versus the participants of the industry if, for example, they belong to a group that is more concentrated than the industry they sell to; they do not totally

depend on the industry; a supplier change is associated with high switching cost for the industry participant. An IP related factor influencing the bargaining power of suppliers is an offering of differentiated products resulting from the supplier's high innovation activity. This factor will become more important if the differentiating features are protected by intellectual property rights thus making it very difficult for the industry participant to source substitutes from other suppliers without infringing on the supplier's IP. The supplier's negotiating power in such a case will depend on the industry participant's design around capability, which again may depend on the participant's own innovation capability and the overall supplier network.

### ***Bargaining power of buyers***

Powerful customers can capture more value for themselves by forcing down prices, demanding better quality or more/better services and playing industry participant off against one another. This again occurs at the expense of industry profitability. Buyer groups have a higher bargaining power versus the participants of the industry if, for example, the number of buyers is low or the industry participant's portion of the buyer's overall consumed volume is low; the buyer's switching cost is low; the buyer has the capability to integrate backward by increasing production depth. In general, price sensitive customers will negotiate harder especially when the purchased components/products have less influence on the quality of their end products or have little effect on the buyer's other cost. An IP related factor influencing the power of buyers is, for example, a high degree of standardization of the industry's products. This typically allows for less differentiation of the participants versus the buyers. Industry standards excel the level of competition within the industry to new, differentiating features or services that build on the standard and may help the participants to reduce again the negotiating power of buyers. In some industries, such as the automotive industry, buyers (e.g., car manufacturers) try to increase their bargaining power versus industry participants (e.g., component manufactures) by negotiating contracts with the participants where the IP being developed in the course of collaborating on a new product belongs to the buyer. Contracts may even go that far that the industry participant gets contractually bound to the buyer without having a permission to use the IP that was generated by the participant for any other potential buyer.

### ***The threat of substitutes***

A substitute performs the same or similar function as an established industry product. Think of the Internet as a new platform for advertising. In this scenario the Internet is a substitute for TV or printed media because it pulls away revenue from those established products. A high threat of substitutes makes industry profitability suffer. The threat of a substitute is high if it offers an attractive price-performance trade-off to the industry's product; the buyer's switching cost to the substitute product is low. Disruptive innovations resulting in substitute products often are derived from other, seemingly unrelated, industries. For example, flash animation, Web 2.0 technology and its interactive capabilities made the Internet an increasingly interesting platform for the advertising industry. From an IP perspective substitutes can replace established industry products/services if they do not conflict with existing IP rights of the industry participants. As substitutes often come from different fields of technology, this is often the case. For example, video-conferencing as a substitute for travel will in general not face any IP related risks from travel agencies, rental car companies or airlines who are all players in the mobility business.

### ***Rivalry among existing competitors***

The degree to which rivalry drives down an industry's profit potential depends on the intensity and the basis of the competition. Intensity is greatest if, for example, there are many about equally powerful competitors; industry growth is slow; exit barriers are high; participants have high aspirations for leadership. It may be especially destructive to profitability if competition is primarily based on price. Competition on the basis of product differentiation, support services, time to

market or brand awareness is less likely to erode profitability because it increases the added value for the buyer and can finally result in higher prices. Competition on the same basis (dimension) is more likely to result in even higher intensity of the competition. Product differentiation and brand awareness are two dimensions of competition having important IP aspects. IP rights can be used by participants to build feature monopolies for certain value adding, differentiating features of their products/services or to protect trademarks being associated with those products/services. Those protection means are used twofold. On the one hand they serve as barriers for new entrants. On the other hand they are used to distinguish over the competition and gain market share from other participants. Therefore, there is an opportunity to use IP for improving the profitability of a participant through charging premium prices for protected value adding features or even reserve a certain market segment within the industry by blocking other participants actively from that segment.

### ***Factors influencing the competitive landscape***

There exist further factors, which cannot be considered as part of the underlying structure of an industry but still may have significant influence on shaping the competitive landscape. Those factors are neither inherently good nor bad for the industry's profitability. Some of those factors are important to understand today's developments with regards to the use of IP and the formation of IP holding companies in specific industries. In this context we will discuss the factors technology and innovation, government and complementary assets.

## **IP holding companies / trolls**

### ***Definition and business model***

Let us first clarify the term IP holding company or IP troll. An IP holding company is building an IP portfolio by acquiring IP rights at a reasonable price from bankruptcies, universities, IP auctions, etc. The portfolio is then structured into industry specific IP packages. Those IP packages can then be asserted against participants in a respective industry. The goal is to generate license revenues out of the IP portfolio, which should provide extraordinary high returns on the original investment in building the IP portfolio. The IP holding company typically has no products or services in the market of that industry.

### ***The role of a troll in Porter's framework***

What is the role of an IP holding company in Porter's framework? As said above, the IP holding company usually does not actively participate in the market of the industry because it does not provide own products or services for that market. Therefore, it does not qualify as an industry participant although it may dramatically shape the competitive situation within this industry. Trolls are a pretty new phenomenon that only exists for a couple of years now. Can we consider trolls as new entrants to the industry? For the same reason that trolls do not qualify as industry participants they cannot qualify as new entrants either. A new entrant would enter the market with competitive products or services, which is not the case for a troll.

Actually, in their primary role, trolls must be considered as suppliers in Porter's framework. However, they are not suppliers in the traditional sense. They do not offer tangible components or services to the participants. They supply licenses for IP rights to the players in the industry. A troll or patent holding company, therefore, supplies intangible assets to the industry.

## ***The trolls' "market"***

There is no real market for those intangibles. As there is no market for IP there is no price tag for IP rights either. Under specific circumstances the value of IP can be heavily underestimated. Therefore, trolls may be able to acquire IP cheaply from bankruptcies, IP auctions or universities in cases where the value of IP is not realized by the IP vendor. The IP vendors are typically participants of the industry. We can see that a troll actually performs a secondary role in Porter's model – namely the role of a buyer for IP. As we will show below, the troll may even act as a buyer in one industry and as a supplier in other industries as well.

Value is an abstract, subjective concept that can be simply defined as the sum of future net benefits associated with the respective asset for a certain buyer or vendor. It must not be confused with a price tag. Only if the price is slightly below the subjective value of the buyer and slightly above the subjective value for the vendor a transaction will actually occur. Two different views on value of IP are important to understand in this context. (*I guess here we need some reference to a publication of Alex*) The IP value may be derived under the assumption that the IP is actually used by the IP owner itself (value in use) or it may be derived under the assumption that it is transferred to another party (asset value). In both cases the value of IP has three dimensions which may turn out to be totally different under the respective view. The three dimensions are: the value potential of the IP; the complementary assets; and an exploitation process.

The value potential is somehow related to the quality of an IP right. Questions like: "How broad is the scope of protection? How easy is it to detect infringing embodiments? Did the IP right survive an opposition or has it been successfully enforced before?" can be used to build a scoring system that describes the value potential of an IP right. This value dimension does not depend on the valuation view.

However, the dimension of complementary assets may strongly depend on the respective view. For example, a university valuating an IP right under a "value in use" view may end up with a rather low value for the university because the university may lack any production facilities or other complementary assets that would be necessary to derive a higher value in use. Whereas the "asset value" when selling the IP right to an industrial company that has all the required complementary assets may exceed the "value in use" by orders of magnitude.

The third dimension – exploitation process – can almost be considered as a multiplicative factor being 1 in case an exploitation process is existing and being 0 if not. Coming back to the example of the university it means that the university's IP value becomes 0 if the university does not have the right exploitation processes in place to realize the value potential. Such exploitation processes may be a licensing process or an auctioning process.

Dependent on the applied value view the IP vendor (industry participant) may therefore sell its IP to a troll at a price which is still above the IP vendor's internal value assessment but which may be well below the value the IP may finally have for the troll. The value of single IP rights is not adding in a linear way when the IP rights are aggregated into an IP portfolio. Therefore, a troll may end up with a high value portfolio covering a whole branch of technology by simply combining sub-portfolios or single IP rights that have lower value in themselves. Of course, it is part of the troll's business model to provide excellent exploitation processes for the exploitation of this portfolio which in turn generate additional money streams to acquire further IP. By systematically analyzing industries and their participants with regards to the required complementary assets trolls can extend their business by acting as IP buyers and suppliers in multiple industries.

# Porter's factors "technology and innovation" and government

## ***Technology and innovation***

It seems as if there is a tendency that trolls primarily form in industries based on complex, cumulative technologies (e.g., software, telecommunications, etc.) rather than in discrete industries (e.g., pharma, chemicals, etc.) One difference between those two different types of industries is the nature of innovation and its protection in the industry's products or services. In discrete industries typically an innovation forms the basis for a new product. Therefore, protecting the innovation results in protection of the product. In complex, cumulative industries typically thousands of innovations go into a single product. That is, protecting an innovation results in protection of only a minor portion of the product.

This makes it clear that in a discrete industry it is much more difficult for a troll to act as an IP buyer. The IP is typically used by the industry participants (e.g., pharmaceutical companies) and the "value in use" for those participants is tremendously high because it will guarantee them a monopoly for the commercial exploitation of the protected product. Therefore, the willingness of participants to sell their IP to trolls is very small. This may be different when it comes to research oriented institutions in such an industry, which do not have their own product or service lines in that industry but which act exclusively as IP suppliers. In cases where those suppliers are not contractually bound to the industry participants there may be a potential for a troll to buy IP from such an institution even in a discrete industry. However, it is more likely that in the future those IP suppliers will act as IP holding companies on their own. For example, for a research institution this would be a natural migration from a contractually bound research service provider into an IP supplier exploiting the research institution's intangible core assets – namely the IP resulting from its innovative power.

In complex industries typically the number of participants in the industry is higher and the market is more fragmented. In such an industry it is obviously much easier for trolls to identify potential IP vendors and benefit from the differences in the perceived value of the IP as discussed before. *(We need some statistics here to prove. For example, is the number of bankruptcies in complex industries higher than in discrete industries? Do you have any idea where to get those figures?)*

We believe that based on the above reasoning there is a strong tendency for troll type businesses to be more active in industries based on complex, cumulative technologies rather than in industries based on more discrete technologies.

## ***Government***

One of the factors shaping the competition within an industry is the set of rules enforced by the government of a respective country. Governmental rules influencing competition are for example laws like anti-competition law, patent law, trademark law, copyright law, contract law, etc. For example it is clear that in a country like China that provides rules for compulsory licensing with a very low threshold, it can become much more difficult for an IP owner to use the IP for a competitive advantage versus other participants in the industry. In general, rules affecting the protection and use of intellectual property will have a high impact on the competitive landscape in the corresponding geographic market.

For the time being trolls seem to be primarily a phenomenon of the US. We believe that one reason is the uniqueness of the US IP regime. What makes the US IP regime so unique compared to other industrialized countries?

## The US IP regime as an ideal playground for trolls

It is undisputed that in the past it was easier to obtain patents at the US patent office than in other patent offices of similar importance, such as the European or Japanese patent office. The main reasons were fewer restrictions on what is perceived to be patentable subject matter in the US and a threshold for non-obviousness which was certainly lower than for example the threshold for inventive step in Europe. Non-obviousness or inventive step is one of the core criteria for patentability. This situation led to some kind of inflation in intellectual property rights in the US market. Many patents were issued on subject matter that may be considered as a normal work result of a skilled person under today's practice.

The US IP regime does not foresee a post-grant opposition procedure which could have made it easier for participants in the industry to challenge such IP rights with a very low inventive activity immediately after allowance and at a reasonable cost. However, there is a re-examination procedure foreseen in US patent law, which was not very much used in the past. One reason may be that in cumulative technologies the flood of allowed patents was so huge that it became simply impractical for the market participants to monitor the IP rights under reasonable effort. The assumption of validity of a granted patent in the US makes it difficult to destroy invalid patents. It requires a court procedure which is associated with very high cost in the US. Further, the outcome is very uncertain as such trials are typically handled through jury trials with a jury consisting primarily of technically unsavvy members. For a defendant it may therefore be more cost effective and less risky to simply take a license on patent that could otherwise only be invalidated at a substantial financial and business risk.

The practice of granting high damages to a patentee whose IP rights are found to be infringed by another party are a high motivation in the US IP regime to litigate. On top, the triple damages option in case of willful infringement makes it even more attractive for the patentee.

Moreover, in the past there was an automatic injunction against the infringing party.

Although the US has also moved to a publication system some years ago there is still the possibility to file a request for non-publication if there a subsequent filing of the patent application outside the US is not intended. Those so-called submarines are IP rights leaving the public in doubt of technology fields being blocked by other participants. Such IP rights in the hands of a troll can pose a huge risk to a whole industry as the IP rights can be amended to read on the industry's products without the participants becoming even aware of it.

As a consequence the US IP regime is a perfect environment to stimulate the formation of troll like businesses. There is a huge reservoir of IP rights especially in cumulated technologies thus providing a multitude of industry participants as potential IP vendors. Many low quality patents may allow trolls to argue that the corresponding portfolios have a low value potential and acquire such rights at low prices. However, there may still be high quality patents in those portfolios where the value is not recognized because the owner does not know about the complementary assets of industry participants or has no exploitation processes in place. Once the troll has built an IP portfolio relevant for a certain market segment the troll can start to notify the major players in this segment trying to negotiate license agreements and thus generating revenues. The above described properties of the US IP regime seem to favor the patentee in terms of the risk versus opportunity chances in a possible litigation. The alleged infringer may feel threatened by the trolls notice and rather agree to an unfavorable license agreement than taking the risk of a long lasting law suit. In the US IP regime trolls as IP suppliers can have an almost infinite negotiating power against industry participants. By means of an injunction trolls can basically "blackmail" industry participants who would then need to pay for licenses in addition to their internal investments or resign as an industry participant.

Trolls have a negative impact on the industry profitability. As the industry participants being attacked by trolls already have the knowledge to practice the subject matter claimed by the troll's IP portfolio, there is no added value for the participants in taking a license. On the other hand the trolls did not create the IP and thus did not contribute to the value creation either. It seems as if trolls are companies that found a clever way to fill the gap left by IP owners who do not have exploitation processes for realizing the value potential of their portfolios. That is, trolls do not

actively add value but rather realize value created by other industry participants. The corresponding profits are taken away from the value adding market participants and might therefore have a detrimental impact on the industries overall profitability.

## **How to defend against trolls?**

How can the bargaining power of trolls be reduced? The question relates to both roles of a troll – IP supplier and IP buyer. One measure is certainly to adjust the IP regime in a way that it becomes less favorable to the IP holding business model. Adjusting the IP regime in a certain country can only be pursued by governmental legislative institutions. However, also the industry participants can take measures on their own to shift the balance of bargaining power towards themselves and away from the trolls.

### ***Adjusting the IP regime***

The discussion about possible measures to adjust the IP regime will again be based on the example of the US IP regime. As of today, the US market is the only one where significant troll formation can be observed and the legislative institutions in the US have already taken the first measures. Measures in two major adjustment trends can be observed – on the one hand the development of US patent case law at the Supreme Court and the Federal Circuit, on the other hand the preparation of the US patent law reform. In the following we will discuss the impact of some adjustment measures on the bargaining power of IP holding companies.

### **US Supreme Court Decisions**

KSR vs. Teleflex (2007) is a recent landmark decision increasing the threshold for non-obviousness in the US patent system. It has become easier for patent examiners to reject patent applications by combining prior art references without an explicit teaching, suggestion or motivation in any one of the prior art references as long as the result of the combination leads to the claimed subject matter in a predictable manner. As a consequence it can be expected that in the long term the inventive quality of US patents will raise as more and more trivial and obvious inventions will not result in granted patents. This should raise the value potential of patents and at the same time reduce the percentage of low quality patents in existing IP portfolios of industry participants. As a result we may see increasing price tags in IP transactions which should weaken the bargaining power of trolls when acting as IP buyers.

In the Ebay decision (2006) the Supreme Court found that an injunction is neither required nor automatic anymore in this or any patent case where guilt has been established. In the first 15 cases decided after Ebay an injunction was granted in all cases where the IP owner (plaintiff) was an industry participant offering its own products or services in the market, whereas no injunction was granted in all cases where the plaintiff was a troll type of business. The low probability to effectively threaten industry participants with an injunction, which could basically drive the participant out of the market, is considerably reducing the bargaining power of a troll when acting in the IP supplier role. Industry participants can now take more time to settle the case and hope for a more favorable license agreement or even try to invalidate the troll's patents under the new KSR standard on non-obviousness.

### **Federal Circuit Decisions**

Comiskey and Nuijten (2007) put additional restrictions on patentable subject matter. The routine addition of modern electronics to an otherwise unpatentable invention now typically creates a prima facie case of obviousness (Comiskey). A signal is not patentable even if tied to a transitory form (such as a radio broadcast or light pulses in a fiber optic cable). The court could not fit a 'signal' into any of the four patentable categories of US patent law (Nuijten). Those decisions amplify the effects on the bargaining power in the IP buyer role resulting from the KSR decision.

A further case (Bilsky) is currently pending at the Federal Circuit that may set new standards for business method type of patents.

In Seagate, the Federal Circuit raised the burden of proof for enhanced damages. Enhanced damages are now only available for willful patent infringement that is at least “objectively reckless.” And, as a consequence, there is no affirmative obligation to obtain opinion of counsel to avoid a willfulness charge. This essentially moves potential triple damages from a negligence standard of due care to a more stringent standard. As a consequence industry participants face reduced financial risks when being attacked by a troll. For the troll as an IP supplier the negotiating power is reduced because industry participants may be more ready to defend the case and not settle the case by a license agreement. If the case finally gets decided by a jury or judge the maximum profit for the troll is limited which may make the troll business model less attractive.

## **Planned US Patent Reform**

The United States are working already for a couple of years on the reform of their patent system. Currently it is not clear when and in what form the reform will become effective. However, it is expected that the reform will pass congress earliest in 2009 after the next presidential elections. Presumably one effect of the patent reform will be that the US patent system becomes more similar to other major patent systems, such as the European or Japanese systems.

Some of the planned changes could have a significant impact on the bargaining power of trolls and their profitability potential. For example, it is foreseen that all patent applications will be published 18 months after the filing/priority date. That is, there will be no submarines any more – even not for US only patent applications. Industry participants will therefore have more security with regards to patent claims that can be asserted against them. A post-grant review similar to opposition proceedings may also become part of the US patent system. Such a procedural element can help industry participants to invalidate patents right after their grant at reasonable expenses by introducing additional prior art that was not found by the patent examiners. Again, such a procedure is likely to improve the inventive quality of granted patents and will amplify the above discussed KSR effects on the bargaining power of trolls. A change that may amplify the effects of the Ebay decision is the intention to base damages on apportionment, that is, only a partial value of an infringing product is to be used for the calculation of damages. This may dramatically reduce the attractiveness of the IP holding business because potential profits would be much more limited than under the current US IP regime.

## ***Measures to be taken by industry participants***

What measures can industry participants take by themselves under the current IP regimes to better defend against trolls? As trolls are not industry participants in the sense of product or service providers it is basically not possible to defend against troll attacks through own IP rights. A troll cannot infringe an industry participant’s IP rights. Therefore, a defensive use of IP as, for example, often used by industry participants in the form of cross-license agreements is no option to defend against a troll.

We believe that the most effective defense measure for an industry participant is a comprehensive value oriented IP strategy. Such a strategy includes building a value optimized IP portfolio. Of course, for an industry participant the primary source for high value IP rights is the innovation potential of the participant’s R&D organization. However, focusing on internal resources is not sufficient with regards to defend against trolls. In the future industry participants also need to look outside their entities. They must watch IP in the market and try to acquire valuable IP from other industry participants IP suppliers, such as research institutions. Pursuing such a strategy reduces the potential for trolls to acquire the IP by themselves and finally enforce it against industry participants. Further, active procurement of IP by industry participants will raise price tags for IP and – together with the above effects of limited profit potential through adjustments of the IP regime – may cut into the profitability of IP holding companies. As a result,

the business model of IP holding companies may become financially less attractive. This reasoning applies to IP holding companies that systematically build huge IP portfolios and try to enforce the IP rights against many industry participants across Industries. With regards to smaller trolls asserting a hand full of IP rights against large industry participants with deep pockets the only remedy seems to be adjusting the IP regimes.

## **Conclusion**

IP holding companies can be seen as IP buyers and IP suppliers in Porter's five forces framework. Their bargaining power versus industry participants significantly depends on the properties of respective IP regimes as well as on the type of industry.