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Micro-foundations of platform-complementor coopetition

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Abstract

Superseding the traditional view of cooperation and competition as separate constructs, coopetition research gained traction in the last two decades. Recently scholars have voiced the need to disentangle the different levels of analysis and to explore the micro-foundations of coopetition. Filling in this gap, we study the intensity of platform-complementor coopetition, as a function of past commitment and primed regret. We theorize that, when a partner platform intensifies competition, the complementor's escalation of commitment renders the cooperation with such platform more likely, possibly by decreasing competition with other platforms the complementor is involved. Nevertheless, keeping the past commitment equal, we expect a primed regret to decrease the extent of cooperation with the competing platform and possibly, to increase competition with other platforms, hence also increase coopetition with the focal platform. We find evidence of the expected effects and we further elaborate on the underlying mechanisms.

ABSTRACT

Superseding the traditional view of cooperation and competition as separate constructs, coopetition research gained traction in the last two decades. Recently scholars have voiced the need to disentangle the different levels of analysis and to explore the micro-foundations of coopetition. Filling in this gap, we study the intensity of platform-complementor coopetition, as a function of past commitment and primed regret. We theorize that, when a partner platform intensifies competition, the complementor's escalation of commitment renders the cooperation with such platform more likely, possibly by decreasing competition with other platforms the complementor is involved. Nevertheless, keeping the past commitment equal, we expect a primed regret to decrease the extent of cooperation with the competing platform and possibly, to increase competition with other platforms, hence also increase coopetition with the focal platform. We find evidence of the expected effects and we further elaborate on the underlying mechanisms.

1 INTRODUCTION

Traditionally the management literature views of inter-firm resident dynamic capabilities and inter-firm relational capital as mutually exclusive with inter-firm competition. Research on coopetition, simultaneous pursuit of cooperation and competition has abolished such view (Ann Peng, Yen, & Bourne, 2018; Bengtsson & Kock, 2014; Dahl, 2014; Fernandez, Chiambaretto, Le Roy, & Czakon, 2018; Pellizzoni, Trabucchi, & Buganza, 2018). Theoretical and empirical studies demonstrated that reconciling and implementing both is possible and even desirable for organizations such as in case of joint R &D efforts of otherwise competing firms. Such studies also build conceptual foundations for coopetition's antecedents, intensity and dynamics, highlighting among others inter-firm trust and commitment, as key determinants of firm's decision to continue coopetition (Fernandez et al., 2018)

Despite scholars flagging important avenues for future research, they have not unveiled the foundations of coopetition's very roots: "mindsets that are fundamentally related to individuals and what they feel and do" (Huy, 2010 in Fernandez et al, 2018).

We fill in this gap and that, all things being equal, when one side switched to competition from cooperation, the other side will support and not adapt their behavior, reflecting an escalation of commitment (K. F. E. Wong, Yik, & Kwong, 2006). On the contrary, such behavior will be moderated in presence of a primed regret (Ku, 2008).

We study individual decision making in dynamic conditions of coopetition in the empirical setting of digital platforms and their complementors. In such context, platform and complementor cooperate, but both may also engage in competition. On the one hand, a complementor can easily provide its service or product to a competitive platform (same app developer work for the Google Play and Apple App Store). On the other hand, a platform can

enter the product space of its complementors, issue known as the spread fear of “Amazon is coming” or the platform envelopment strategy (Eisenmann, Parker, & van Alstyne, 2011). As there is a variation in intensity of cooperative and competitive behavior (boiling down to variation in coopetition), this setting is particularly useful to study coopetition (Kang, 2017; Ritala, Golnam, & Wegmann, 2014; Zhu & Liu, 2018).

We implemented a lab experiment on a group of graduate students with interest in digital platforms and strategy that have skills to be mobile app developers. We randomly assigned a single scenario with a baseline condition or a manipulation (primed regret). We found that indeed the likelihood of coopetition is lower in the non-treatment group, however this is, surprisingly, not because of an increased cooperation with the competing platform (escalation of commitment), but by the virtue of total withdrawal. For the treatment group, we found a higher likelihood of coopetition, driven by a sustained cooperation. Such cooperation was, however, seen by the respondents as means of ultimately outcompeting the partner by exploiting knowledge spillovers.

Our study bears important managerial implications for participants in platform markets. The transition from cooperation to competition and vice versa is fragile and very much depending on the expectations of the future.

2 THEORY BUILDING

While coopetition has been widely studied in the last two decades (Ann Peng, Yen, & Bourne, 2018; Bengtsson & Kock, 2014; Dahl, 2014; Fernandez, Chiambaretto, Le Roy, & Czakon, 2018; Pellizzoni, Trabucchi, & Buganza, 2018), scholars pointed to an existing gap related to understanding its micro-foundations (Huy, 2010 in Fernandez et al, 2018). In this paper, we integrate the literature on coopetition with the literature on micro-foundations and decision-making. We explore the

context of platform-complementor relations that encompass cooperation, but also competition (with another platform). We argue that increased competition from the focal platform directed at the complementor translates into increased uncertainty and study various drivers of complementors' subsequent decisions under uncertainty.

The existing literature pertaining to decision making under uncertainty established that individuals use heuristics (Kagel & Roth, 1995; Kahneman, 2011). Several biases have been uncovered in the related literature.

Research on organizational decision making has shown individuals exhibit strong tendencies to be locked into losing courses of action despite negative feedback (K. F. E. Wong et al., 2006). Scholars attributed such a behavior to cognitive and emotional aspects.

First, under exposure to a negative factor (such as feedback, or intensifying competition), we argue that individuals' minds process the information in a specific way. Two factors are at play here, the "self-verification" is a push towards a confirmation of individual's existing beliefs. The "self-enhancement" is an attitude by which individuals filter the information processed so that it does not hurt their self-esteem and enhances their feeling of confidence (Sieck, Merkle, & Van Zandt, 2007). Such an attitude leads, in a straight way, to a behavior aiming at maintaining the status quo, or confirmation bias (Kagel & Roth, 1995; Kahneman, 2011). The confirmation bias indeed leads, through a selective information processing and an emotional answer, to an underestimation of signals of threat and maintenance of the status quo (Bazerman & Moore, 2013).

Second, along similar lines, individuals tend to preserve the status quo because of past commitment in a preferential way (Sorenson & Waguespack, 2006)¹. Such behavior documented in collaborations research, where although a project is being threatened by failure (or simply under-

¹ Similar behavior, leading to negative performance outcomes has been found in management research and is known as over-embeddedness (Gulati & Gargiulo, 1999; Polidoro, Ahuja, & Mitchell, 2011; Uzzi et al., 2004)

performing), individuals continue to assign a significant amount of time and effort to keep going. A pattern of continuous, optimistic and perseverant efforts has been found, for instance in the context of entrepreneurial startups (Van Gelderen, 2012) and in the resources distribution in Hollywood industry (Sorenson & Waguespack, 2006), It has been found that, in particular, initial decision makers, such in case of entrepreneurial start-ups, experience difficulties in deviating from the taken course.

When faced or involved with a failing endeavor, people frequently escalate their commitment to that task. There is almost a tyranny of optimism and perseverance, an unwillingness to give up that may keep us on an unproductive path (Van Gelderen, 2012). This behavior can be explained on the basis of loss aversion (Kahneman, 2011; Koudstaal, Sloof, Praag, Koudstaal, & Sloof, 2016; Molden & Hui, 2010) or justification of prior decisions. Individuals indeed identify with the choices they make, which makes a de-escalation to a particular challenge. Escalation of commitment has been even proved to drive individuals' decision in spite of an indication of transparent, lower future outcomes (Karlsson, Gärling, & Bonini, 2005). Furthermore, sunk costs are another driver or escalation of commitment. "Sunk cost is the irrational tendency to persist with an initial investment despite the availability of better option" (Magalhães & White, 2013 in Thompson, 2013). As individuals invest in a project or task, they find it difficult to disengage from something they feel close and committed.

Based on the tendency of individuals preserving the status quo under uncertainty, by self-verification, enhancement and escalation of commitment, we hypothesize as follow:

H1: Under intensified competition from the platform, complementors will seek to increase the cooperation with the focal platform (by the same, complementors may withdraw from other competing relations with other platforms, therefore decreasing the likelihood of coopetition with the focal platform).

The extant literature regards escalation of commitment as a copying strategy under condition of uncertainty. Such strategy however turns out to entail negative consequences for the persistent individuals. The literature proposed accordingly several moderations to the escalation of commitment.

The escalation of commitment was found to be negatively correlated with presentation of broader motivations of growth (Molden & Hui, 2010).

Regret, and in particular anticipated regret, has been found to particularly enhance the escalation of commitment (K. Wong & Kwong, 2007). Individuals may avoid withdrawal from a failing project or task simply because of the intolerable premonition of feeling of loss². However, the same regret felt synchronically (or primed to individuals under condition of escalation of commitment), drives the escalation of commitment down (Ku, 2008). Therefore, keeping the level of past commitment constant, we theorize:

H2: Under intensified competition from the platform and in the presence of primed regret, complementors will seek to decrease the extent of cooperation with the focal platform (by the same, complementors may engage in other competing relations with other platforms, therefore increasing the likelihood of coopetition with the focal platform).

3 EMPIRICAL SETTING

3.1 Choice of empirical setting

We studied decision-making patterns as drivers of coopetition in the empirical setting of a digital platform- complementor relation. There are several reasons for choosing this setting.

First, there is a baseline relation of cooperation between the platform and complementors. On the top of such relations, both: platform and complementors frequently compete. Such situation arises when complementors sell their products to a competitive platform. As such, this setting offers a unique opportunity to study coopetition in a context of varying cooperative and competitive relations between a platform and a complementor.

² The research demonstrates that such anticipated regret has the same effect as the regret over the past (such as initiating past actions).

Second, with the raise of digital platforms, the complementors flourished. They often are entrepreneurial startups that work closely with a platform to fulfill specific needs and develop high level of complementarities (sometimes even resulting in the so-called envelopment by the platform). This characteristic allows us to study decision making, as individuals who make initial decisions to join the platform (entrepreneurs) are mostly the same who make the decisions to continue under different circumstances.

Finally, as the coopetition intensity changes (such as in the case of an intensified competition imposed by one of the parties), the uncertainty about future outcomes of coopetition increases. This allows us to study the particular types of decision making under uncertainty.

3.2 Characteristics of platform-complementors' relations

The empirical phenomenon of platform markets kept on gaining tractions in today's economies with, estimated, four out of top five and seven out of top ten world's largest firm use a platform business model (Financial Times, 2018) as do nearly 60% of billion-dollar "unicorn" startups (Moazed, 2016).

There is a baseline cooperation relation between the platform and a complementor, selling products on the platform. Due to indirect network effects complementors value of participating in the platform increases by reaching multiple customers, while the platform ensures a critical mass of products and/or services to attract more customers. Driven by such network effects, platform-complementor cooperation, may simply thrive by the virtue of the creative participants (Iansiti & Levien, 2004).

However, a powerful platform may also choose to enter the product spaces of its sellers when, for example, there is a potential for value appropriation from a successful product (Zhu & Liu, 2018).

Another reason for entering complementor's space arises when the platform owner is not satisfied with sellers/complementors' products (Gawer & Cusumano, 2002; Gawer & Henderson, 2007). Inversely, a complementor may offer the same product or service to two different platforms. This phenomenon is known from Apple and Google: both firms run marketplace platforms for mobile apps. A complementor

may decide to work with both platforms at the same time as no exclusivity agreements bound the app developer to only one of the platforms. Moreover, as Google and Apple develop their own apps they may introduce a competition element to otherwise a cooperative baseline relation with their respective competitors (the exact topic of our experiments).

We introduce an important assumption here. While it is rational for the complementors to expect some level of competition from the platform cooperating with, we argue that, the complementors will expect such to arise from other platform complementors (and a platform decision to allow for products or services similar to those of the focal complementors). We claim that this is given by the accepted rule of no exclusivity. We assume, on the contrary, that a situation in which the complementors face a direct competition from the platform will entail a degree of uncertainty about the future platform-complementor relations. First, it is common that products and services are developed by joint efforts between platform and complementors (so-called high complementarities in production Jacobides, Cennamo, & Gawer, 2018) and, as such, the complementor may fear that the platform will use their strategic knowledge to design a better quality or service. Second, reputation of both players kept constant, the complementor may fear that the platform will use its marketing skills and simply better bargaining position in order to promote their own app and take over the market shares. One could indeed imagine that a platform's own service or product could be immediately bundled with other product (such as hardware in case of Apple or Google) on promotional conditions. This could significantly affect the complementors' competitive advantage. Third, only by the entry decision, the platform may signal that the quality of complementor's product or service is inferior. Customers or other partnering platforms are likely to react upon such signal by reducing the use of switching to a different product, which may again affect the focal complementor's competitive advantage.

To sum up, we argue that if the platform adds a competitive element to the existing cooperative or competitive relations with a complementor, it entails a significant uncertainty about future of the relation.

4 METHOD

We designed and implement a between-subjects lab experiment to study the behavioral drivers of cooperation and its stability under a condition of an intensified competition.

4.1 Participants

We gained access to a lab in one of leading business schools in Denmark. We targeted a group of graduate students as respondents of our experiment. The group was carefully selected. Although the students have limited work experience in different positions related to a firm's digital strategy, they are active in strategy and Information System fields, especially course about digital platforms, and therefore should have an in-depth understanding of the empirical context. On this premise, we judged them as capable and skilled enough to provide insights into our topic of interest.

4.2 Materials and method

In the initial setting, we sketched a cooperative complementor-platform relation, in which the complementor sells products through two competitive channels. Accordingly, the introduction summarized the existence of both competing platforms along with their activities in the field of complementor's product. The respondents were forced to identify with the complementor.

To such a setting, we added a condition of intensified competition from the platform to complementor. One of the partnering platforms indeed introduces a product similar to the one of the focal complementor directly to the market.

In the first scenario, the respondents were told that they committed a lot of time and effort to the ongoing cooperation with the platform that initiates direct competition (skewed in comparison to the other platform that the complementor works with). The other scenario contained the exact same formulations plus a "primed regret"- mention of regret while visualizing the future

cooperation with the competing platform, the respondent feels a regret. We subsequently randomly assigned one of these two scenarios were to the respondents.

We provide the exact text of the scenarios below:

You are the CEO of a small entrepreneurial venture. Your product is an AI-powered photo editing app that is available in a similar form on both Apple App Store (iOS) and Google Play Store (Android) You made certain initial financial and coordination investment in the development of the app before launch dedicated mostly to the Android app. (When you now imagine your future cooperation with Google you feel like you will regret it). Google has just released a new version of their free Photos app, which includes a very similar AI-powered photo editing functionality like in your app. Please rate how likely you are to :

The respondents were presented with several choices/decisions. These in turn, were design to capture the degrees of sustention or withdrawal from cooperation and competition in the complementor-platform relation, they include:

- 1) keeping the app on Google Play store and continue to invest in updates on both platforms
- 2) as above but only invest in updates on Android
- 3) keeping the app on Google Play store but only invest in updates on iOS
- 4) remove the app from Google Play Store completely, only focus on developments of iOS
- 5) keep app on both stores but stop investing in updates
- 6) shut down the business completely removing apps from both stores

Once a respondent made a decision in an assigned scenario, we provided her or him with an opportunity to elaborate on the main reasons of such. We ended the survey with a set of demographics such as gender, education level, age, work experience, entrepreneurial venture and the latter in the context of on-line platform market. This part of the experiment also included ten

items measuring personality (Rammstedt & John, 2007). Additionally, we added one question that aimed at assessing whether the respondents read carefully the presented scenarios. All materials are available upon request.

The experiment took place under a supervision of a university professor. The respondents were instructed about the anonymity and confidentiality of the study as well as of the importance of their honesty in answer. The supervising staff made sure there were no interruptions and no contact between the respondent during the session.

4.3 Dependent variable

We constructed the dependent variable, *coopetition*, to capture the intensity of coopetition in the complementor-platform relation. It is contingent on two elements, outlines as basis of coopetition: cooperation and competition. We evaluated the cooperation element based on investment in: i) keeping the product on the platform and ii) investing in updates. If the complementor ends the cooperation with the focal platform completely (choices 6 and 4) *coopetition* takes the value of zero. If the cooperation is sustained along the first dimension (keeping the product in the stores) and/or both dimensions for the competing platform, the *coopetition* takes the value of one (choices 5 and 2). Furthermore, if the cooperation is sustained along both dimensions (keeping the product in stores and investing in updates), and this for both platforms, *coopetition* takes the value of two (choice 1). Finally, *coopetition* takes the value of three in case if the cooperation is sustained with the competing platform to the minimum extent (keeping the product in the store) and the total effort is switched to the competitor (developing updates, choice 3).

As an alternative, we also constructed a dummy, which takes the value of zero in the exact same instances as outlined above and value of one for the remainder. Both variables yielded similar results.

4.4 Independent variables and controls

We create a dummy *treatment* that takes the value of one for all decisions made for the scenario including a primed regret, zero otherwise.

In order to rule out that other factors drive our results, we included controls for gender, age, work experience and the level of education and ten items measuring personality traits.

5 RESULTS

We collected 53 observations. We first checked for the presence of outliers. We eliminated four observations because of wrong answers to the mentioned check question. This left us with 49 usable observations. Twenty-three of these were choices of respondents from the non-treated group, the remainder originated from the treatment group.

We further checked if the randomization was implemented correctly. We namely run a series of tests to see whether an assignment to one of the groups (treatment/vs. non-treatment) was contingent on demographics such as age, gender, working experience or level of education or personality traits. None of the variable varied significantly across the two groups; we therefore concluded that randomization was successful.

We analyzed the decisions related to cooperation in both groups. Table 1 below reports our first finding. A simple t-test corroborated our theorizing that, *ceteris paribus*, the treatment group (primed regret) will display higher propensity to cooperation.

Insert Table 1 about here

The difference in means of the treated vs. non-treated are significant in a one-sided test (0.03) indicating that the means are significantly larger for the treated group.

We further run a regression analysis using a simple OLS framework for a continuous dependent variable³ in the Model 1 (M1). We use the dummy *treatment* and the set of controls in the Model 2 (M2). We present the results in the Table 2 below.

Insert Table 2 about here

The findings from the OLS and logistics regressions demonstrate that being part of the treatment group significantly affected the cooperative decisions of respondents: as compared to the other group, the “treated” were significantly more likely to engage in cooperation. This is signaled by the coefficient of the *treatment* variable in both models, which is significant at, respectively, three and 2 percent level.

We further analyze the exact frequency of choices (1-6). According to our theorizing, we expect the lower propensity to cooperate to be driven by respondents over-committing to exclusively the focal (competing platform) in the not-treated group. Table 3 demonstrates that, although, in absolute terms, a large part of respondents (13) escalated by continuing to cooperate, respondents from this non-treated group withdrew from the cooperation. Both: the withdrawal and cooperation has been disproportional when analyzed in relative terms. While altogether there were six withdrawals in the non-treated group, there was only one equivalent decision in the treatment group. Thirteen respondents voted for the continued cooperation in the non-treatment vs. twenty-one in the treatment group.

³ We currently prepare a series of robustness checks where the dependent variable will be treated as an ordinal one.

Insert Table 3 about here

The higher intensity of cooperation in the treated group, was, in turn, driven mainly by the behavior of respondents continuing to cooperate, or simply doing “business as usual”. The distribution of extreme cases (minimal investment in keeping the product in the store but switch to fully develop for the platform’s competitor- captured by *coopetition*: 3) were distributed equally among respondents in the two groups (3/3). The main difference in the cooperative behavior between the two groups was therefore driven by the disproportionately high trend to keep the status quo by the treated group.

6 DISCUSSION AND CONCLUSION

The disproportional withdrawal tendency (or the relatively lower escalation) that drives the propensity to cooperation in the non-treated group might be driven by several factors. First, although the respondents in both groups did not display any differences across a range of demographics there might have been a higher risk aversion among the non-treated. The qualitative insights that the respondents volunteered corroborated this perspective. The fear of a “giant” competing against them was too much to bear in the opinion of all five respondents who withdrew. Alternatively, the empirical setting of platforms with a high speed of activities and intertwined competition and cooperation simply leaves only some space to the escalation of commitment. On the contrary, the respondents volunteered that, keeping an open door at the competing platform, might be a way to benefit from interesting spillovers (“to keep the options open in case of innovative ideas come through”). The spillover mechanism can be another characteristic of the setting that affects respondents’ choices so that the more risk averse opted out and others remained hoping for unintended developments. Several respondents voting for the “business as usual” (thus demonstrating some escalation of commitment) believed in a lock-in effect that would ensure that

their users would stick with them, instead of switching to the competitive product from the platform.

We symmetrically analyze the finding on the disproportionately higher tendency to stick with the “business as usual” in the treated group. The qualitative insights point to mechanisms present in the non-treated group too: lock-in effect, but also curiosity (“wait and see as the value of competitors’ product is not certain”) and optimism (“prospects of being bought by the competitor”). While our randomizations checks ruled out that that both groups display different personality traits, we believe that the characteristics of the empirical setting might drive our results. The baseline of the non-treated group displayed tendency to commitment higher than withdrawal. The trend to commitment however increased, instead of decreasing in case of the treated group. We believe that the characteristics of the empirical setting, namely cooperation that might be considered as a way of competing through knowledge spillovers, could drive such effects of our manipulation. This is an important finding that further contributes to the literature on cooptition and its micro-foundations.

Our study has implications for platforms and complementors. Foreseeing and learning about relations in changing competitive landscape is strategically important. In addition, our study demonstrated that the expected behaviors might vary depending on the context. Context-dependent behavior involving cooperation and competition are interesting topics for future research.

We suggest that future research also addresses the limitations of our study. First, researchers could further explore micro-foundations of cooptition in different settings. Second, future studies could target audiences other than students and possibly also with experimental methods including games.

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Table 1 Results of the lab experiment: t-test

	Non-treatment	Treatment (primed regret)
Coopetition (mean)	1.56	2
Number of observations	23	26

Table 2 Results of the lab experiment: regression analysis

	M1: continuous dependent variables	M2: dummy dependent variable
Intercept	0.90 (0.84)	15.38 (12.84)
Treatment	0.24 (0.11)	5.04 (2.28)
Gender	0.05 (0.13)	3.07 (1.76)
Job	0.32 (0.24)	1.27 (2.03)
Set of personality controls	YES	YES
R-squared /Pseudo R2	0.26	0.39
Number of observations	49	

The table provides the coefficients and robust standard errors in parentheses.

Table 3 Frequency table: split of coopetition by treated vs. non-treated

Coopetition	Non treatment	Treatment	Total
0	6	1	7
1	1	1	2
2	13	21	34
3	3	3	6