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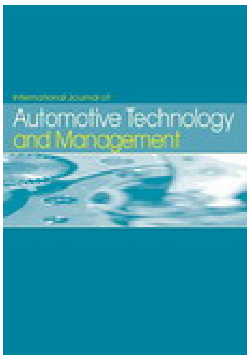


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# Tech play and global play in the automotive industry – mediating goal conflicts with platform-based ecosystems

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**Abstract:** To maximise profits, traditional automotive companies have to invest heavily both in new technologies, e.g., for connectivity, autonomy and sharing, as well as in international operations in the international growth markets. At the same time, capital markets are pushing automotive companies very strongly towards 'asset-light' strategies. Therefore, multinational automotive companies are now increasingly facing goal conflicts between investments and 'asset-light' strategies, for which they have to seek solutions through mediation. It is expected that the use of digital platforms across company and country boundaries in innovation and transaction ecosystems can significantly reduce the use of resources. Hypotheses have been derived and tested in an empirical study of 286 global automotive companies. The results show that it is possible to realise 'asset-light' strategies of technology expansion and internationalisation in ecosystems and to mediate goal conflicts.

**Keywords:** ecosystems; goal conflicts; mediation; global play; tech play.

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## 1 Introduction

Recently, profit pools in the automotive industry have been moving downstream towards smart mobility solutions and upstream towards networked and self-driving vehicles, i.e., they are shifting towards a 'tech play' (e.g., Adner and Lieberman, 2021). At the same time, the growing automotive markets as the target of a future 'global play' lie outside the traditional triad markets of North America, Europe and Japan (see Ghauri et al., 2021 and the sales forecasts up to 2030, e.g., IHS Markit, 2022) as well as the local knowledge from these markets is important for multinational companies (Meyer et al., 2020). In order to maximise profits, traditional automotive companies need to make high investments in connectivity, autonomy, sharing and electrification (CASE technologies) in competition with technology companies (e.g., Llopis-Albert et al., 2021) while simultaneously strengthening their global supply chains (Contractor, 2022) and their inter-national operations outside the triad markets (e.g., Cha, 2020).

The above-mentioned need for capital-intensive (automotive) companies to invest in both new technologies and new markets (see also e.g., Cennamo, 2021; Covarrubias, 2018; Nambisan et al., 2019) conflicts with the fact that capital markets are simultaneously pushing these companies toward 'asset-light' strategies. Particularly with international activities, additionally, a tendency towards slowbalisation or de-globalisation (e.g., Petricevic and Teece, 2019) is becoming increasingly visible with 'increasing pressures for the back shoring' to reduce depth and scope in inter-national operations (e.g., Kafouros et al., 2022) and break down global supply chains.

These conflicting requirements or goal conflicts (e.g., Kaplan, 2019; Ozanne et al., 2016; Uzzi, 1996) in the corporate environment between necessary investments in tech and global play and the pressure towards asset-light strategies and disinvestments are also seen by Jacobides et al. (2016) as major challenges for capital-intensive companies. In tech play, there are conflicts between essential investments in new technologies and asset-light strategies of concentrating on traditional technologies (e.g., Cusumano et al., 2019; Ceccagnoli et al., 2018; Gawer, 2021). In global play conflicts between essential investments in global markets and asset-lightness as well as de-globalisation strategies to reduce international operations are apparent (e.g., Cha, 2020; Luo and Witt, 2022). Between tech and global play additional conflicts regarding investing in new technologies and investing in global markets arise (e.g. Kim et al., 2020; Luo, 2022).

With such conflicting goals in tech and/or global play, neither a decision in favour of one of the goals (Daniels et al., 2019) nor complete achievement of both goals is possible. That is, the conflicts cannot be resolved (e.g. Gavidia, 2016), either in a hierarchy or through negotiation or competition (Proff, 2018). Therefore, the literature suggests balancing such intractable conflicts and seeking mediation solutions (Arregle et al., 2013; Gavidia, 2016; Kolb and Faure, 1994) or 'third variables' (e.g., Scharmer, 1995, e.g., p.634) to mediate them.

So far, MNEs have usually been able to mediate goal conflicts relating to the global play with steadily increasing capital investments. One example is the mediation of the goal conflict between cost leadership and differentiation (Porter, 1985) with hybrid strategies (e.g., Pertusa-Ortega et al., 2009) as a 'third variable' based on platforms and identical parts in vehicles (Proff, 2000).

Today, capital-intensive mediation solutions are no longer possible, as capital markets are no longer willing to provide much money to capital-intensive companies (e.g., Asker et al., 2015; Fee et al., 2009). However, 'structural' ecosystems as multilateral collaborations with fixed partners – across companies (Adner, 2017) and even across country boundaries (e.g., Nambisan et al., 2019), usually via digital platforms (Cusumano et al., 2019; Gawer, 2022) – can be expected to significantly reduce the use of resources by joint alignment on an overarching value proposition (ibid.). Such ecosystems can thus serve as a third variable in the trade-offs over (dis)investment.

This paper therefore examines three research questions:

1 Do ecosystems provide a way to mediate conflicts in tech play?

2 Do ecosystems provide a way to mediate conflicts in global play?

3 Do ecosystems provide a way to mediate conflicts between tech and global play?

In answering these questions, the article first and foremost offers an explanation of the fundamental problem of dealing with conflicting goals in strategic and international management and provides an empirical survey of 286 automotive companies. It concretises a solution to conflicting goals via third variables and examines this solution for the major challenges currently facing automotive companies and others: the unsolvable conflicts between the need to invest in new technologies and markets and, at the same time, to reduce capital intensity.

The outline of the paper is as follows: After addressing specific features of goal conflicts relating to tech and global play and possible approaches to deal with them, in particular with the help of value drivers, in the literature review (Sections 2.1 to 2.3), we explain the methodology in Section 3. We first derive hypotheses as to why platform-based ecosystems can mediate the goal conflicts between high investment and asset-light strategies. Then we explain the study approach (a causal analysis with structural equation modelling using PLS), the operationalisation of the variables and the sample. The results are then discussed in Section 4, and implications for practice and research are derived (Section 5). The article ends with limitations and a brief conclusion in Section 6.

## 2 Literature review

### 2.1 Goal conflicts concerning tech and global play

(Multinational) automotive companies are increasingly facing conflicting requirements in the corporate environment (goal conflicts, e.g., Uzzi, 1996) regarding technologies and/or country markets. As far as technologies are concerned, the sources of profit in the traditional manufacturing industry (e.g., Sjödin et al., 2022) have recently experienced a sharp increase in competition. Specifically for the automotive companies, both downstream competition with new smart mobility solutions, e.g., ride sharing companies, and upstream competition with 'brain suppliers', e.g., electronics and software providers for connected and self-driving vehicles, are being discussed (see the debate about whether systems integration is a unique competence of automotive companies which protects them in the competition Jacobides et al., 2016, MacDuffie, 2018 but also Adner and Lieberman, 2021). In any case, high investments into connectivity, autonomy, sharing and electrification (CASE technologies) are required in order to compete with technology companies (e.g., Llopis-Albert et al., 2021, who analyse the future impact of digital transformation on business performance models and the different actors' satisfaction). Investments in new technologies are also demanded by capital markets (see Ceccagnoli et al., 2018, who analyse the importance of corporate venture capital investments as real options in technology markets.

However, this is in contrast to the demands of the capital markets for asset-light strategies requiring (low) investments in traditional technologies (e.g., Cusumano et al., 2019; Gawer, 2021) and thus moving towards a concentration on traditional business (see Kapoor and Lee, 2013).

Thus, there is a trade-off with respect to tech play, as investing in a tech play conflicts with the given limited resources and demand for asset-light strategies (see Figure 1), as evidenced by, e.g., Weigelt and Sarkar (2012), in that intra-firm innovation driven by technology investments causes efficiency trade-offs and extensive investments. However, outsourcing services to tech firms decreases firm adaptability. Furthermore, the capital markets have declined since the outbreak of COVID-19 (Alam et al., 2021), consequently making firms strive for asset-light strategies. This poses a paradox.

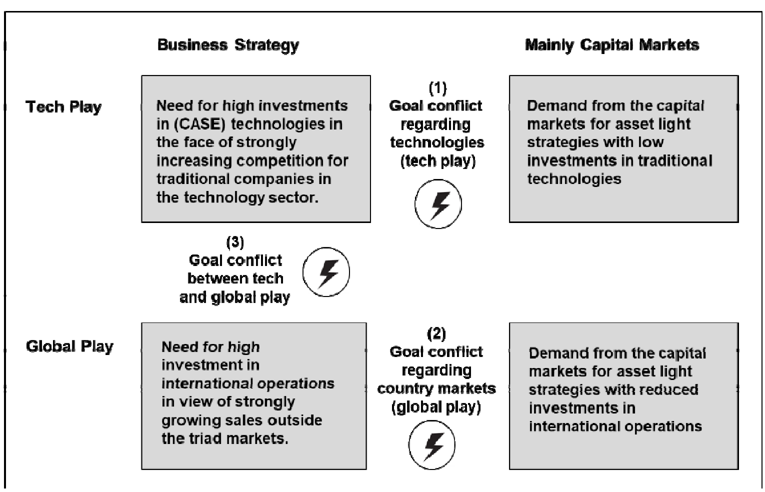
At the same time, the growing automotive markets as the target of a future sales and global play lie outside the traditional triad markets of North America, Europe and Japan (e.g., Ghauri et al., 2021). Sales are predicted to grow between 2025 and 2029 by a compound annual growth rate of 3.7% in the BRIC countries of Brazil, Russia, India and China, by 1.7% in the MIST countries (Mexico, Indonesia, South Korea, Turkey) and by 2.5% in the rest of the world, while the triad markets will grow by only 0.1%. In addition, the local knowledge from these markets is important for multinational companies (Meyer et al., 2020). According to conceptual papers, these two factors together explain the need for high investments in global supply chains (Contractor, 2022) and in international operations outside the triad markets (e.g., Cha, 2020).

However, this is contrary to the tendency towards slowbalisation or de-globalisation (e.g., Petricevic and Teece, 2019) to reduce the depth and scope of international operations (e.g., Kafouros et al., 2022) and break down global supply and value chains. This tendency is partly a result of nationalism, the debates on climate protection and sustainability (e.g., Ghauri et al., 2021) and corporate social responsibility (e.g. Buckley and Casson, 2021), and is partly overlaid by a discussion about the disaggregation of global supply chains (e.g., Orlando et al., 2022) as a consequence of the COVID-19 pandemic (e.g., Ciravegna and Michailova, 2022) and the Ukraine war.

Thus, there is a goal conflict concerning global play, because investments in a global play contradict given limited resources and the demand for asset-light strategies (see also Figure 1), which is proven by, e.g., Luo and Witt (2022), e.g., in that de-globalisation restricts the growth of emerging MNEs in particular, and hence future profit pools due to limited cross-border access to markets for supply, demand, and cooperation. They are therefore obliged to pursue asset-light strategies. Furthermore, investments in global play happen fairly gradually and dynamically and firm path dependence makes managers rather unwilling to allocate much of their resources to global play at once (Vahlne and Johanson, 2017).

Since investing in a tech play and a global play at the same time is even less feasible in view of limited resources and the demand for asset-light strategies, there is a third trade-off between the tech play and the global play (Figure 1). It is proven by, e.g., Nambisan et al. (2019), in that a paradox arises between the demand for the intra-firm employment of digital technologies and the global portfolio management because both actions require financial resources. Heterogeneity stemming from history dependence is bounded by managerial capacity for both internationalisation and technology development paths (Vahlne and Johanson, 2017). Therefore, managers tend to decide on where to allocate the resources between tech and global play. Indeed, international business scholars have observed de-globalisation efforts that also reduced the development of technologies (Petricevic and Teece, 2019).

**Figure 1** Goal conflicts regarding tech and global play




*Source:* Based on Adner and Lieberman (2021)

## 2.2 *Possible approaches to deal with goal conflicts*

In the face of these conflicts, neither a decision in favour of one of the goals nor complete joint achievement of the goals is possible. Instead, it is suggested that such unsolvable conflicts should be balanced and mediation solutions (Arregle et al., 2013; Gavidia, 2016;

Kolb and Faure, 1994) or 'third variables' [Scharmer, (1994), e.g., p.624] should be sought. With an interpretative case study of a large multinational company, Gavidia (2016) shows the importance of mediation solutions specifically in the conflict between parent and subsidiary in the implementation of enterprise resource planning (ERP). Arregle et al. (2013) use a database to examine 1,076 Japanese multinational companies which established 3,394 new foreign subsidiaries in 45 different countries. They show that the degree of their internationalisation in a country is influenced by both the national and regional institutional environments. In between, a semiglobalisation perspective has particular explanatory power. They see semiglobalisation as a 'third variable' between conflicting influences which provides a new perspective on how multinationals consider the institutional environment in their international strategy.

In the conflict between low costs and differentiation, examples of such 'third variables' were platforms or common parts – in the case of automotive companies also construction kits. They enable benefit growth and cost growth to be decoupled along the value chain through either a greater increase in benefits in activities close to the customer, such as marketing and customer service, without a corresponding increase in costs, or higher cost savings in activities remote from the customer, such as production, without a corresponding loss of benefits (e.g., Proff, 2000). The use of platforms, common parts and construction kits establishes hybrid competitive strategies of cost-minimising differentiation (e.g., Pertusa-Ortega et al., 2009).

Today's conflicts about investments or disinvestments relating to new technologies (tech play) and/or international operations (global play) can no longer be resolved via hybrid strategies, be-cause they lack agility (e.g., Teece et al., 2016). In addition, the capital markets are no longer prepared to make as much money available to capital-intensive companies as previously. However, there is increasing discussion about the issue that digital platforms (Gawer, 2021, 2022) in structurally oriented (global) partner networks (structural ecosystems, e.g., Adner, 2017; Adner and Lieberman, 2021; Jacobides et al., 2018) across companies (Adner, 2017) and even country boundaries (e.g., Nambisan et al., 2019; Vahlne and Johanson, 2017) enable technological and cross-border strategies with low capital investment (see also Cha, 2020). This allows 'making business scalable flexibly without investments in heavy assets' internationally (ibid.). Automotive companies, for example, can thus create joint value with partners (e.g., Brandenburger and Stuart, 2007) and deal with disruptions by high tech competitors, substitutes and complementors (Adner, 2021) and/or reach international markets beyond their own without physical presence (Meyer et al., 2020).

If such ecosystems are digital and more than two partners share stable information on digital platforms, their interaction increases (e.g., Cusumano et al., 2019; Knobbe and Proff, 2020; Cusumano et al., 2019; Knobbe and Proff, 2020; Sommer et al., 2021) and joint value creation is likely to be even more successful (e.g., Benner and Waldfogel, 2020). A distinction has to be made between ecosystems with:

1 innovation platforms (IP) as places for innovation in new technologies (Cusumano et al., 2019)

2 transaction platforms (TaP) as online marketplaces (Rochet and Tirole, 2003), especially in global competition

3 hybrid platforms which combine the best of both the above types (Cusumano et al., 2019).

## 2.3 Platform-based ecosystems as a mediation solution

The explanation of the potential of platform-based ecosystems to mediate goal conflicts is based on the idea that they increase the ability of partner companies to transfer primary strategic re-sources and asset-specific knowledge.

This is based on explanations that single diversified (multinational) companies are already able to transfer resources and capabilities or competencies between multiple business units or/and foreign subsidiaries (e.g., Almeida and Phene, 2004) via physical platforms. This makes resources and capabilities quasi-public goods (Buchanan, 1965), which, unlike public goods (Buchanan, 1965), cannot be transferred as often as desired (Zander and Kogut, 1995). They lose value as the amount of transfer increases (e.g., Buchanan, 1965) because they are bound up in complex routines and processes and therefore any reuse incurs high transaction costs (e.g., Bloodgood, 2019). The use of digital platforms with greater standardisation and interfaces between individual business activities along the value chain (e.g., Cano-Kollmann et al., 2016) improves the transferability of resources and capabilities in multinational companies.

Benner and Waldfogel (2020) argue that resources and capabilities can be exchanged even more between partner companies in (international) ecosystems, but then they develop in the direction of public goods (Buchanan, 1965) with the risk of an unintended outflow of resources and capabilities (e.g., Krylova et al., 2016). This limits the advantageousness of the resources and capabilities and prevents them from becoming public goods.

The conflict mediation potential of ecosystems is essentially explained by the joint value creation by the partners which generates incentives for transforming resources. Game-theoretic explanations using biform games (Brandenburger and Stuart, 2007) form the basis. According to these explanations the participating partner companies autonomously contribute value creation activities in a non-cooperative phase and negotiate on how the added value will be shared in the cooperative phase. This explanatory framework was later differentiated (Gans and Ryall, 2017) to include the resource-based view (RBV, e.g., Barney, 1991), which takes into account the importance of the partner companies' critical VRIN (valuable, rare, inimitable and non-substitutable) resources (e.g., Barney, 1991), and the 'service-dominant logic' (e.g., Vargo and Lusch, 2004), which takes into account value co-creation with customers. In addition, the relational view (Dyer et al., 2018; Dyer and Singh, 1998) considers value-creation networks in which partners add value through superior complementarity in the collaboration phase (also Jacobides et al., 2018).

When more than two partner organisations stably exchange via digital instead of physical plat-forms, their interaction increases (e.g., Cusumano et al., 2019; Gawer, 2014). In accordance with Hagiu and Rothman (2016), six 'platform effects' can be distinguished, specifically via digital platforms:

1 'modularisation' (Baldwin and Clark, 1997; Jacobides et al., 2018), because clear interfaces are created which minimise transaction costs (Williamson, 1975) in ecosystems, maximise the value generated, and create the flexibility to expand the ecosystem (Williamson and Meyer, 2012).

2 'complementary resources and capabilities' according to the 'relational view (Dyer et al., 2018), which explains joint value creation not only by adding up the autonomous strategic actions of the individual partners with critical VRIN resources

in the non-cooperative phase of competition, but also by their cooperation in the cooperative phase.

3 'value co-creation' with the customers, who optimise their value in use by assembling a customised, integrated and interactive customer solution according to the 'service-dominant logic' (e.g., Vargo and Lusch, 2004, 2008).

4 'scaling the network', i.e., demand-side economies of scale, according to network theory (e.g., Katz and Shapiro, 1985),

5 'cross-subsidising' the more price-sensitive side according to the theory of multi-sided markets (Cusumano et al., 2019; Eisenmann et al., 2006)

6 AI-based learning (e.g., Iansiti and Lakhani, 2020).

To avoid the unwanted outflow of resources and capabilities, a seventh effect has to be added:

7 limitation of the outflow of resources and capabilities through effective governance (e.g., Dyer et al., 2018; Dyer and Singh, 1998).

## 3 Methodology

### *3.1 Derivation of the hypotheses*

The seven explanations of joint value creation in platform-based ecosystems (Section 2.3) can be used to derive hypotheses about how (structural) platform-based ecosystems might mediate goal conflicts relating to technologies or/and markets. It is depending on the platform type (e.g., Cusumano et al., 2019).

In the goal conflict concerning the tech play, platforms in innovation ecosystems enable high investments in tech play because they can be split up across partners and customers, and third parties can also be involved in generating the innovation. For example, the partner companies can play a role in new technologies such as cloud architecture, data management and analytics, which are becoming essential in view of the increasing competition from new tech companies from out-side the industry. This is explained by the fact that complementary resources and capabilities of stakeholders, including customers (Vargo and Lusch, 2004, 2016), can be more easily translated into innovations via a modular architecture of IP (Cusumano et al., 2019), and this effect can be further accelerated by scaling the number or utilities of the complements (e.g., Cusumano et al., 2019) and by cross-subsidisation of innovative companies to expand the innovation network (Eisenmann et al., 2006) as well as by data-driven AI-enabled radical process learning (Iansiti and Lakhani, 2020). These innovation-platform effects, however, require that the outflow of resources and capabilities to partners in the ecosystem can be limited. Only then costs can be shared among partners, enabling the necessary innovations with the asset-light strategies demanded by the capital market. This justifies a first hypothesis:

H1 The greater the goal conflicts between investment in new technologies and concentration on traditional technologies, the greater the use of IP by a company.

In the goal conflicts concerning the global play, markets beyond a company's own physical presence can be reached by aligning international companies into ecosystems (Cha, 2020; Meyer et al., 2020) while achieving a country-specific focus. This focus remains important because foreign markets can be very different due to country-specific regulations and intercultural differences (e.g., Stallkamp and Schotter, 2021). In this context, TaP with clear interfaces and modular architecture (Baldwin and Clark, 1997) facilitate interaction between country markets (Nambisan et al., 2019; Nambisan and Luo, 2021), especially with complementary partners (e.g., Cusumano et al., 2019). In addition, an asset-light improvement in international activities is enabled by an exchange of information with global customers via transaction plat-forms which allows companies to adapt to their wishes and incorporate their suggestions for improvement (value co-creation) (e.g., Nambisan and Luo, 2021). This could help to mediate goal conflicts, and likewise to achieve fast and cost-neutral acquisition of new customers worldwide by scaling in the global network, provided that companies do not try to overcome excessively large distances (Stallkamp and Schotter, 2021). The worldwide customer network can also be enlarged by cross-subsidising demand, often by 'enveloping' adjacent foreign markets (Eisenmann et al., 2006). Furthermore, international activities can be improved through data-based improvement learning (Cha, 2020; Iansiti and Lakhani, 2020), at least if the outflow of resources and capabilities can be limited (e.g., Krylova et al., 2016). This leads to a second hypothesis:

H2 The greater the goal conflicts between investments in international operations outside Europe, North America and Japan and reduced international operations outside these triad markets, the greater the use of TaP.

Integrative hybrid platforms in structural ecosystems can help to mediate the goal conflict between investments in tech and in global play by creating both, degrees of freedom through transfer and leverage effects and also economies of scope between innovations and improved international operations. Platforms as 'venues for innovation' support global play, for example by enhancing 'the value proposition of their core offering by seeking out and incorporating knowledge and expertise from diverse global partners as well as [by customising] the value proposition and business models to fit diverse international markets' (Nambisan et al., 2019, p. 1469). Therefore, it is often assumed that most platforms are digital and global, but the added value of such platforms is not addressed. However, if new technologies provide new opportunities for R&D collaboration across geographies (Meyer et al., 2020), there are synergies in modular linking and complementarities, but also effects of value co-creation and scaling in the network (Cusumano et al., 2019). In addition, it is possible to attract and cross-subsidise innovative partners and customers, because hybrid platforms create higher barriers to entry as they become more difficult to set up. In addition, hybrid platforms mediate goal conflicts between tech and global play by radical learning, if the outflow of resources and capabilities across technologies and markets can be limited. This leads to a third hypothesis:

H3 The greater the goal conflicts between investments in new technologies and investments in international operations outside Europe, North America and Japan, the greater the use of hybrid platforms.

In line with the considerations of game theory (Brandenburger and Stuart, 2007), the 'service dominant logic' (Vargo and Lusch, 2004) and the resource-based view (e.g., Barney, 1991), it can be assumed that the mediation of conflicting goals by digital platforms in ecosystems has a positive influence on corporate success. This is because it enables companies to improve joint value creation based on the seven platform effects. This not only results in positive effects on partners' relational rents, which are according to Dyer and Singh (1998) supernormal gains which can only be generated jointly, and not by one partner alone (see also Lavie et al., 2010), but also in positive effects on performance (e.g., on profitability, Kumar et al., 2022). This justifies three further hypotheses:

H4 The more an innovation platform is used in an ecosystem in the face of goal conflicts between investment in new technologies and concentration on traditional technologies

- a the higher are the relational rents
- b the higher is the profitability.

H5 The more a transaction platform is used in an ecosystem in the face of goal conflicts between investing in international operations outside Europe, North America and Japan and reducing international operations

- a the higher are the relational rents
- b the higher is the profitability.

H6: The more a hybrid platform is deployed in an ecosystem in the face of goal conflicts between investments in new technologies and investments in international operations outside Europe, North America and Japan

- a the higher are the relational rents
- b the higher is the profitability.

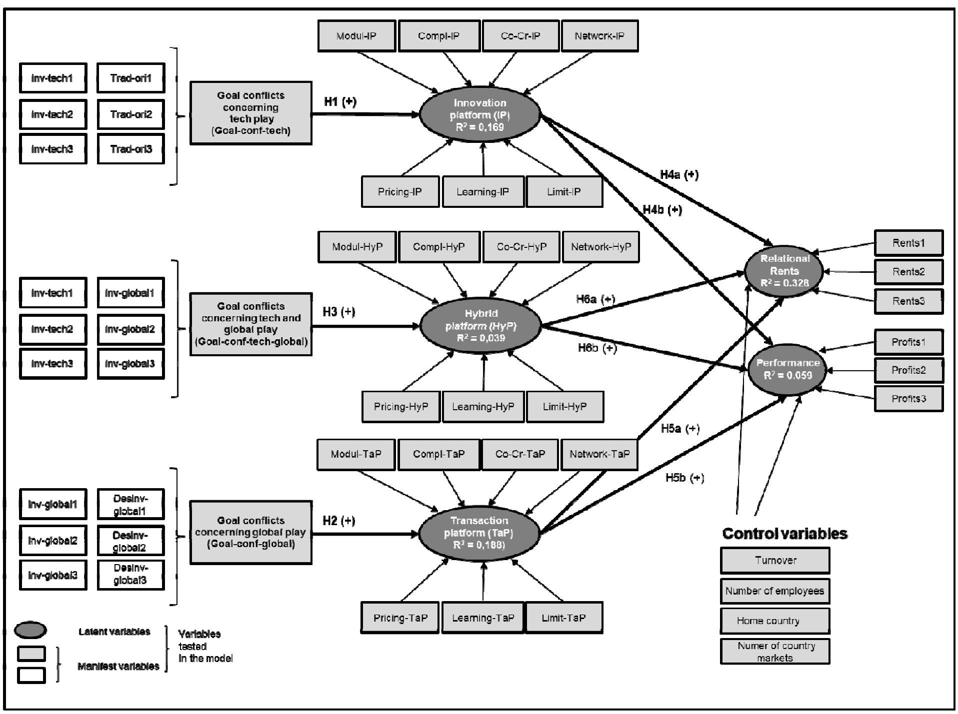
In the following, we explain the study approach (Section 3.2), the operationalisation of the variables used and the selection of the sample of companies studied.

## *3.2 Study approach*

These hypotheses for mediating the three conflicting goals with different platform-based ecosystems and their effects on success now have to be translated into a measurement model (cf. Figure 2). This model first examines the extent of perceived use of digital platforms as a function of the extent of perceived goal conflicts. More precisely, the model examines the extent of perceived use of digital IP as a function of the extent of perceptions of conflicting goals between investment in new technologies and concentration on traditional technologies (goal-confltech). It further examines the extent of perceived use of digital TaP as a function of the extent of perceived conflicting goals between investments in international operations outside Europe, North America and Japan and reduced international operations outside these triad markets (goal-conf-global). The model finally examines the extent of the perceived use of digital hybrid platforms TaP as a function of the extent of the perceived goal conflicts between investments in new technologies and investments in international operations out-side Europe, North America and Japan (goal-conf-tech-global). Secondly, we also investigate whether the extent of the perceived use of IP, TaP or hybrid platforms in the face of different goal conflicts influences the level of rents (relational rents) and profitability (performance).

The empirical study was conducted as a sectional study at a single point in time in the spring of 2022 (see Section 3.4 regarding the sample). In order to translate the hypotheses into an analytical approach, the analysis was based on a structural equation model which was analysed using a partial least squares-structural equation modelling (PLS-SEM) algorithm (Ringle et al., 2015) to translate latent variables and their interrelationships into causal analysis (Chin, 1998; Henseler et al., 2009). PES-SEM serves to identify dependencies between complex structures (Eisend and Kuß, 2017) and to maximise the R2 values (Hair et al., 2017). Therefore, this method has become established in business research for estimating causal models (e.g., Hair et al., 2019). With the help of the robust PLS-SEM method, the correlation between the extent of the distinctive conflicting goals and the use of the corresponding digital platforms as well as the correlation between the use of the platforms and the success was examined (Figure 2). We used the Smart PLS4 software package using Bootstrapping with 5,000 samples and a significance level of 0.05.

**Figure 2** Measurement model




## 3.3 Variables used in the study

In order to transform the conceptual model into a structural equation model, the individual constructs had to be operationalised (Eisend and Kuß, 2017). The variables from which the goal conflicts were calculated were manifest variables on opposing influences (see Table A1 in Appendix):

- on the tech play (three items on investment in new technologies and three items on the concentration on traditional technologies)
- on global play (three items on investment in international operations outside the triad markets and three items on the reduction of such international operations)
- thus, also on the interplay between tech and global play (three items on investment in new technologies and three items on investment in international operations).

As an example, the three items on investment in new technologies were 'investment in new technologies in order to play a role in these technology fields' (Inv-Tech1; based on Ferràs-Hernández, 2018; Kapoor and Lee, 2013; Llopis-Albert et al., 2021), 'investment in new tech-nologies in order to play a role in the increasing competition among technology companies' (Inv-Tech2, based on Adner and Lieberman, 2021; Ferràs-Hernández, 2018), and 'investment in new technologies in order to meet the increasing importance of software over hardware' (Inv-Tech3, based on Haghighatkhah et al., 2017; Ozalp et al., 2018). The three items on the focus on traditional technologies were 'focus on traditional technologies in order to play in these technology fields' (Trad-Ori1, based on Kapoor and Lee, 2013), 'Focus on activities in the traditional core business in order to secure competitive position in these business fields' (Trad-Ori2, following Harrigan and Porter, 1989), and 'Focus on traditional technologies in order to meet the requirements of capital providers to reduce capital intensity' ('asset light' strategies, Trad-Ori3, in accordance with Gawer, 2021). For an overview of all constructs and items used, see Table A1 in Appendix. In principle, sources independent of the industry were used as much as possible. However, in some cases sources specific to the automotive industry were also used (Llopis-Albert et al., 2021). The individual indicators were recorded using a seven-point Likert scale ranging from 'I disagree' (1) to 'I fully agree' (7) (e.g. Jamieson, 2004; Joshi et al., 2015). All indicators apart from the control variables were coded in this way to fulfil the requirement of equidistance (Hair et al., 2017).

Since no scale mean or scale difference could be formed here – a new group variable was created instead – the goal conflict entered the model as a manifest variable with no underlying variables. Here, the average ratings of the opposing influences on tech play, i.e., the average rating of the three items relating to the investment in new technologies (Inv-Tech1 to Inv-Tech3) and the average rating of the three items relating to a concentration on or orientation towards traditional technologies (Trad-Ori1 to Trad-Ori-3, see Table A1 in Appendix) and similar ratings for global play were calculated. They were divided into three percentiles (high, medium, low) to determine goal conflict as follows: strong goal conflict (both percentile variables high), medium goal conflict (both percentiles medium high), weak goal conflict (one of the two percentiles high, the other medium), and no goal conflict (all other combinations). Thus, goal conflict entered the model with the values 1 (strong) to 4 (none) as an ordinally scaled variable.

The use of the three digital platforms was directly measured with manifest variables, each with different manifestations of the factors influencing joint value creation in these types of ecosystem (modularisation, complementarities, value co-creation, scaling in networks, pricing/cross-subsidising, data-based learning, and limiting of skill leakage, cf. Hagiu and Rothman, 2016). Therefore, for example, the latent variables modularisation across IP, TaP, and hybrid platforms (modul-IP, modul-TaP, and modul-HyP, see Table A2 in Appendix) went back to the same sources on modularisation (Baldwin and

Clark, 1997; Jacobides et al., 2018), but the specificities of each platform were taken into account when coding them (see, for example, Cusumano et al., 2019; Nambisan et al., 2019; Rochet and Tirole, 2003; Table 2 in the appendix). The use of second-order constructs with several latent variables for the factors influencing joint value creation would have led to a better model fit in the analysis, but the sample size requirements were unrealistic for a survey of companies.

Success was operationalised, on the one hand, by relational rents (e.g., Dyer et al., 2018) according to Lavie et al., 2010, i.e., revenues that no longer had to be shared (Rel-Ren1), but had to be divided among the partners on a scale from 1 to 7 by fixed agreements (Rel-Ren2) or negotiations (Rel-Ren3). Second, the potential improvement was captured in firm performance through collaboration in ecosystems via global platforms, i.e., the increase in profitability (Kumar et al., 2022), the share of total revenue achieved through such collaboration (Wang et al., 2021), cost savings, and the ecosystem market share (Ramanathan and Gunasekaran, 2014), each on a scale of 1 (0%) to 7 (> 25%).

Control variables were also recorded: firstly, the turnover (see similarly Urbinati et al., 2019) in nine steps from (1) < USD 1 million to (9) USD 10 Bn. and more. Secondly, the number of employees was reported (see similarly Hair et al., 2019) in 12 steps from (1) less than 1,000 employees to (12) 100,000 and more employees. Thirdly, the home country of the headquarters was captured, with 12 countries from Europe, North America and Asia considered in this study being surveyed: Canada, China, France, Germany, Italy, Japan, Mexico, Poland, South Korea, Spain, UK and USA as well as others, see Section 4.1). Finally, the number of countries in which a company operated was recorded (see similarly Hair et al., 2019) in six steps from (1) 1–10 to (6) > 100.

### *3.4 Sample*

The survey was conducted in the automotive industry in the spring of 2022 using an online questionnaire, with OEMs and suppliers which participated in ecosystems, had their headquarters in countries with an important automotive industry in Europe, North America or Asia and had revenues of more than USD 50 million. This focus on one particularly capital-intensive industry has the advantage of increasing the comparability of the companies, since industry effects are eliminated (cf. e.g., Miozzo and Yamin, 2012).

To ensure validity in conducting the survey, a standardised online questionnaire was developed and pre-tested with 20 automotive suppliers which had different annual turnover, employed different numbers of employees, were of different global scope and whose headquartered differed in geographical scope of the headquarter (Hair et al., 2019). The respondents surveyed in the pre-test demonstrated a clear understanding of the aim of the questions asked. To ensure the reliability of the survey, the programmed online questionnaire was designed to be as user-friendly as possible.

Thereafter, a total of 3,000 automotive companies from Europe (France, Germany, Poland, Spain and UK), North America (Canada, Mexico and the USA) as well as Asia (China, Japan and South Korea) were contacted. They were selected with the help of the automotive industry associations in the individual countries (such as the VDA in Germany) by selecting the largest of their member companies (with sales of over EUR 50 million) – a total of 3,000 in all countries. They were selected, contacted in writing and asked to participate in the survey because the con-tact persons were known there.

In the study, 456 companies participated, 125 of these companies could not be evaluated due to incompleteness or undifferentiated response behaviour. Of the remaining 331 companies, a further 45 (13.6%) were excluded because they showed a lack of ecosystem orientation. This was recorded by a self-assessment of the ecosystem criteria according to Adner (2017). The self-assessment captured whether a company had a binding orientation towards one or more inter-company value creation networks, cooperated with a defined group of partners, interacted with more than two partners there and created or improved new customer solutions with the partners. Ecosystem orientation was assumed to exist if all four criteria were rated by a company at no less than 3 on a scale from 1 (does not apply at all) to 7 (fully applies).

Data from 286 automotive companies were therefore generated for the next stage of analysis (response rate 9.5%). The sample size was hence sufficiently high for the use of PLS-SEM (Cohen, 1988). The respondents were people from the strategy or organisation departments of the respective companies, and in the case of smaller companies managing directors or board members.

## 4 Results

### *4.1 Descriptive statistics*

Of the 286 automotive companies, 49 (17.1%) are headquartered in Asia (China, Japan or South Korea), 94 (32.9%) in North America (U.S., Canada or Mexico) and the remaining 143 (50%) in Europe (France, Spain, Italy, Germany, U.K. or Poland, see Figure 3(a)). Most of the respondents are suppliers (97%) and the remaining 3% OEMs. The turnover is less than USD 1 billion dollars for 111 (38.8%) companies, 103 (36%) have a turnover of between USD 1 and 5 billion and 72 companies (25.2%) have a turnover of USD 5 billion dollars or more (see Figure 3(b)). Of the companies surveyed, 174 (60.8%) operate in two to ten foreign markets, 48 (16.8%) operate in 11 to 30 foreign markets, 42 (14.7%) operate in 31 to 100 foreign markets and only 22 companies (7.7%), particularly Tier 1 suppliers and OEMs, operate in more than 100 foreign markets (see Figure 3(c)).

**Figure 3** Descriptive statistics of the online survey of 286 automotive companies (3% OEMs and 97% suppliers) in spring 2022 (see online version for colours)

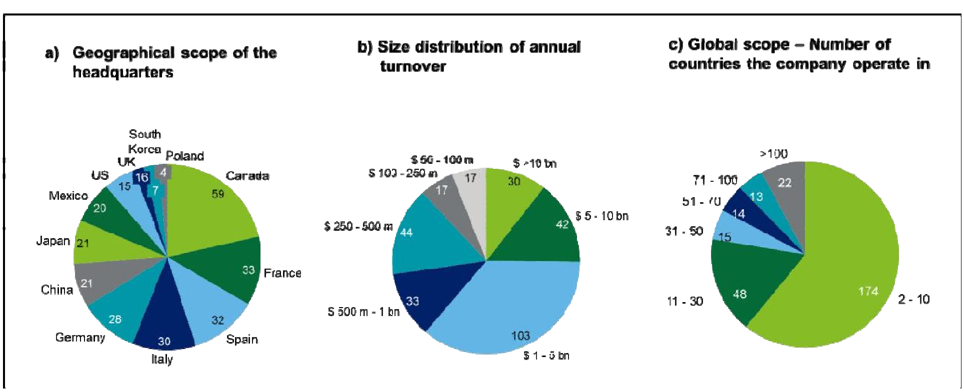



Table 1 also compiles the descriptive statistics for the variables explained in Section 3.3.

**Table 1** Descriptive statistics for each variable

| *Goal conflicts* | | | | | *Goal conflicts* | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Tech play* | *Mean* | *SD* | *min* | *max* | *Global play* | *Mean* | *SD* | *min* | *max* |
| (Inv-Tech1) | 5.41 | 1.23 | 1 | 7 | (Inv-global 1) | 5.41 | 1.23 | 1 | 7 |
| (Inv-Tech-2) | 5.52 | 1.21 | 2 | 7 | (Inv-global 2) | 5.52 | 1.21 | 2 | 7 |
| (Inv-Tech 3) | 5.53 | 1.21 | 1 | 7 | (Inv-global 3) | 5.53 | 1.21 | 1 | 7 |
| (Trad-Ori1) | 5.26 | 1.35 | 1 | 7 | (Desinv-global 1) | 5.26 | 1.35 | 1 | 7 |
| (Trad-Ori2) | 5.39 | 1.27 | 1 | 7 | (Desinv-global 2) | 5.39 | 1.27 | 1 | 7 |
| (Trad-Ori3) | 5.34 | 1.38 | 1 | 7 | (Desinv-global 3) | 5.34 | 1.38 | 1 | 7 |
| *Constructs* | | | | | *Constructs* | | | | |
| *Innovation platform* | *Mean* | *SD* | *min* | *max* | *Transaction platform* | *Mean* | *SD* | *min* | *max* |
| (Module TaP) | 5.24 | 1.23 | 1 | 7 | (Module TaP) | 5.18 | 1.26 | 1 | 7 |
| (Compl-TaP) | 5.24 | 1.21 | 1 | 7 | (Compl-TaP) | 5.20 | 1.27 | 1 | 7 |
| (CoCr-TaP) | 5.56 | 1.18 | 1 | 7 | (CoCr-TaP) | 5.54 | 1.21 | 1 | 7 |
| (Network-TaP) | 5.51 | 1.22 | 1 | 7 | (Network-TaP) | 5.41 | 1.19 | 1 | 7 |
| (Pricing-IP) | 5.38 | 1.20 | 1 | 7 | (Pricing-TaP) | 5.37 | 1.21 | 1 | 7 |
| (Learning-IP) | 5.36 | 1.23 | 1 | 7 | (Learning-TaP) | 5.35 | 1.22 | 1 | 7 |
| (Limit-IP) | 5.41 | 1.26 | 1 | 7 | (Limit-TaP) | 5.37 | 1.29 | 1 | 7 |
| *Constructs* | | | | | *Constructs* | | | | |
| *Hybrid platform* | *Mean* | *SD* | *min* | *max* | *Success* | *Mean* | *SD* | *min* | *Max* |
| (Modul-HyP) | 5.24 | 1.22 | 1 | 7 | (Rel-Ren 1) | 5.36 | 1.22 | 1 | 7 |
| (Compl-HyP) | 5.27 | 1.20 | 1 | 7 | (Rel-Ren 2) | 5.46 | 1.12 | 1 | 7 |
| (CoCr-HyP) | 5.47 | 1.28 | 1 | 7 | (Rel-Ren 3) | 5.55 | 1.11 | 1 | 7 |
| (Network-HyP) | 5.42 | 1.19 | 1 | 7 | | | | | |
| (Pricing-HyP) | 5.29 | 1.22 | 1 | 7 | | | | | |
| (Learning-HyP) | 5.25 | 1.29 | 1 | 7 | | | | | |
| (Limit-HyP) | 5.34 | 1.25 | 1 | 7 | | | | | |

Based on these data the PLS-SEM algorithm was used to test the model presented in Figure 2.

## *4.2 Testing hypotheses and discussion*

Based on Figure 2, the sample not unexpectedly showed a high average for identified individual conflicts in the automotive companies surveyed. In ‘tech play’ they scored 3.3 and in global play 3.32 on a scale from 1 (no conflicts) to 4 (high conflicts). The conflicts between ‘tech’ and ‘global play’ appeared very slightly lower (average of 3.28).

To test the collinearity between the constructs of the structural equation model, the VIF values were tested using the PLS-SEM algorithm (Diamantopoulos and Riefler, 2008). Bootstrapping with 5.000 samples and a significance level of 0.05 was used. The VIF values show no collinearity as they are all in an interval between 1.0 and 1.5 within the range of 0.2 to 5.0 (e.g., Hair et. al., 2017). Outer weights and outer loadings were calculated by the model to assess the significance and relevance of the formative indicators. The survey confirms both that higher goal conflicts relating to technologies lead to greater use of IP in an ecosystem and that higher goal conflicts relating to international operations lead to greater use of transaction platforms in an ecosystem. It thus confirms H1 and H2 (Table 2). The path coefficients of 0.411 and 0.434 are highly significant (p-value $p < 0.01$) and the respective R2 of 0.169 and 0.188 are above the threshold of 0.10 required by Falk and Miller (1992) for the variance explanation to be considered adequate (similar to Cohen, 2013). Higher goal conflicts between technologies and markets, on the other hand, do not lead to greater use of hybrid platforms in an ecosystem, and H3 must therefore be rejected (Table 2). The study thus shows that hybrid platforms are not (yet) seen as a solution for mediating goal conflicts in the combination of tech and global play.

**Table 2** Testing the hypotheses

| *Hypotheses* | *Path coefficient* | *p-value* | $R^2$ | *Platform effects (significant)* | *Innovation platform* | *Transaction platform* | *Hybrid platform* |
|---|---|---|---|---|---|---|---|
| H1 | 0.411 | <0.01 | 0.169 | Modul | –0.326 | | |
| H2 | 0.434 | <0.01 | 0.188 | Compl | 0.408 | 0.225 | |
| H3 | –0.197 | n.s. | 0.039 | Co-creation | | | |
| H4 | 0.152 | n.s. | - | Network | 0.530 | 0.238 | |
| | –0.142 | n.s. | - | Pricing | | 0.475 | |
| H5 | 0.058 | n.s. | - | Learning | | 0.261 | |
| | –0.073 | n.s. | - | Limit | 0.302 | 0.465 | |
| H6 | –0.413 | n.s. | - | | | | |
| | 0.032 | n.s. | - | | | | |

The model also significantly confirms four of the seven platform effects based on Hagiu and Rothman (2016) in innovation and five in transaction ecosystems. The greatest influence at a significance level of $p < 0.01$ is demonstrated by network effects on the innovation platform and by pricing effects on the transaction platform (highest path coefficients: Network-IP → IP; Pricing TaP → TaP). Only the influence of modularisation on the innovation platform is currently still negative (Modul-IP → IP).

According to Jacobides et al. (2018), complementarity (Compl-IP → IP) is important on the innovation platform, but modularisation is not important yet. Thus, transaction costs do not yet play a significant role in the establishment of an innovation platform.

The effects on performance and relational rents, however, could not be confirmed. H4 to H6 therefore have to be rejected at the present time. The model shows that in 2022 relational rents were actually to be observed much more frequently than classical performance effects (see Table 2). This can probably be seen in the context of the COVID-19 crisis, which was affecting profitability, especially for automotive suppliers. In addition, automotive companies are still in the process of building ecosystems. Higher costs and set-up investments will rule out positive economic effects in the initial phase.

The influence of the control variables (Section 3.3) on the performance variables is insignificant. With regard to the relational rents, no regional effect (impact of the country where the headquarters is based) can be confirmed.

## 5 Implications

Five implications can be derived from the results of this study for automotive companies and, more broadly, for research into trade-offs and ecosystems:

1 Automotive companies should face the conflicting goals relating to technologies and markets instead of heeding the external calls to concentrate on traditional technologies and reduce international operations. It is possible to realise asset-light strategies of technology expansion and internationalisation (e.g., Meyer et al., 2020) with innovation and TaP in ecosystems and to mediate conflicting goals. In this context, the issue in the automotive industry is not a 'tech play versus global play', but a platform-based tech play and global play, simultaneously at first, although perhaps with a different focus on new technologies and market expansion. Later, an integrated connection via hybrid platforms which combines the best of both platforms can also be approached (Cusumano et al., 2019).

2 Automotive companies should therefore strive to develop the effects of ecosystems to the full in the future. In the further development of innovation ecosystems, modularisation in particular, but also the subsidisation of partners in the context of pricing, data-based learning and joint value creation with the customer have to be implemented even better. In the development of transaction ecosystems to support international operations, modularisation and joint value creation with the customers also have to be implemented better. However, given the challenges for automotive companies due to the supply difficulties of, e.g., chips and key raw materials due to COVID-19 and the Ukraine war (e.g., Ciravegna and Michailova, 2022; Orlando et al., 2022), it is important for them to start with the minimum viable ecosystem play in the first place (similar to Lewrick et al., 2018 or Polydoropoulou et al., 2020), modularisation can then follow in a next step. This means starting to build ecosystems in an agile way, rather than wasting too much time defining them, which is especially important in the times of rapid change in which the automotive industry, for example, currently finds itself.

3 In this context, effective governance is very important (e.g., Dyer et al., 2018), especially in the automotive industry (see Donada and Attias, 2015). This can also enable automotive companies to address a further goal conflict between improved transferability of skills and competencies and protection against their undesired outflow (e.g., Contractor, 2022) through regulations and trust-building (Dyer et al., 2018; Hagiu and Rothman, 2016; Weber et al., 2016). Sustainable ecosystems can not be built without trust, which must always be based on reliable, functioning governance mechanisms.

4 The results of this study contribute to research on conflicting goals in management (e.g., Urzi, 1996), in particular to research on intractable goal conflicts (e.g., Gavidia, 2016), by showing significantly that innovation and TaP can be 'third variables' in the sense of Scharmer (1995) in the mediation (e.g., Proff, 2018) of conflicting goals relating to technologies and markets.

5 In addition, the results of this study support research on the paradigm shift towards ecosystems in management – not only in the global play of multinational corporations across national borders (Cha, 2020; Nambisan et al., 2019), but also in the tech play relating to new technologies (Cusumano et al., 2019). However, further research is needed into how the paradigm shift can succeed (see Cha, 2020); particularly in view of the risk of resource and capability outflow (e.g., Contractor, 2022; Krylova et al., 2016).

## 6 Limitations and conclusions

The generalisability of the results of the present study is limited by the fact that only companies from one industry (the automotive industry) are considered and that a dynamic view of ecosystem design and alignment over time is missing (e.g., in accordance with Adner, 2021; Dattée et al., 2018). Another limitation of the study arises from the fact that international operations are considered in an undifferentiated manner and, for example, no distinction is made according to the type of operation (e.g., assembly or production) (see Békés et al., 2021; Casella and Formenti, 2019; Klier and Rubenstein, 2022).

Nevertheless, the study makes clear that, as suspected, the 286 automotive companies surveyed in the largest automotive countries worldwide perceive conflicts regarding tech and global play. They see conflicts between the need to invest in new technologies and markets in order to compete and the demands for 'asset-light' strategies and a focus on traditional technologies and markets – the latter also in view of global supply chain problems. The study further shows that these companies are attempting to mediate these conflicts via digital innovation and TaP in ecosystems, but without a significant performance impact yet. This is where future research should start.

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## Appendix

**Table A1** Goal conflicts – constructs and items

| *Constructs* | *Items* | *Source* |
|---|---|---|
| Goal conflicts regarding tech play | Investment in new technologies to play a role in these technology fields (Inv-Tech1). | Based on Llopis-Albert et al. (2021), Kapoor, Lee (2013) and Ferras-Hernandez et al. (2017) |
| | Investment in new technologies to play in the increasing competition from technology companies (Inv-Tech2). | Based on Ferras-Hernandez et al. (2017) and Adner, Lieberman (2021) |
| | Investment in new technologies to meet the increasing importance of software over hardware (Inv-Tech3). | Based on Haghighatkhah et al. (2017, p.82) and Ozalp et al. (2018) |
| | Concentration on traditional technologies to play in these technology fields (Trad-Ori1). | Based on Kapoor and Lee (2013) |
| | Concentration on activities in traditional core business to secure competitive position in these business fields (Trad-Ori2). | Based on Harrigan and Porter (1983) |
| | Concentration on traditional technologies in order to meet the demands of capital providers to reduce capital intensity ('asset light' strategies) (Trad-Ori3). | Based on Gawer (2021a) |
| Goal conflicts regarding global play | Investment in international operations outside Europe, North America and Japan to secure access to these growing markets (Inv-global1). | Based on Narula and Dunning (2000, p.154) and Ghauri et al. (2021) |
| | Investment in international operations outside Europe, North America and Japan to meet the different customer requirements there (Inv-global2). | |
| | Investment in international operations outside of Europe, North America and Japan to meet the regulatory environment there (Inv-global3). | |
| | Reduction of international operations to meet the demands of capital providers for a reduction in capital intensity (according to 'asset light' strategies) (Desinv-global1). | Based on Cha (2020) |
| | Reduction of international operations to meet the rising nationalism in many countries (Desinv-global2). | Based on Buckley (2020) |
| | Reduction of international operations to meet increasing convergence in customer tastes (Des-inv-global3). | Based on Cha (2020) |
| Goal conflicts between tech and global play | Investments in new technologies. | See above |
| | Investments in international operations. | |

**Table A2** Platform types: constructs and items

| *Constructs* | *Items* | *Source* |
|---|---|---|
| Innovation platform (Gawer and Cusumano, 2002; Cusumano et al., 2019) | Development of innovations via digital platforms with clear interfaces in partner networks (Module IP). | Based on Baldwin and Clark (1997) and Jacobides et al. (2018) |
| | Development of innovations together with complementary partners via digital platforms (Compl-IP). | Based on Milgrom, Roberts (1990, 1992) and Jacobides et al. (2018) |
| | Development of innovations together with customers on digital platforms in partner networks (CoCr-IP). | Based on Vargo and Lusch (2004, 2008) |
| | Development of innovations by new partners acquired in the network via digital platforms (Network-IP). | Based on Katz and Shapiro (1985, 1986) and Rietveld and Schilling (2020) |
| | Development of innovations through cross-subsidisation of innovative companies via digital platforms in partner networks (Pricing-IP). | Based on Eisenman et al. (2006) and Cusumano et al. (2019) |
| | Developing innovations through shared data-driven radical learning via digital platforms in partner networks (Learning IP). | Based on Iansiti and Lakhani (2020) |
| | Developing innovations by limiting the outflow of resources and capabilities to network partners via digital platforms (Limit-IP). | Based on Krylova et al. (2016) |
| Transaction platform (Rochet and Tirole, 2003; Nambisan et al., 2019; Cusumano et al., 2019) | Improve international activities by exchanging with partners via digital platforms with clear interfaces (Module TaP). | Based on Baldwin and Clark (1997) and Jacobides et al. (2018) |
| | Improvement of international activities through task sharing with complementary partners via digital platforms (Compl-TaP). | Based on Milgrom and Roberts (1990, 1992) and Jacobides et al. (2018) |
| | Improvement of international activities through exchange with global customers via digital platforms in the partner network (CoCr-TaP). | Based on Vargo and Lusch (2004, 2008) |
| | Improvement of international activities through new customers in other country markets, which can be acquired in the network via platforms at minimal cost (Network-TaP). | Based on Katz and Shapiro (1985, 1986) and Rietveld and Schilling (2020) |
| | Improvement of international activities through cross-subsidisation of customers in individual country markets via digital platforms in partner networks (Pricing-TaP). | Based on Eisenman et al. (2006) and Cusumano et al. (2019) |
| | Improvement of international activities through joint learning via digital platforms in partner networks (Learning-TaP). | Based on Iansiti and Lakhani (2020) |
| | Improve international activities by limiting the outflow of resources and capabilities to network partners via digital platforms (Limit-TaP). | Based on Krylova et al. (2016) |

**Table A2** Platform types: constructs and items (continued)

| *Constructs* | *Items* | *Source* |
|---|---|---|
| Hybrid platform (Cusumano et al., 2019) | Creation of additional degrees of freedom through economies of scope between innovations and improved international activities via digital platforms with clear interfaces in partner networks (Module HyP). | Based on Baldwin and Clark (1997) and Jacobides et al. (2018) |
| | Creation of additional degrees of freedom through economies of scope between innovations and improved international activities together with complementary partners via digital platforms (Compl-HyP). | Based on Milgrom and Roberts (1990, 1992) and Jacobides et al. (2018) |
| | Creation of additional degrees of freedom through economies of scope between joint innovation generation with customers and improved international activities through exchange with global customers via digital platforms in the partner network (CoCr-HyP). | Based on Vargo and Lusch (2004, 2008) |
| | Creation of additional degrees of freedom through economies of scope between innovation through new innovative partners and improved international activities through new customers (worldwide) via digital platforms (Network-HyP). | Based on Katz and Shapiro (1985, 1986) and Rietveld and Schilling (2020) |
| | Creation of additional degrees of freedom through market entry barriers for innovations and improved international activities through cross-subsidisation of individual partners via digital platforms in partner networks (Pricing-HyP). | Based on Eisenman et al. (2006) and Cusumano et al. (2019) |
| | Creation of additional degrees of freedom through economies of scope between innovations and improved international activities with joint learning via digital platforms in partner networks (Learning-HyP). | Based on Iansiti and Lakhani (2020) |
| | Creating additional degrees of freedom through economies of scope between innovations and improved international activities in limiting the outflow of resources and capabilities to network partners via digital platforms (Limit-HyP). | Based on Krylova et al. (2016) |