



Paper to be presented at
DRUID15, Rome, June 15-17, 2015
(Coorganized with LUISS)

Determinants of performance in rare strategic events: How emotional distress misleads and IP roadmaps lead organizations navigating the IP litigation landscape

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Abstract

The paper develops and tests a theoretical framework explaining how emotions and learning affect outcomes of rare strategic events, namely Intellectual Property litigations. We investigate how organizations' negative emotions influence performance outcome in IP litigations negatively. Though cumulative learning in rare strategic events is scarce, and cannot be understood through the standard framework of routines and capability development, we argue that firms may learn from rare events, and propose that learning moderates the negative effect of emotions. We test this utilizing data on all publically available IP litigation cases in China from 2001 to 2009 (n=13,030). We find that when organizations undergo emotional negative stress they lose IP litigations more often, but development of roadmaps though past successes moderate the negative effects from emotional distress.

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Abstract

Understanding firm's behavior in respect to IP litigations has directed attention towards the strategic reasons and dispassionate activities, while psychological dimensions, such as emotions, have been largely ignored. This paper is the first to theoretically conceptualize as well as empirically test emotions as determinant for losing IP litigations. We investigate organizations that undergo emotional *negative* stress, defined as the emotions that arise when emotions are dealt with in a damaging rather than supportive way, and how the negative emotions influence performance outcome in IP litigations. We conceptualize IP litigations as rare strategic events, the limited literature on rare events shows that cumulative learning in rare strategic events is challenged. We argue that learning in such events takes a different form namely that of roadmaps rather than routines, and that these roadmaps help organizations navigate unusual and infrequent situations, in our example the IP litigation landscape. Roadmaps are beneficial, why the negative effects from emotional distress can be moderated by organizations previous experience in successful accomplishments in IP litigation. Based on a dataset containing 13,030 IP litigations that has taken place in China from 2001 to 2011 we test our hypothesis of relationships between negative emotions learning through roadmap development and performance using a matched sample of similar cases with low or high emotional distress in the focal case. Our results show that organizations experiencing negative emotional distress are more likely to lose IP litigations, than matched firms that are under less emotional distress. Our work contributes to the understanding of learning and emotional effects in rare strategic events, and thereby provides fruitful insights to recent developments in scholarly work examining psychological aspects of strategy execution.

Introduction

“Once you get involved with bloodsport litigation, you can not only get drunk on your own greed but start to believe your own lies.” Jello Biafra

IP litigation is costly and can have enormous impact on firm's strategy and economy. In history we even observe organizations going bankrupt or close to as a result of losing an IP court case. For example, in 2012 the US court found that Samsung had willfully infringed a number of Apples patents, and Samsung was initially sentenced to pay USD 1.049 billion in damages. The ruling against Samsung was issued on the 24th of August 2012 and the next day Samsung stock fell 7.5%, needless to say this was a tough time for Samsung. Prior literature also reports a relationship between organizations engagement in IP litigations and their value: on average the market value of organizations involved in patent litigation decreases 2-3.1 percent alone by organizations filing an IP litigation (Bhagat, Brickley et al. 1994, Lerner 1995). Often organizations therefore tries to avoid IP litigation, empirical work confirms this, as only 1.5 lawsuits are filed per 100 patents in the US (Lanjouw and Lerner 1998, Somaya 2003). Engaging in IP litigations are therefore strategic events for the participating firms, events which organizations most often try to avoid and events that do not often occur. In organizational learning literature events carrying such specification: strategic important and infrequent are classified as *rare strategic events* (Lampel, Shamsie et al. 2009).

A central debate in organizational research has been to study what organizations learn from previous events. In the last two decades, research has focused on how organizations learn from repeated events (e.g. Argote 1999, Zollo and Winter 2002) focusing on routines and capabilities (Zollo and Winter 2002). In contrast, only recently (with few exceptions e.g. March, Sproull et al. 1991), research has focused on whether and what organizations learn from rare strategic events (e.g. Christianson, Farkas et al. 2009, Madsen 2009, Rerup 2009, Zollo 2009). In both literature streams,

learning from frequent and learning from infrequent events, the effect from psychological constraints, such as emotions, has been largely neglected (Hodgkinson and Healey 2011). On the other hand, in other parts of organizational literature, namely the literature based on cognitive theory and psychology shows how organizations' decision processes based on negative emotions trigger stakeholders to take suboptimal decisions (Kisfalvi and Pitcher 2003, Maitlis and Ozelik 2004). In this literature, however, neither the link to rare strategic events nor how organizations mitigate the influence from emotions is examined. Against this backdrop we set out to explore how organizations' performance in rare strategic events (IP litigations) are influenced by emotional distress and how organizations' prior experience can mitigate the harmful influence of negative emotions.

We do so by conceptualizing IP litigations as a landscape of cases in which organizations from prior (though rare) successful cases can build a roadmap which helps the firm to navigate towards winning. The roadmap learned from prior successful cases may not necessarily take into account every little bump or rock creating challenges in the IP litigation landscape, and the landscape may change from case to case, however, having been through a similar landscape and solved the case successfully might still give organizations an advantage in 'steering safely' when bumps and rocks are met in the landscape. Empirically, we study 13,030 IP litigations in China in the period from 2001 to 2011. IP litigation is an ideal setting to study these issues for several reasons: First, pursuing court cases (like acquisitions, partnerships, and reorganizations) is a rare strategic event in which we can observe a performance outcome (winning, partial winning or losing the court case). Second, the emotional investment in IP litigation systematically varies why we can isolate organizations pursuing litigation under varying degrees of emotional distress, for this we use the distinguishing between contract and infringement cases. Like marriages, contracts are between familiar organizations who once chose to invest in one another, while infringement cases are most

often between unfamiliar organizations with no common investment. We utilize this variation to isolate negative emotions arguing that contact cases are more likely to entail negative emotions. We measure variation in organizations' economic investment to isolate our measure of negative emotional investment. Third, we can observe the sequence of each individual organizations' rare strategic events, by looking at their IP court case history. Finally, the prior experience of either losing, partial winning or winning previous cases can then be explored to study whether organizations prior experience in rare strategic events enables organizations to build IP litigation roadmaps which help them navigate in the IP litigation landscape, even though, the focal case being fought in court is new and conducted under negative emotional influence.

We use a matching procedure to isolate the effects, and find that organizations more often lose IP litigation when under influence of negative emotions, at the same time organizations with IP litigation roadmaps are better at not losing litigations, and these roadmaps also moderates the influence from negative emotions. Our contributions from this research are three folded, first, we introduce the conceptualization of IP litigation as an IP litigation landscape and explain how IP litigation roadmaps of successful prior rare strategic events are beneficial for organizations, clarifying how also prior learning from rare strategic events are canalized into better decision. Second, we contribute to the organizational learning literature by linking emotional aspect into our understanding of learning in rare strategic events. Third, we contribute to the limited but recent literature stream (Zollo 2009) of studying determinants of performance in rare strategic events in a large N dataset.

The rest of the paper is structured in the following way, first we theoretically conceptualize how negative emotions influence firm's behavior in rare strategic events, second, we present the conceptualization of IP roadmaps supporting organizations in navigating in the IP litigation landscape. Then we present the empirics and data, the results and discussion.

Theoretical Background and hypotheses: Performance influence of emotions, contract relationships, and roadmaps in rare strategic events

This section develops a theoretical framework for how negative emotions and cognitive learning simultaneously occur and interact influencing outcomes in rare strategic events. Rare strategic events are particularly interesting to examine as learning from rare strategic events is especially prone to be biased by emotions (Starbuck 2009). Below we build a model representing the theoretical framework: First, we draw on cognitive psychology literature to develop the foundation for understanding how emotions, namely negative emotions (also mentioned as toxicity and affection), come into play in rare strategic events, focusing on their occurrence depending on type of IP litigation; Secondly, we build a theory which explains how organizations use previous experiences of rare strategic events in building a ‘roadmap’ in which a codification of how to solve ‘bumps and rocks on the road’ occurs, which supports the firm in finding their way when they next time, maybe years later, again experience a rare strategic event (in our case IP litigation); Thirdly, we argue that the roadmaps are particularly beneficial for organizations when facing negative emotionally rare strategic events.

Emotions as determinants in rare strategic events: How negative emotions influence IP litigation outcome

Organizational learning and strategic management literature has focused on establishing an understanding of heterogeneity in organizational performance based on non-psychological factors (Teece, Pisano et al. 1997). Scholarly work in understanding IP litigation has followed this focus

and the research conducted unravels rational reasons for engaging in IP litigation such as the importance of IP at stake, type of underlying technology, wish for retaining market shares and building a strong reputation in the market, ensure royalties, and protect organizations core assets (Lanjouw and Schankerman 2001, Somaya 2003, Graham and Somaya 2004, Agarwal, Ganco et al. 2009, Polidoro and Toh 2011). This research is rooted in economics and law (Lanjouw and Lerner 1998, Somaya 2003) disregarding whether psychological biases, such as emotions, or organizational aspects, such as learning, are influential in explaining the heterogeneity observed in IP litigation outcomes. Selected parts of organizational research have incorporated insights from psychology on human behavior into understanding performance outcomes, examples are understanding bias in strategic investment decisions (Schwenk 1984, Bateman and Zeithaml 1989) or for understanding competition within industries and their evolution (Porac, Thomas et al. 1995, Peteraf and Shanley 1997). More recently, research conceptualizing organizations as emotional entities have spurred, focusing on examining how emotions influence organizational setup and outcomes (e.g. Elsbach, Sutton et al. 1998, Mellers 2000, Forgas and George 2001, Ashkanasy, Hartel et al. 2002, Maitlis and Ozcelik 2004). The research on the psychology of organizations, has put emphasizes on two strings of interesting questions: those pertaining to how organizations are influenced by negative emotions; and those analyzing the influence of positive emotions. The positive influence of emotions has for example been emphasized in entrepreneurship literature, where the often positive emotional state of the entrepreneur has been the topic for much research (Mano and Oliver 1993, Gasper and Clore 2002, Carver 2003, Haynie, Shepherd et al. 2010, Morris, Kuratko et al. 2012). In this respect arousal and pleasantness has been identified as influential for performance, positive emotions influence the type of learning and level of risk that is pursued. For example, arousal leads to optimism why individuals feeling arousal will pursue more explorative learning paths (Gasper

and Clore 2002, Carver 2003), and therefore will pursue projects that are more risky, and thereby have a higher likelihood of introducing new innovative products on the market.

In contrast a limited body of research has analyzed negative emotions and their consequences for organizations (Flam 1993, Lewis 2000). In this limited stream of research, Frost (2003) defines the negative emotions that arise when organizational emotions are dealt with in a destructive (rather than healing) way as ‘toxicity’. Maitlis and Ozcelik (2004) reuses the notion of toxicity and describe ‘toxic decision processes’ in which negative emotions in organizations develop through an interplay of actions and emotions, resulting in a negative build-up in the organization having harmful influence on performance. Negative emotions are also displayed in management literature related to management control, Flam (2003) describes how managers feel fear, embarrassment and shame even though they on the outside display enthusiasm. In Frost’s (2003) work the negative emotions, sadness, anger, bitterness and frustration are described as toxic emotions with negative consequences for firm performance. This literature displays evidence for emotions influencing individuals’ behavior within organizations and organizational strategic behavior, and thus performance outcomes.

Now we will turn to describing how negative emotions will impact in rare strategic events, such as IP litigations.

Negative emotions when contracts are broken

In this paper we investigate effects of negative emotions for the outcome of rare strategic events, using the context of IP litigations. IP litigations have been anecdotally described as an emotional journey (Somaya 2003). We argue that IP litigations can occur between partners with relatively strong or relatively weak relationships, and that this distinction of the reciprocity in

between the partners engaging in the IP litigation influence the level of negative emotional distress experienced by the organizations engaged in the litigation. In infringement cases, unfamiliar firms engage in litigation, while contract cases are between familiar firms previously agreeing to a mutual commitment, we propose that the familiarity and previous commitment between contract partners increases the level of emotional distress and that plaintiffs in contract cases are hence more emotionally involved than plaintiffs in infringement cases.

Findings from relational sociology suggest that situations with the features of a contract case would tend to involve a higher level of emotional distress than infringement cases. In most relationships, there is an underlying assumption of reciprocity (Emerson 1976), which when violated produces resentment and calls for retaliation, even if that may cause further damage to both parties, leaving the focal organization worse off than doing nothing (the predominance of this logic is evident from the many experiments finding consisting punishing behavior by participants in the *ultimatum game*). Literature also shows that engaging in contractual agreements, build relationship between partners, and relational learning takes place (Bercovitz and Tyler 2014). The stronger the relationship, the stronger the desire to retaliate will be (Reuben and van Winden 2008). The analogue to a contract case would be that of a capsized marriage ending up in court. By the time the case gets to the courtroom, both parties are prone to be engulfed in intense negative emotions. When engulfed in the negative emotional distress of IP litigation, organizations will be tempted by their immediate desire for retaliation (Johnson and Tversky 1983) rather than rational considerations. This emotional distress will increase the probability of an outcome unfavorable to the plaintiff in contract cases, when compared to less emotional cases, such as infringement cases.

How negative emotions influence IP court litigation

Based on the above understanding that the nature of the relationship in which the IP litigation takes place influences plaintiffs' level of negative emotions, we argue that there are two dominant ways in which negative emotions experienced when litigating a contract case will influence the plaintiff when navigating in the IP litigation landscape. First, momentary emotions influence actions, psychology research suggests that individuals make decisions that are consistent with their 'state of mind' at the given judgement time (Johnson and Tversky 1983) therefore for example in the case of a plaintiff that has prior contractual relationship with the opponent the disappointment and frustration over the broken relationship will lead to a negative state of mind in the firm which then will influence the decisions taken concerning the case. Second, emotions may lead to strategic decisions that are not well thought through, under intense unpleasant emotions bias towards short term enhancements can be observed as decision outcome, even though the long term implications of the decision taken could have severe negative consequences (Gray 1999). Organizations taking a prior contractual partner to court will most likely experience a momentary relief and well-being just by suing the opponent, a prior partner that at this point in time imply hurt feelings. The firm will, due to this momentary feeling, feel inclined to take the case to court even though the likelihood of a long-term positive outcome might be questionable and despite a rational analysis of the situation would entail the firm to decide otherwise. We argue that the stronger emotional investment represented by a prior contractual relationship will bias organizations in the decision process and induce them to take cases to court which they would otherwise have accepted to settle privately if less emotionally involved. When engaged in a negative emotional IP litigation, organizations will be tempted by their immediate desire for retaliation. The outcome of the litigation will therefore more likely be unfavorable to the plaintiff in contract cases, when compared to less emotional cases,

such as infringement cases, where the plaintiff and defendant does not know each other on beforehand, we therefore suggest:

Hypothesis 1: The performance outcome of an IP litigation is likely to be negatively influenced if organization pursue contract cases (cases with strong negative emotions).

The effect of prior successful experience in rare strategic events

Literature on organizational learning is deeply rooted in the notion that organizations develop and refine routines and capabilities through repetition (March and Simon 1958), however, this framework cannot be directly applied to rare events. Rare events are by definition too erratic for organizations to build up sets of routines and capabilities (Lampel, Shamsie et al. 2009, Starbuck 2009), but this does not mean that organizations cannot extract learning from rare events, merely that learning is difficult and prone to bias.

Attention is a precondition for learning, and while attention is always scarce, it is especially so in rare events where learning potential and relevance of the event is unclear, the opportunity to learn is by definition rare, and much attention is diverted by dealing with the disruption of the event (Rerup 2009). The erratic nature of rare event leaves organizations more discretion in teasing out patterns and causalities, and hence learning from a rare event is more prone to perceptions and biases than development of routines and capabilities. When learning from rare events, organizations do not experience as many opportunities for aligning their assumptions and actions with reality as feedback is infrequent, which increases the influence of the learners' mental framework (Starbuck 2009).

Rare events may appear similar, but in essence be very different (Zollo 2009) and consequently learning from each event or across events requires that they are experienced richly (Beck and Plowman 2009). Details and nuances must be appreciated and causal relationships understood to extract learning. Furthermore, the outcome of the rare event will matter greatly for the quality of learning and organizations learn little from failures (Starbuck 2009). In the face of good outcomes, organizations will seek to replicate their approach in their next encounter with a similar situation. Poor outcomes on the other hand, will lead organizations towards attempts to predict future similar situations and ameliorate consequences of the undesired outcome rather than learning from the event (Lampel, Shamsie et al. 2009). Organizations' potential reactions to failures are further elaborated on by Starbuck (2009) who argue that small failures in rare events may produce some learning, as organizations will use their experience as point of departure for incremental change. Contrary, organizations experiencing major failures will tend to categorize the event as not merely rare but even unique, exceptional, and produced and driven by exogenous factors beyond the organization's control (Starbuck 2009). The causes for the unfortunate outcome will be projected out of the organization and leave no incentives for dwelling on the experience. Hence, in the face of failure, organizations will adopt a framework distant from learning enhancing factors, and in combination with the erratic nature of rare events, this will greatly mitigate the quality of the learning resulting from the firm's experience.

We propose that though IP litigation is an event too rare for the vast majority of organizations to build routines and capabilities, organizations can extract meta-level learning from the experience. We term this meta-level learning *Roadmaps*. Roadmaps are neither routines nor capabilities as they are used to infrequent to become incrementally evolving habits. Rather, they are navigation tools to be used in a certain landscape, in our example the IP litigations landscape. Roadmaps assist organizations in navigating through rare events. High quality roadmaps increase organizations'

foresight in the litigation process, they assist in elimination of suboptimal paths, illuminate possible aims and improves accuracy and speed (Fleming and Sorenson 2004). In innovation literature the same analogy has been used for science being a map in leading organizations to more useful combinations of technology (Fleming and Sorenson 2004). The quality of roadmaps will depend on learning effort and outcome of the rare events producing the experience, and experience in general from a rare event is not as important as experience with winning an IP litigation. Based on this we propose the following hypothesis:

H2: The performance outcome of an IP litigation is likely to be positively influenced by the plaintiff prior experience with winning or partially winning IP litigation cases.

Can high quality roadmaps mitigate the influence from negative emotions?

In this section we propose, that above and beyond the direct positive effect of higher quality roadmaps on the probability of winning IP litigation, there is also a positive moderating effect for organizations operating in a negative emotional state of mind. We argue that the meta-level learning embodied in roadmaps enables organizations to surpass their emotions and focus their attention on the relevant IP issues of the case at hand. The experience stored in roadmaps focuses organizations' attention on relevant threats, issues and opportunities, and thereby guides attention away from emotionally infested aspects of the case and towards the main points. This focus of attention is especially valuable for organizations in a negative emotional setting as such organizations do not only need guidance towards the core of the matter but also away from irrelevant and destructive emotions. With high quality roadmaps developed based on experience with winning previous cases, any deviation from the successful formula will be questioned and carefully considered. This reflection mitigates the power of negative emotions, and push organizational decisions to rely less

on the immediate emotional reaction and more on reflexive consideration based on experience. The quality of organizations' roadmaps will affect the magnitude of any moderation of the negative effects of emotions. In the case where organizations draw upon experience from previously successful mastering of rare events, they tend to replicate the script, which has already proven to work so well (Lampel, Shamsie et al. 2009). This leaves little room for interpretation and an emotionally motivated desire to deviate from the roadmap provokes reflection. It is not obvious to the organization why deviation would increase probability of winning the case, rather the contrary, and hence a high quality roadmap will decrease the influence of negative emotions in the decision processes. This results in the following hypothesis 3:

H3: The negative effect of negative emotions will be positively moderated when organizations hold high quality roadmaps produced through experience with winning previous cases.

In the case where organizations draw upon a history of minor failures, they do not have the same protection against emotional bias, because experience prove their roadmaps to be faulted, there is an opening for incremental change (Lampel, Shamsie et al. 2009). Because of the unclear causal linkages and the lack of opportunity for testing, organizations are uncertain as to which aspects of their previous actions lead to the successful part and the unsuccessful parts of the previous outcomes (Zollo, 2009). Hence, there is room for interpretation and for emotional bias to influence that interpretation and choice. Following theory of immediate gratification sacrificing long term returns (Johnson and Tversky 1983, Starbuck 2009), organizations may choose to go for solutions satisfying their immediate need for redemption in a negative emotional situation, without consideration for the long term consequences. And without reliance on previous experience, this temptation is imminent. This leads us to hypothesis 4 and 5.

H4: The negative effect of negative emotions will be positively moderated when organizations hold medium quality roadmaps produced through experience with partially winning previous cases.

H5: The positive moderating effect of organizations holding high quality roadmaps will have greater magnitude than the positive moderating effects of organizations holding medium quality roadmaps.

We do not hypothesize on any moderating effect of organizations holding low quality maps. In the face of failure, organizations have little to build on (Lampel, Shamsie et al. 2009), and hence we cannot expect organizations to develop any roadmaps with the power to guide them against an urge to indulge any destructive desires produced by a negative emotional state of mind.

Study design

To understand the relationship between emotional investment, organizational learning, and litigation outcome, we use a longitudinal dataset in which we can observe firms' experience and investment in 13,030 court cases in China. Our data is organized at the firm level, with each observation representing a firm acting as plaintiff in a court case. To avoid left truncation, we use observations from 2001 to 2004 to create a baseline of firm experience and focus our analyses on the period from 2005 to 2009. To ensure a non-symmetrical distribution of our dependent variable, we focus on one part in each court case, namely the plaintiff, the firm bringing the case to court. When a case reaches court, the parties did not succeed in settling the matter outside the court, but the plaintiff is the part making the decision to pursue a court case, a decision which places importance on plaintiffs' agency and the decision making process in which we argue that the non-strategic aspects of emotions and perception play a significant role.

Data

Our data come from CIELA, a service provider for statistical analysis of civil and administrative IP litigation cases in China. CIELA gathers published IP judgments and settlements across all 94 major IP courts in the 35 leading cities in China¹. In comparison, other studies on IP litigation have mainly dealt with US data (Somaya 2003), and more recently data from European courts (Harhoff 2009, Mejer and de la Potterie 2012, Cremers, Ernicke et al. 2013, Schliesser 2014).

The CIELA data includes information on case rulings, appeals and jurisdictions as well as opportunity to track firms' experience in the court system. Far from all disputes end up in court (Lumineau and Oxley 2012), thus we only include cases where firms have not been able to or interested in private settlement. We utilize a sample of 14,602 cases between 2001 and 2011. As figure 1 shows, the rate of cases increased dramatically from 2001 to 2004, and we focus our analysis on the period 2005-2009 and use the previous period to calculate firms' experience levels. This leaves 13,030 court cases with 4,706 firms represented. Of these 9,650 are first instance cases and 3,374 second instance cases, and 662 are contract cases and 12,368 infringement cases.

Insert Figure 1 here

Identification of emotional distress by matching contract and infringement cases

As we wish to compare contract and infringement cases above and beyond differences leading to firms ending up in contract versus infringement cases, we apply a match sample approach where

¹ Simple analysis of the data is publicly available at ciela.cn, and we are grateful to CIELA for allowing us to use the richer source files.

we match all 662 firms acting as plaintiffs in contract cases with firms acting as plaintiffs in infringement cases similar on important aspects. In the existing literature on IPR litigation, focus has been on identifying strategic reasons for pursuing IPR cases in the court system. We control for these effects to isolate the emotional aspects of IPR litigation. We are not aware of any natural experiment or exogenous shock in the context and instead we apply a quasi-experimental design and use a matched sample approach to isolate emotional effects affecting behavior in IP litigation. We identify a set of plaintiffs in contract cases, which due to the relationship between the involved parties prior to the court case represent a higher emotional distress due to broken agreements, neglected trust, and unfulfilled expectations than what we should expect in e.g. infringement litigation cases. We create a matched sample of infringement cases similar to the contract cases on all relevant dimensions. We chose infringement cases over violation of rights to ensure a substantial pool of untreated matches.

Firms taking contract disputes to court might reasonably be assumed to be different from firms taking infringement cases to court. We are interested in estimating effects of emotional investment in contract cases above and beyond such tendencies. Hence we match firms involved in contract cases and infringement cases which are similar on important criteria. These criteria are firms' prior experience in the Chinese court system measured as the number of cases firms have previously been involved in (*Experience*), experience of winning cases (*Ratio_win*), and the tendency to act as plaintiff rather than defendant (*Ratio_plaintiff*). These experience dimensions could all differ between contract and infringement cases, as infringement cases are more frequent in the court system. Also, firm origin could influence the type of case firms take to court and is a proxy for firms' investment in pursuing court cases. Finally, internationalization may influence which type of cases firms bring to court, and as internationalization increases over time, we can measure this by time periods (*Time_period*). To address this issue of heterogeneous propensity of

taking contract cases versus infringement cases to court, we apply a combination of exact matching and propensity score matching (Rosenbaum and Rubin 1983, Rosenbaum and Rubin 1985), on the variables that reasonably can be assumed to affect the probability of bringing a contract case to court, to create a control sample of comparable firm-case combinations pursuing infringement cases. This matching procedure allows for investigation of the relationship between emotional investment in contract cases and the probability of drawing upon experience, given the conditional probability of taking contract cases to court.

In the propensity score matching procedure, we include firms' ratio of appearing as plaintiff versus defendant (`ratio_plaintiff`), firms' (logged) experience with the Chinese court system (`LN_tot_exp`) and firms' ratio of winning cases (`ratio_win`). The exact matching includes firm origin (`foreign`), court instance (`instance2_case`), and time (`period1`). We match contract and infringement cases 1:5. Due to the limited pool of available untreated matches, some untreated observations are used multiple times; potential bias in standard errors is corrected for by employing cluster correction effects (by both plaintiff and defendant) in the estimations. This process follows the examples of (Cameron, Gelbach et al. 2011, Dahlander and McFarland 2013, Kleinbaum, Stuart et al. 2013). Analysis of the matched observations shows no significant differences between treated and untreated observations on the matching variables.

Analysis

Dependent variables: *First instance outcome* of focal court case was measured as a binary variable where 1 denotes losing and 0 winning the case partially or absolutely. Winning a court case must be considered a decidedly positive outcome, while partially winning a court case must be considered as a more dubious outcome depending on prior expectations and the specifics of the

court ruling. However, losing a court case must be considered as a negative outcome regardless of prior expectations, and we hence estimate plaintiffs' likelihood of engaging in court cases in which they receive this unfavorable outcome. For the appealed cases we further utilize the *Second instance outcome* to assess the soundness versus emotional bias of the plaintiffs' probability of winning.

Independent variables: We identify the effect of plaintiffs' emotional involvement by identifying whether the focal case is a *Contract case* or not. Contract cases are between familiar firms, which have singled each other out in a selection process, and hence represent substantial emotional distress.

The *Ratio of won* and *Ratio of partially won cases* a firm has experienced previous to the focal case can have to potential effects: A track record of several partially won cases indicates that the firm has acquired the competences to avoid losing, but at the same time it place the firm at risk of inferring from that blurry experience whatever suits its current situation. We calculate the ratio of partially won cases as the number of partial wins over all other outcomes plus 1 (*Ratio_part_win*).

We interact both of these variables indicating firms' experience with successful outcomes of previous litigation processes with the dummy variable for contract case, identifying the firms we expect to be under the highest level of emotional distress.

Controls: To control for experience effects we control for *Ratio of won cases* (*Ratio_win*) and *Ratio of lost cases* (*Ratio_lose*), we calculate these measures as the count of focal (win / lose) the outcome over the count of all other outcomes plus 1. We use a dummy identifying *Foreign* firms (neither mainland China nor the associated islands) to control for the effect of extraordinary economic investment in cases (foreign). When foreign firms decide to pursue IP cases in the Chinese court system rather than settling the matter outside the courtroom they face a substantial context specific investment, as their experience from court systems outside China is of limited

value, and as the experience they build during their involvement in the case will be of limited value outside the Chinese context. We measure this by a dummy variable taking the value 1 if the plaintiff is a foreign (non-Chinese) firm. We control for firms' *total experience* (LN_tot_exp) measured by firms' logged total number of prior IP litigations and *Contract case experience* (Exp_contract) by the number of cases or contract cases the firm has been involved in as either plaintiff or defendant in the three years preceding the year of the focal case. *Ratio plaintiff* (Ratio_plaintiff) measures whether the firm act role congruent or not, and thus whether the firm can rely on its role specific experience, and *IPR type* controls for the type of right which plaintiffs claim to be violated, we distinguish between patents (reference group), copyrights, unfair competition and trademarks. In all models we include time and geography dummies (Dummy location).

In table 1 we present the descriptive statistics and in Table 2 the pairwise correlations.

Insert Table 1& 2 here

Model choice and analysis

Our dependent variables can only take the values of 0 and 1 and we consequently consider estimating a linear, logit or probit model. The underlying distribution allows estimation of a linear model, which we prefer for computational reasons, but utilizing a linear probability model with a limited dependent variable can lead to prediction of probabilities outside the realistic spectrum of 0-1, where prediction of negative probabilities is the main concern. Only 5% of our observations have negative predicted probabilities in our main model (model 3), and we can hence proceed with the

linear probability model. Another issue is that heteroskedasticity may present a problem for the reliability of results. We address this issue with two estimation strategies: First, as we wish to control for clustering of observations on both plaintiff and defendant in each focal case, we wish to cluster by both variables in one estimation. We use an approach developed by Cameron, Gelbach, and Miller (2011) that allows for clustering of standard errors based on more than one variable. This allows us to cluster standard errors for both plaintiff and defendant in each case. The approach has been used by Kleinbaum, Stuart, and Tushman (2013) studying e-mail exchange within in an organization, and by Dahlander and McFarland (2013) studying faculty collaboration at Stanford. We review the probability plots and variance and find some though not much variation across the probability distribution. Second, we reestimate all models with Huber–White robust standard errors clustering observations by plaintiff in one estimation and defendant in another. These models produce results almost identical to our main models and are available from the authors upon request.

Insert Table 3 here

In table 3 models 1 to 3 predict the likelihood of losing first instance cases. Model 1 is the baseline model estimating effects of our controls on the likelihood of losing first instance cases when excluding our key variables. Model 2 includes our key variable identifying plaintiffs in contract cases and plaintiffs’ ration of partial wins in previous cases. The model shows no significant effect of plaintiffs engaging in contract cases, but a high ratio of previously winning or partially winning cases significantly decreases the likelihood of losing. Model 3 includes the interaction terms between being plaintiff in a contract case and the ratio of win outcomes and partial

win outcomes in previous cases respectively. Both interaction terms significantly lowers the likelihood of losing the focal case.

Models 4 to 6 predict the likelihood of plaintiffs losing second instance cases. These models are not our main models, but serve as a robustness check replicating our findings in a similar but slightly different situation and for a subsample of firms. Model 4 is the baseline model including only controls. Model 5 includes our key variable identifying plaintiffs in contract cases and plaintiffs' ration of wins and partial wins in previous cases. The model shows no significant effect of plaintiffs engaging in contract cases, but a high ratio of win outcomes or partial win outcomes in previous cases significantly decreases the likelihood of losing. In model 6 we include the interaction term between being plaintiff in a contract case and the ratio of partial win outcomes in previous cases and the interaction between being plaintiff in a contract case and the ratio of win outcomes in previous cases. In this full model, being plaintiff in a contract case increases the likelihood of losing, while a high ratio of win or partial win outcomes in previous cases decreases the likelihood of losing. The interaction effect for plaintiffs in a contract case and a high ratio of winning previous cases significantly decreases the probability of losing, while the interaction effect of being plaintiff in a contract case and having a high ratio of partial win outcomes in previous cases increases the likelihood of losing. We base our conclusions on our main model, model 3, and relate it to the comparable models for second instance outcomes. All other robustness checks on first instance cases support the findings present in model 3.

Varying degrees of emotional distress: We argue in hypotheses 1 that firms emotionally invested in legal cases face higher probability of losing, due to irrational behavior brought about by their emotional investment in the case. In support for this, model 3 shows a significant increase in

probability of losing for plaintiffs pursuing contract cases at first instance. This indicates that firms emotionally invested in contract cases might be lead to suboptimal strategic decisions by their emotional investment in the contract relationship and bring matters of disagreement to court with comparatively higher likelihood of losing. We cannot rule out that part of this suboptimal decision process is due to an economic investment in the contract relationship, but as the effect remains when we control for extraordinary economic investment and we find no significant effects of measure for extraordinary economic investment, we argue, that economy cannot be the only cause. These findings support hypothesis 1 as do our robustness checks including model 6 based on second instance cases.

Learning from rare events: The results in models 2, 3, 5 and 6 indicate that firms are able to interpret and learn from rare events at both instances, a high ratio of win and partial win outcomes in previous cases significantly decrease the likelihood of losing the focal case.

The moderating effect of learning on emotional distress: With Hypothesis 3 we proposed that above and beyond a direct positive effect of experience with successful litigation, learning from previous litigation processes also hold the power to moderate the negative effects of emotional distress. The findings in model 3 supports this claimed moderating effect for both previous experience with winning and partially winning previous cases. This indicates that both high and “medium” quality roadmaps can help firms navigate rare strategic events. However, in one of our robustness checks, for second instance outcomes, experience with partially winning increases the probability of losing the focal case. We interpret this as an indicator in favor of the high quality roadmaps developed based on a history of winning previous cases.

Discussion and conclusion

Prior literature on IP litigations and strategic decision making has been centered around the strategic rather than non-strategic determinants of litigation (Somaya 2003). The strategic dimension have been found to be explanatory factors for IP litigation (Lanjouw and Schankerman 2001, Somaya 2003, Graham and Somaya 2004, Agarwal, Ganco et al. 2009, Polidoro and Toh 2011). At the same time, the non-strategic dimensions for IP litigation and outcome pertain to anecdotal evidence, stories of ‘large egos’, poor legal advice, or both parties losing perspective in a given case have been described in the popular press.

We find that firms’ level of emotional distress affects performance in IP litigation. Namely, we find support for the notion that firms tend to act on their emotional bias and thereby engage in cases and behave in a way increasing their probability of losing. We further find that experience with winning or partially winning cases endow firms with roadmaps, which guide them through the litigation process and increase their performance. These roadmaps are especially valuable to firms operating under emotional distress as they positively moderate the negative effect caused by emotional bias. Below we relate our findings to literature on rare events, emotional bias in decision-making, organizational learning, and findings in the IP litigation literature. In turn, we discuss how our findings relate to and inform dominant perspectives in these streams of research. We then turn to the managerial implications of our findings for the IP area and beyond.

In relation to the limited research on rare events within management (mainly limited to Org Sci special issue 2009), our findings offer valuable insights in the form of a conceptual framework and bordering conditions for organizational learning from rare events. In the extant literature, there is unanimous agreement, that organizations *can* learn from rare event, but also that this learning process is challenged by the erratic nature of rare events, which greatly disrupts learning, and

renders analysis according to the dominant views on organizational learning as development of routines and capabilities impossible. The idea of meta-level learning is imminent in a number of papers: Rerup's (2009) analysis of the importance of richness when learning from rare events, Madsen's (2009) analysis of mines learning from minor and major disasters, Beck and Plowman's (2009) analysis of the importance of middle managers, and Christianson et al.'s (2009) analysis of reorganization in the face of disaster at the B&O Railway museum. Each paper offers part of a framework for understanding how organizations learn from rare events and which conditions facilitates or hinders learning. In this paper we build on their insight and produce a framework for understanding what this type of learning consists of. The concept of roadmaps highlight that what is learned is not knowledge, the rarity of the event would render knowledge stored from previous events obsolete. But rather organizations learn to navigate the IP litigation landscape through foresight.

One major difference across the existing work on organizational learning from rare events is the issue of agency as the degree and timing of firms' agency varies across contexts. In the case of acquisitions analyzed by Zollo (2009), organizations have a high degree of agency in deciding whether to acquire, when to acquire and which firms to target and close deals with. In the case of mines dealing with disasters analyzed by Madsen (2009), organizational agency rests predominantly in reactive responses and attempts of avoiding future disasters. Our context is somewhere in between. Organizations do not choose to have their patents infringed upon or their contracts violated, but they have some agency in regard to how they handle the situation. Institutional pressure may force them to take action, but the specific actions are very much at their own discretion. This distinction in how much agency and when in the process of dealing with rare events organizations have room to maneuver may influence findings across studies of organizational learning in rare events. In deliberate and self-inflicted rare events such as acquisitions (Zollo, 2009),

organizations may enter the situation with the perception that no learning is necessary, which will greatly decrease their motivation to extract any competence from the situation and their attention to discrepancies and details. Without motivation and attention learning is hard and learning from rare events with all the additional challenges is harder (Starbuck, 2009, Rerup, 2009, Lampel et al., 2009), and hence organizations may build more confidence than competence (Zollo, 2009). Based on the few available studies on learning from rare events, we propose that learning – competence building in Zollo’s terminology – may benefit not only from performance and the absence of confidence, but also from a sense of uninitiated urgency of the situation brought about by lack of agency in initiating the event. In the situation of acquisition analyzed by Zollo (2009), the confidence is tied to the acquiring firms’ control of the process. We argue, that learning may be better facilitated by situations imposed on firms, as in the case of mining firms’ learning from minor and major accidents analyzed by Madsen (2009).

We contribute to literature on organizational learning by introducing the concept of roadmaps to describe the learning organizations extract from experiencing rare events. By now we as research community understand the antecedents and effects of routines and capabilities quite well, but we lack knowledge and a coherent theoretical framework for understanding if, how, and when firms may learn from experiences not part of everyday organizational life – from rare events. In this paper we propose a theoretical framework for understanding such learning through the analogy of roadmaps: A mental framework equipping organizations with foresight to navigate complex and strategic rare events where knowledge accumulation and development of routines is challenged. We are aware that organizations “lawyer up” when faced with litigation cases, and for these lawyers, the litigation process may be rather routinely dealt with. But for our focal firms, it remains a rare and strategic event. The value of roadmaps may be limited to something as simple as foresight

regarding when to listen to the lawyer and when to act on gut feelings, but given the stakes and our consistent findings supporting the value of roadmaps, this simple learning holds ample value.

The concept of roadmaps as a form of meta level learning has implications for a large area of rare events, for which researchers have only begun to study learning implications. Adoption of disruptive technologies and business model innovations are situations firms may find themselves in more than once, yet still rare. Specific knowledge from previous technology adoptions or business model innovations will be obsolete, but the framework for the process, the mental map of how to navigate may still hold relevance, and the better the organization transitioned through the last experience, the higher quality will the roadmap have. Disruptive activities such as starting up or moving a division, downscaling or radically upscaling size, changing core partners or collaboration modes are all events of strategic importance, which occur relatively infrequent in the lifespan of most organizations. Understanding how to extract learning from these events can contribute to organizational performance at a large scale.

TABLES AND FIGURES

Table 1: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
contract	.159	.366	0	1
ratio_partial win	.610	.802	0	6
contract*partialwin	.088	.334	0	4
contract*win	.038	.192	0	1
exp_contract	.432	1.163	0	10
ratio_plaintiff	2.935	7.403	.2	152
foreign	.019	.138	0	1
LN_tot_exp	.776	.779	0	5.023
ratio_win	1.138	1.833	0	9
ratio_lose	.405	.882	0	5
period1	.533	.499	0	1
Copyright	.384	.486	0	1
Patent	.281	.449	0	1
Trademark	.207	.405	0	1
Unfair Competition	.128	.334	0	1