Strategy Trickle: How an Industry's Dominant Players Strategies Impact Complementors' Performance

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Abstract

By examining how the value of the inter-firm cooperation resource is mediated and varies depending on the strategies of platform developers, this study contributes to the resource-based view, in particular to its discussion regarding the resource value estimation. We show that the inter-firm cooperation between product suppliers and platform developers increases product quality and product visibility and, consequently, improves product performance of suppliers. We also demonstrate that the effects of product quality and product visibility depend on the platform developers’ strategy. The analysis is based on video game industry with unique panel data spanning from 1995 to 2014.
INTRODUCTION

In a modern business world, it is almost impossible to find a firm that works autonomously and does not have any cooperative ties. Even small bakeries require partners to provide them with resources that cannot be developed internally. Therefore, the performance of firms should not be considered in the vacuum (Galaskiewicz and Zaheer, 1999; Gulati, 2000). With this paper, we contribute to academic literature that focuses on studying the role which inter-firm cooperation plays in the performance of individual firms. In particular, we address the question of how inter-firm cooperation between a platform developer, on the one side, and suppliers of products based on these platforms (further in the text - suppliers), on the other, impacts product performance of the latter.

Gulati et al. (2000) emphasize that inter-firm cooperation can be viewed as a unique resource for each individual firm. It brings different tangible and intangible assets which strengthen firms’ competitive advantages (Walker and Poppo, 1991). Firms in inter-firm cooperation networks benefit from the access to financial resources, new markets (Hitt et al., 2000), new production facilities (Teece, 1986), new knowledge (Powell et al, 1996), and new technologies (Ahuja, 2000). Building on the resource-based view (in particular, its argument that uniqueness of resources is one of the key prerequisites of competitive advantage) we analyze to what extent and via which channels inter-firm cooperation with platform developers, as a resource, affects product performance of the suppliers.

As channels, we explore two ways by which suppliers may improve product performance based on inter-firm cooperation. The first one is enhancement of product visibility (product
push); the second one is improvement of product quality (product pull). Product visibility attracts consumer attention via promotional activities while product quality attracts consumer attention via products’ characteristics that are relatively better compared to other products on the market (Karray and Sigue, 2016; Moon and Kamakura, 2016).

The effects of the product visibility and product quality on product performance of suppliers may vary depending on the platform developers’ strategy (McEvily and Zaheer, 1999). Some platform developers may choose a strategy of direct competition and try to outperform competitors by providing a superior platform and complementary assets. Others may choose a strategy of avoidance of direct competition and try to conquer unoccupied market’s niches or create new niches (Cennamo and Santalo, 2013; Megerian, 2007). We assume that the platform developers’ strategy may moderate the effect of product visibility and product quality and, hence, the effect of inter-firm cooperation resource. Platform developers that are involved in direct competition may have higher demands for suppliers’ product quality and product visibility than platform developers that avoid direct competition. In order to identify whether this is the case we include platform developers’ strategy in our conceptual model as a moderator.

Along with academic literature that focuses on studying the role of inter-firm cooperation, this study contributes to the resource based-view theory. While being one of the strongest theories in economics and strategic management, the resource based view is still criticized for the lack of consistency in some key issues. The most visible and not easy to fill theoretical gap is the critics that the value of resources is not fully determined and usually simplified to monetary assessment (Kraaijenbrink et al., 2010). Our study aims to address this critic and show that the same single resource does not bring the same outcomes for all firms. Kor and Leblebici (2005) highlight that future sustainable competitive advantage of a firm is defined
not by the values of unique resources but by a synergy of different resources. Using the example of inter-firms cooperation resource our study shows that the value of this resource relies on other factors such as platform developers’ strategy. This suggests that while estimating the value of any resource one should take into account other complementary resources and influential factors.

In order to assess the effect of inter-firm cooperation resource on product performance of suppliers we select console video game industry as an empirical setting. This is a unique industry that permits to define and operationalize clearly the main constructs for this study, namely platform developers and suppliers, levels of integration between them, product visibility and product quality. This industry is populated by a few platform developers which compete with each other using various competition strategies. It is also populated by suppliers that develop complementary products for platform developers. Inter-firm cooperation between these two parties can be measured and classified. The information about product quality (quality of video game), product visibility and performance in terms of sales is available over time and can be operationalized upon collection. All these elements make video game industry an appropriate setting for our study.

This study provides valuable knowledge for managers of firms that are involved into inter-firm cooperation and occupy supplier position. More precisely the study allows better understanding of how two complementary but distinct factors, such as product visibility and product quality, mediate the effect of inter-firm cooperation on product performance of suppliers, and whether the mediating effects hold under heterogeneous platform developers’ strategies. The study also extends the discussion in the resource-based view theory about the correct way to determine the value of resources. With the conceptual design of the study and its results we aim to show how the value of resources can be defined via the assessment of the
synergetic impact of different factors. This is called to resolve the problem of resources’ value determination in this theory.

**CONCEPTUAL BACKGROUND**

The conceptual grounding of this study, above all, addresses the inter-firm cooperation literature. Studies in this stream are relatively diverse and discuss different aspects of inter-firm cooperation. The literature can be split in two streams. In the first stream scholars focus on studying the performance of the entire firms networks (Ozcan and Eisenhardt, 2009) whereas in the second stream the focus falls on the performance of dual inter-organizational relationships (interactions between two firms) or performance of a single firm in an inter-firm cooperation (Capaldo, 2007; Dyer and Singh, 1998; Samson, 2007). Based on this distinction, our study can be placed in the second stream of the literature because its main research focus is on the impact of inter-firm cooperation on product performance of suppliers.

The available studies explain well the main factors which affect the performance of a firm engaged into inter-firm cooperation. Among other, they discuss the impact of the network positioning on firms’ performance (Dolfsma and Eijk, 2016; Zaher et al., 2010), benefits of collaborative networks in terms of knowledge/technology acquisition or knowledge/technology sharing (Chesbrough, 2003), the impact of direct and indirect network links on firms’ performance (Ahuja, 2000), and the impact of technological diversity (or technological distance) of partners on the inter-firm cooperation performance (Samson, 2007). At the same time, relatively little is known about the effect of the level of integration of suppliers into inter-firm cooperation with platform developers on product performance of suppliers. Deep integration into inter-firm cooperation may bring better technology and knowledge exchange but it also makes firms (supplies) more dependent on their partners (platform developers) and, hence, less flexible in their business activities outside the inter-
firm cooperation. It remains unclear from the available studies whether deeply integrated suppliers into inter-firm cooperation perform better than less integrated ones.

Apart from inter-firm cooperation literature, the study builds on the resource-based view theory and addresses the criticism of this theory regarding inadequacy of resource value assessment. The main postulates of the resource-based view can be summarized as follows: (1) each firm has to develop a set of resources that allow acting in a competitive environment (Miller and Shamsie, 1996); (2) unique and hard-to-imitate resources provide firms competitive advantage (Lippman and Rumelt, 1982); (3) resources have to generate income or decrease losses. Miller and Shamsie, (1996) and Kraaijenbrink et al. (2010) highlight the need in conceptualization and operationalization of firms’ resources and their value assessment for better grounding of the resource-based view. Following (Kraaijenbrink et al., 2010), we aim to extend this theory via addressing one of its main critics by conceptualizing inter-firm cooperation as one of the main firms’ unique resources and assessing its value through synergetic effect of this resource and other factors on product performance of suppliers.

Focusing on inter-firm cooperation as a resource that brings benefits to product performance of suppliers via positive changes in product quality and product visibility, we also consider the impact of strategies of their partners (platform developers). In general, firms’ strategy can be described as framed behavior which facilitates the access to resources that bring competitive advantage and returns from investments (Barney, 1986). In other words, a strategy is the way of how a firm competes with other market players (Olson et al., 2005; Varadarajan and Clark, 1994). In inter-firm cooperation literature, strategy oriented studies are focused on economies of scales effect; technological leadership efforts (Thompson and Strickland, 1980); cost efficiency actions; geographical positioning of firms; and product
diversification benefits. At the same time, little attention is paid to such strategies as avoidance or engagement in direct competition in the context of inter-firm cooperation. Inter-firm cooperation between suppliers and platform developers implies that both sides are mutually depend on their strategic choices. Platform developers are less dependent since they can have a numerous suppliers and strategic choice of one of suppliers will not significantly impact them. On the contrary, a strategic choice of platform developers may significantly affect suppliers since, usually, there is a few platform developers in industry and any change in their activities influence their partners. Direct competition strategy and strategy of avoidance of direct competition pose different requirements for products and thus, for suppliers.

Similarly to the studies of Matsuno and Mentzer (2000), Olson et al. (2005), and Vorhies and Morgan (2003) that find that there is a moderating effect of firms’ strategy on relationships between firms’ organizational structure and firms’ performance, we propose our conceptual model that reflects moderating effect of platform developers’ strategy on interaction between product quality/product visibility and product performance of suppliers. The conceptual model is depicted in Figure 1.

**HYPOTHESES**

**Level of integration**

Generally inter-firm cooperation is established in order to outperform competitors outside the cooperative network (Hitt et al., 2000; Walker and Poppo, 1991). The level of integration in inter-firm cooperation depends on the strategic objectives of partnering firms and may vary across firms. Some firms engage in inter-firm cooperation to get access to resources or new markets while others use inter-firm cooperation to compensate lacking production facilities or
to complement their existing products or services (Grove, 1996). This variance in goals alters the level of integration between suppliers and platform developers (from low integration to full integration).

The level of integration in inter-firm cooperation differently affects product performance of suppliers. First of all, the deeper inter-firm cooperation, the more resources firms share. These can be both tangible resources (production facilities, equipment, real property, financial assets) and intangible resources (licenses, patents, brand names and others). Secondly, deep integration in inter-firm cooperation facilitates extensive technological and knowledge exchange. Knowledge is a firm’s specific asset. Technological improvement and knowledge enrichment boost firms’ performance. Thirdly, for suppliers, deep integration in inter-firm cooperation provides the access to new markets (Hitt et al., 2000). Suppliers may use the experience of platform developers in certain areas and with their support access inaccessible earlier markets. Fourthly, suppliers may get access to other suppliers via a platform developer. This allows extending already acquired resources and knowledge, and thus, improving performance. Fifthly, deep integration in inter-firm cooperation may allow avoiding mistakes which have already been made by other partners. Sixthly, deep integration in inter-firm cooperation facilitates economies of scale (Gulati et al., 2000) due to increase in the volume of production. Seventhly, deep integration in inter-firm cooperation allows creating partnerships that develop complementary products (Grove, 1996). Product complementarity is one of the main reasons why suppliers engage into inter-firm cooperation. The main benefit of it is that suppliers and platform developers do not compete with each other due to heterogeneity of their products but cooperate with each other due to product complementarity. This positively affects their performance. Eighthly, deep integration in inter-firm cooperation facilitates increase in speed of product development process (Powell,
1990) via shared routines (Gulati et al., 2000) and new technologies and knowledge. Ninthly, deep integration in inter-firm cooperation helps improving learning capabilities (Gulati and Lawrence, 1999), and accelerates speed of development of these capabilities (Grant and Baden-Fuller, 1995).

Deep integration in inter-firm cooperation may also negatively affect product performance of suppliers. Among the most common factors of the negative impact are: (1) opportunism of partners (Coleman, 1988; Rowley et al., 2000), (2) the harmful effect of exogenous factors such as technological change, and (3) negative effect of indirect ties within collaborative networks (Gulati et al., 2000). Firms may act opportunistically when get access to technologies, knowledge, collaborators, markets of their partners. Opportunistic suppliers may go into direct competition with their partners after they acquire all missing resources and assets. Thus, deeply integrated partners always consider the level of openness and resource exchange within inter-firm cooperation in order to avoid such negative outcomes.

Technological change may disrupt existing technologies and harm platform developers’ performance (Afuah, A., 2000; Leonard-Barton, 1992). Their suppliers may be locked into collaborative networks and lose their flexibility, ability to make decisions independently and enter new inter-firm cooperation (Gulati et al., 2000). Therefore, all negative consequences caused by technological change will be transmitted from platform developers to their deeply integrated suppliers. Suppliers may be a source of information to other unscrupulous suppliers with whom they are indirectly connected. A platform developer may favor one supplier over others and provide it with a better access to resources or even transfer knowledge from other suppliers to a preferred one which may negatively affect the performance of other suppliers.
We assume that the negative effects of inter-firm cooperation are outweighed by positive effects. We think that, in general, inter-firm cooperation positively affects the product performance of both platform developers and suppliers and all negative effects of inter-firm cooperation are side effects and do not impact product performance of suppliers with the same magnitude as positive effects. To validate our assumption we hypothesize following:

*HP1: The higher the level of integration in inter-firm cooperation, the better product performance of suppliers.*

**Mediation: product quality and product visibility**

All positive effects caused by inter-firm cooperation lead to changes in product visibility and product quality. These two aspects are interconnected and significantly affect product performance. Change in product visibility is significantly determined by market power of a platform developer. Usually suppliers have less market resources than platform developers; therefore, suppliers may compensate the lack of market resources via inter-firm cooperation with a platform developer and improve product visibility (Lei et al., 2008). Platform developers also benefit from cooperation with suppliers. An increased number of products released for a certain platform makes this platform more visible. Thus, joint promotional activities positively affect product visibility of both sides (Augustine and Cooper, 2009; Karray and Sigué, 2015; Varadarajan, 1986). The level of integration in inter-firm cooperation reflects the level of commitment to joint promotional activities. The deeper firms are integrated into inter-firm cooperation, the more resources they invest in joint promotion of products and, hence, the higher is product visibility.

In recent academic literature, product visibility is more and more associated with multiple online reviews and individual consumers’ reflections on products or services (Moon and
Kamakura, 2016). The higher number of online services and consumers who make product reviews the higher product visibility. Higher product visibility provides more information about products and affects consumers’ product choice (Ert, et al, 2016). In addition, consumers in general are risk averse and tend not to buy products with scarce information (Kahneman and Tversky, 1979). Therefore, it is more difficult for less visible products to affect consumers’ choice than for more visible products.

Similarly to product visibility, product quality significantly affects consumers’ choice (Olbrich, 2017). Logically to assume that consumers will buy products of higher rather than lower quality. Product price also affects consumer’s choice but Olbrich (2017) shows that consumers prefer products of higher quality over products of lower quality even if prices for products of higher quality are relatively high. Fluctuations in product quality makes consumers react respectively. A positive change in product quality increases consumers’ willingness to buy a product (Marquardt and McGann, 1975). At the same time, a negative change in product quality does not only decrease consumers’ desire to buy a product but also has a stronger effect than a positive change (Mizerski, 1982; Reinstein and Snyder, 2005; Shen and Wyer, 2008). Thus, product quality significantly influences product performance and should be considered as one of its key determinants.

Based on these considerations, product quality and product visibility play an important mediating role in interrelationships between the level of inter-firm cooperation and product performance of suppliers. We hypothesize the following:

*HP2a: The positive effect of the level of integration in inter-firm cooperation on product performance of suppliers is mediated by product quality*
**HP2b: The positive effect of the level of integration in inter-firm cooperation on product performance of suppliers is mediated by product visibility**

**Moderation: platform developers’ strategy**

The level of integration in inter-firm cooperation positively affects product quality and product visibility of suppliers and then their overall product performance. However, being a part (one of sides) of inter-firm cooperation, suppliers are dependent on platform developers’ strategic actions. Platform developers’ strategy does not only determines market position of platform developers but also affects market positions of their suppliers. This state of affairs makes managers of suppliers to consider their own strategic behavior in order to determine factors that affect product performance. Platform developers serve as a bridge between suppliers and consumers (Cennamo and Santalo, 2013) and any strategic move of a platform developer may reshape their existent consumer and supplier base. Hence, platform developers’ strategy may also change the effects of product quality and product visibility.

We distinguish two types of platform developers’ strategy that may differently affect product performance of suppliers. The first one is characterized by aggressive behavior that leads to direct competition with other platform developers for market dominance (Cennamo and Santalo, 2013). Pursuing this strategy, platform developers try to develop a wide range of products and complementary assets and attract as many consumers as possible (Caillaud and Jullien, 2003; Katz and Shapiro, 1994). The anticipated outcome of this strategy is suppression of all competitors and dominance on the market (Shapiro and Varian, 1999). For fulfillment of this strategy, platform developers have to increase the consumer and the supplier base (Eocman et al., 2006).
In order to increase the consumer base, a platform developer may apply the strategy of price dumping (Eisenmann et al., 2006). To do that, they need to have a sufficient amount of resources that allow promoting and releasing platforms with the pricing below the point of the payback. In time being, when the price dumping strategy is applied, platform developers may cultivate a sufficient variety of products that will attract a wide range of consumers (Eisenmann et al., 2006). In addition, for increase of product diversification, platform developers need to create appealing conditions for new suppliers and then enhance competition between all suppliers (Boudreau and Lakhani, 2009). In order to attract suppliers, platform developers may use licensing strategy to make formal agreements (Hagiu, 2009; Mantena et al., 2008); create alliances with strong suppliers; attract suppliers via cheap or free access to technology that facilitates product application on their platforms (e.g. program code, technological standards); and promote suppliers’ products. All these arrangements create inter-firm cooperation of different intensity between platform developers and suppliers which also influence the variety of suppliers’ products (Turner et al., 2010). All in all, platform developers’ strategy of direct competition creates tough business environment for their suppliers. Suppliers are forced to compete not only with other suppliers for the same platform but with suppliers of other platforms. This means that in order to outperform their competitors, suppliers need to develop products of relatively higher quality and visibility.

The second type of platform developers’ strategy is characterized by avoidance of direct competition with other platform developers. In order to fulfill this strategy, platform developers may try to satisfy those consumer needs which are not satisfied by existing products (Cennamo and Santalo, 2013); develop exclusive products that are not available on other platforms (Mantena et al., 2008); establish closed relationships with suppliers and prevent them from cooperation with other platform developers (Stennek, 2007); make
dissimilar products compared to other platform developers who pursue the direct competition strategy (Cennamo and Santalo, 2013; Megerian, 2007).

These actions of platform developers may lead to equalization of their suppliers that will develop products of the same types, standards and comparable quality (Lee, 2007). This will decrease competition for technological dominance among ‘standardized’ suppliers. This will also make impossible for suppliers to compete using product uniqueness and product technological superiority since they will have products with comparable designs and levels of quality (assumingly - high). The effect of product visibility may also decreases for such suppliers since they compete with the smaller amount of suppliers and they do not have to compete with suppliers for other platforms. All of this means that product visibility and product quality may vary in effects depending on the business strategy of platform developers. Based on this, we hypothesize the following:

HP3a: The effect of product quality is higher for the suppliers of platform developers that apply the direct competition strategy compared to the suppliers cooperating with platform developers that apply the strategy of avoidance of direct competition

HP3b: The effect of product visibility is higher for the suppliers of platform developers that apply the direct competition strategy compared to the suppliers cooperating with platform developers that apply the strategy of avoidance of direct competition

METHODS

Data

We use a console video game industry as an empirical setting for this study. Data about three main (mainstream) console developers (Nintendo, Microsoft, and Sony) were collected and merged in one dataset. Data were collected from related web-resources such as VGchartz;
GameRankings; MobyGames; GiantBomb; Statista\textsuperscript{1} with the assistance of Google Sheets software. Other web-resources were used to fill in missing data (LinkedIn, Wikipedia, and IGN). Acquired dataset covers the period between 1995 and 2014 and accounts 7073 observations.

Measures

**Dependent variable:**

*Product performance of suppliers* is estimated as a number of units (video games) sold.

**Independent variables:**

*Level of integration into inter-firm cooperation* reflects 3 levels of firms’ integration: level 1 (low integration) – independent suppliers; level 2 (intermediate integration) – subcontracted suppliers; level 3 (high integration) – suppliers owned by a platform developer.

*Product quality (mediator)* is operationalized as an aggregated critical review score ranged from 0 to 100 points. The same approach for measuring product quality is applied by Elliot and Simmons (2008) and Henning-Thurau et al. (2006).

*Product visibility (mediator)* reflects the number of resources where critical reviews for products are made. Among other factors in this specific industry, visibility is predetermined by a number of critical reviews made by different media resources. The more media resources discuss the product, the larger is a number of consumers covered.

*Platform developers’ strategy (moderator).* This is a dichotomous variable which reflects the type of strategy pursued by platform developers, with the aggressive one (direct competition type) and with the evasive one (avoidance of direct competition type). Microsoft and Sony

\textsuperscript{1} VGchartz (www.vgchartz.com); GameRankings (www.gamerankings.com); MobyGames (www.mobygames.com); GiantBomb (www.giantbomb.com); Statista (www.statista.com).
platform developers are considered to be firms that pursue the direct competition strategy while Nintendo is considered to be a platform developer that avoids direct competition (Cennamo and Santalo, 2013; Megerian, 2007). Based on this definition, we combine Microsoft and Sony platform developers in one category leaving another category for Nintendo platform developer.

**Control variables**

A set of control variables has been added to the model. We control for (1) the age of suppliers; (2) speed of release of a new product for a new platform (Speed of release), operationalized as the time span (a number of days) between platform and product’s releases; (3) geographical location of suppliers, operationalized with a set of dummy variables (Europe, North America, Other countries and missing values); (4) level of competition within the industry (Level of competition), operationalized as a number of released products (video games) per annum; (5) type of a product or a genre of a video game, operationalized with dummy variables (video game genres were combine in six related categories); (6) season of sales, operationalized as a dummy variable (with the pick of sales falling on November and December); (7) promotional power of video game publishers (Promotional power), operationalized as a number of products promoted by a video game publisher prior to the release of each video game; (8) sequel, operationalized as a dummy variable that reflects whether a new product (video game) is a ‘spiritual’ successor of previous products; (9) number of developed products, operationalized as a number of video games that had been developed by suppliers prior to the release of a new video game; (10) depth of experience, operationalized as a number of products released for a single platform by a certain supplier; (11) breadth of experience, operationalized as a number of different generations of the same

Video game publishers are responsible only for promotion and distribution of video games. Video game publishers are third party firms in interaction between platform developers and suppliers. These firms provide additional promotional benefits besides those which are provided by platform developers.
platform for which suppliers released products (video games); (12) number of platforms per product operationalized as a number of platforms for which one certain video game has been developed; (13) number of platforms per supplier; operationalized as a number of platforms for which suppliers develop video games.

Analysis

To estimate the mediation and moderation effects we applied the Baron and Kenny’s (1986) general approach. First, we used a 4-step analysis to estimate the mediation effect. Second, we computed a moderator variable with mediators to estimate the moderation effect. Before the analysis, the independent variable, the mediators and the moderator were mean centred. An ordinary least squares (OLS) regression was applied. We also excluded outliers from the analysis, namely the observations with Product quality lower than 30 and excluded cases where exact sales are not available. The dependent variable - Product performance of suppliers - is skewed to the right; hence, in order to apply OLS regression analysis we performed its log transformation. Descriptive statistics and the correlation matrix are provided in Table 1.

INSERT TABLE 1 ABOUT HERE

RESULTS

INSERT TABLE 2 ABOUT HERE

INSERT TABLE 3 ABOUT HERE

In order to test our hypotheses, we ran the analysis in several steps. Firstly, we test the direct effect of IV on DV. The results of the first step (Table 2, Step 1) confirm Hypothesis 1 that there is a positive and significant direct effect of Level of integration in inter-firm cooperation (IV) on Product performance of suppliers (DV) ($\beta = .103; p<.001$).
Secondly, in order to test the mediation effect of Product visibility and Product quality we ran 4 analyses (4 steps). The first analysis has to show the significant direct effect of IV on DV. The second analysis has to show the significant direct effect of IV on Mediator. The third analysis has to show the significant direct effect of Mediator on DV; at this step IV is excluded from the analyses. The forth analyses has to show the significant direct effect of Mediator on DV and the insignificant direct effect of IV on DV; at this step both IV and Mediator are added to the analyses. When the conditions of each analysis of the mediation test are met, the full mediation effect can be confirmed (Baron and Kenny, 1986; Judd and Kenny (1981). Performing this test we acquire the following results. The first analysis was described earlier and has met requirements of the test (Table 2, Step 1) ($\beta = .103; \ p<.001$). The second analysis shows that there are positive significant direct effects of Level of integration in inter-firm cooperation on Product visibility and Product quality (Table 2, Step 2) ($\beta = .139; \ p<.001$ and $\beta = .081; \ p<.001$, respectively). The third analysis shows that there are positive statistically significant effects of Product visibility and Product quality on Product performance of suppliers (Table 2, Step 3) ($\beta = .422; \ p<.001$ and $\beta = .389; \ p<.001$, respectively). The forth analysis shows that the direct effect of Level of integration in inter-firm cooperation decreases (Table 2, Step 4) ($\beta = .031; \ p=.004$) when both Product visibility and Product quality are included in the model (Table 2, Step 4) ($\beta = .309; \ p<.001$ and $\beta = .299; \ p<.001$, respectively). Since there is still a significant direct effect of Level of integration in inter-firm cooperation we cannot claim that there is a fully mediated effect. However, the decrease in the effect of Level of integration in inter-firm cooperation when both mediators are added to the analyses allows us to claim the presence of a partial mediation which partly confirms Hypothesis 2a and 2b.
Thirdly, the further results show that there is a moderated mediation effect (Table 3) as both mediators are affected by the moderator. The positive effect of Product quality is higher for platform developers that pursue the strategy of direct competition (Table 3) ($\beta = -.072; p=0.000$), while, surprisingly, the positive effect of Product visibility is lower for platform developers that pursue the strategy of direct competition (Table 3) ($\beta = .056; p=0.000$). In the regression analysis, platform developers that pursue the strategy of direct competition are in the reference category. These results support Hypothesis 3a but reject (by finding an opposite effect) Hypothesis 3b.

To visualize the regression results, we plotted the moderation effects in Figures 2 and 3. The dashed line represents Product performance of suppliers under the business strategy of avoidance of direct competition (Nintendo platform developer), the solid line represents Product performance of suppliers under the business strategy of direct competition (Sony and Microsoft platform developers).

The control variables show following results: Age of suppliers positively affects Product performance of suppliers (Table 3) ($\beta = .028; p=.032$); Speed of release shows that the longer suppliers wait the higher Product performance of suppliers they reach (Table 3) ($\beta = .076; p<.001$); suppliers in North America have better Product performance of suppliers than in Europe and the rest of the world countries; Level of competition positively affects Product performance of suppliers (Table 3) ($\beta = .061; p<.001$); products genres varies in levels of Product performance of suppliers; Product performance of suppliers is significantly higher when there is a Christmas season (Table 3) ($\beta = .072; p<.001$); Promotional power
positively affects Product performance of suppliers (Table 3) ($\beta = .128$; $p<.001$); sequels have better Product performance of suppliers than their predecessors (Table 3) ($\beta = .053$; $p<.001$). The rest of control variables are not significant.

**DISCUSSION AND CONCLUSION**

In the study we analyze the impact of inter-firm cooperation on product performance of suppliers. We analyze how the effect of inter-firm cooperation is mediated by product quality and product visibility and how this mediation is moderated by platform developer’s strategy. Such a synergetic estimation of the value of resources aims to ease critics which prevails in the resource-based view about inadequacy of resource’s value estimation (Kraaijenbrink et al., 2010). The analysis shows that the same nominal value of resources may vary depending on different contextual factors. Thus, in order to avoid such critics and adequately estimate the value of a certain resource, one should determine all key factors that may affect it and estimate their synergetic effect. The prior studies have not applied such an approach and our conceptual model is called to fill in this gap in the literature.

We found that the effect of inter-firm cooperation is partly mediated by product quality and product visibility. The main effect of inter-firm cooperation keeps its significance ($p =$) while its impact on product performance of suppliers decreases ($\beta =$). This means that the effect of inter-firm cooperation is not only mediated by product quality and product visibility but also by other factors (constructs) that are not included into our conceptual model. It lies beyond the scope of our study to determine all factors (constructs), which mediate the effect of inter-firm cooperation, and we leave it for future research.

The moderating effect of platform developers’ strategies shows somewhat unexpected results. We assumed that all suppliers of platform developers that follow the strategy of direct competition would have higher performance in product quality and product visibility
compared to the suppliers of platform developers that avoid direct competition. We built our hypotheses on the assumption that the competition among suppliers of the first group will be intense which would lead to better performance in product quality and product visibility compared to the second group. The analysis shows that suppliers of platform developers that follow the strategy of direct competition perform better in product quality while suppliers of platform developers that avoid direct competition perform better in product visibility. This is a surprising result that may be interpreted differently. Among other things, it may imply that (1) platform developers that avoid direct competition contribute more to the promotion of their suppliers’ products than platform developers that engage into direct competition; (2) a higher diversity of products for competing platforms may diffuse customers’ attention that will lower the average level of product visibility; (3) suppliers of platform developers that avoid direct competition may use uniqueness of the platform and thus attract more user/customer attention and increase product visibility; (4) apartness of platform that avoids direct competition may cause creation of user-specific products which may lead to better user-awareness about the majority of products for this platform while broadness (in terms of users) of platforms that are involved into direct competition may lack this; (5) there can be a relatively smaller amount of brands or titles for suppliers of platform developers that avoid direct competition, therefore it is easier for them to promote these brands or titles than for suppliers of platform developers that engage into direct competition and have significantly higher amount of brands or titles.

The study also provides valuable knowledge for firms involved in inter-firm cooperation and especially for suppliers of products for certain platforms. There are numerous platform specific industries and firms that plan entering such industries as suppliers may benefit from this study. The awareness about the difference in benefits from product quality and product
visibility regarding platform developers’ strategy may help suppliers to build appropriate product developing strategies. The study also provides valuable knowledge for platform developers who control their portfolio of suppliers and may change it in accordance with their strategy and competencies in product quality or product visibility.

The sample size and methods of data analysis make the results of this study robust. However, additional qualitative studies or survey research may explicitly explain the results. The difference in impacts of product quality and product visibility regarding strategies of platform developers needs better explanations since our initial assumption was that both factors will be more important for suppliers of platform developers that are involved in direct competition. It is also interesting from the theoretical and practical perspectives to know what other product related factors besides product quality and product visibility are affected by inter-firm cooperation. We assume that further qualitative studies may shed light on these questions.

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Annex

Figure 1. Conceptual model
### Table 1. Descriptive statistics and the Correlation matrix

<table>
<thead>
<tr>
<th>Variable</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>1</th>
<th>2</th>
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N = 7073; * P<0.05; ** p<0.01
Table 2. Regression results for Product performance of suppliers (Mediation)

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* p<0.05; ** p<0.01; *** p<0.001

Notes: All reported coefficients are standardised. Control dummy variables which reflect genres and geographical location were included in the model but excluded from Table 2 in order to make it easy to read. Standard errors are indicated in parentheses.
### Table 3. Regression results for Product performance of suppliers (Moderated mediation)

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<td>Product quality</td>
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<tr>
<td>Platform developers’ strategy</td>
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<td>0.049*** (.035)</td>
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<td>Product visibility × Platform developers’ strategy</td>
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<td>-0.072*** (.002)</td>
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<td>0.028* (.000)</td>
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<td>0.076*** (.001)</td>
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* p<0.05; ** p<0.01; *** p<0.001

*Notes: All reported coefficients are standardised.
Control dummy variables which reflect genres and geographical location were included in the model but excluded from Table 3 in order to make it easy to read. Standard errors are indicated in parentheses.*
Figure 2. Effect of product quality on product performance of suppliers for varying platform developers’ strategies

Solid line – Strategy of direct competition (Sony and Microsoft platform developers)
Dashed line – Strategy of avoidance of direct competition (Nintendo platform developer)
Figure 3. Effect of product visibility on product performance of suppliers for varying platform developers’ strategies

Solid line – Strategy of direct competition (Sony and Microsoft platform developers)
Dashed line – Strategy of avoidance of direct competition (Nintendo platform developer)