



The rules of courtship: What drives a start-up to collaborate with a large company?

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ABSTRACT

Collaboration between start-ups and large companies can accelerate innovation and improve the performance of all actors involved. This study aims to analyse the factors that push innovative start-up entrepreneurs to enter into this type of alliance. To do this, we built a conceptual model based on the theory of planned behaviour (TPB). We used a quantitative method and collected data from a sample of 145 Italian startups. The model was then tested, using a partial-least squares approach to structural equation modelling (PLS-SEM). The results confirm the predictions of the TPB, namely that perceived behavioural control, subjective norm, and above all attitude, influence the intention of the start-uppers to collaborate with large companies. These results provide a twofold theoretical contribution by: 1) extending the TPB to the case under examination and 2) helping to explain the formation mechanisms of asymmetrical alliances between young innovative firms and large consolidated companies. This study further provides a practical contribution by indicating the levers that encourage the involvement of start-ups in open innovation programs and, at the same time, make entrepreneurs more aware of the mechanisms activated to involve them.

1. Introduction

Innovative start-ups play an important role in innovation processes (Pushpanathan and Elmquist, 2022). They are inherently agile organizations, typically made up of teams with strong technological skills, capable of rapidly developing and testing new products, services, and business models (Riepe and Uhl, 2020). However, the literature highlighted the limits of new innovative companies. These are mainly attributable to the liability of newness and the liability of smallness (Kor and Misangyi, 2007). In essence, the resource constraints and, specifically, the lack of financial, material, and intangible resources can lead to the failure of potentially valid companies.

Large companies can provide the resources and capabilities that start-ups lack, reducing the difficulties they encounter (Weiblen and Chesbrough, 2015). They can make financial resources, research laboratories, market knowledge, and relationships with potential customers available to new businesses (Prashantham and Kumar, 2019).

In turn, large companies can find in start-ups partners capable of

revitalizing their innovation processes and, in general, promoting a rejuvenation of the organizational culture (Rigtering and Behrens, 2021). Aware of this opportunity, many large companies have, in recent years, launched specific programs to facilitate collaboration with start-ups such as accelerators, innovation hubs, incubators, and corporate venture capital programs, to name the most popular (Shankar and Shepherd, 2019; Steiber et al., 2020).

Despite the enthusiasm towards partnerships between large companies and start-ups, both in the literature and business practice, some reasons hold both partners back. Large companies fear that start-ups are inexperienced and therefore unreliable partners, with the consequent risk of partnership failure, a waste of resources, and possibly damage to the corporate image (Hora et al., 2017). Start-ups fear opportunistic behaviour from large companies, which could exploit their knowledge or technology without worrying too much about the growth of their partners (e.g. Berezki, 2019). This mutual distrust can lead to the loss of important collaboration opportunities.

Most of the studies in the literature assume that start-ups are

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interested in collaboration, seeing only opportunities in a partnership with an established player. However, this assumption becomes less and less tenable as 1) the experiences of collaboration, sometimes having negative results, increase the mistrust of start-ups towards collaboration with large companies in general (Bereczki, 2019; Corvello et al., 2021); 2) the growing offer of collaboration programs promoted by large companies offers many possibilities to start-ups, whereby the most promising ones can decide not to collaborate with a specific large company, preferring others (Allmendinger and Berger, 2020).

Large companies must understand which factors push a start-up to decide to collaborate. In this way, they can actively intervene to attract start-ups, especially the most promising ones, and thus gain a competitive advantage.

In the literature, the analysis of factors motivating start-ups to collaborate is still in an early stage. Some studies focus on organizational or inter-organizational factors that can push startups to collaborate. These studies often analyse, for example, the incentives that large companies can offer. The incentives often mentioned include the prospect of obtaining financing or acquiring customers (e.g. De Groote and Backmann, 2020; Gutmann et al., 2020; Corvello et al., 2021). It has also been highlighted how strategic factors often prove to be more important than strictly economic ones (Das and He, 2006; Riepe and Uhl, 2020). For example, consider the strategic fit with the partner and the possibility of gaining visibility (and the endorsement for their reputation) through the association of one's name with an important brand or acquiring knowledge (Gutmann et al., 2020; Hernández-Chea et al., 2021). Other studies suggest that the formation of a partnership is facilitated by contextual factors such as the presence of a climate of trust (e.g. (Prexl et al., 2018)) or the intervention of intermediaries (e.g. Blanka and Traunmüller, 2020).

It should be noted, however, that in small enterprises of an entrepreneurial nature—as start-ups often are—the decision to collaborate is mainly taken by one individual, namely the entrepreneur. Indeed, start-ups identify themselves to a large extent with the entrepreneur (Mueller et al., 2012). This individual undergoes a wide range of solicitations that influence his/her choices about him/her, as always happens in human decisions. Understanding what factors influence start-up decisions can be very relevant in understanding the formation of partnerships between start-ups and large companies. While in more structured companies the decision-making process involves several actors and is often conditioned by consolidated procedures and practices, it can be said that influencing the choices of start-ups coincides with influencing the choices of start-uppers.

Of note, only a limited number of studies in the current literature have focused on the factors influencing the attitude and intentions of start-uppers (e.g. Simon et al., 2019; Allmendinger and Berger, 2020; Noguti et al., 2021). To address this research gap, we aim to analyse individual and contextual variables that push start-uppers to collaborate with large companies. Our research question is therefore: what are the factors that influence the intention of start-uppers to collaborate with a large company?

To answer the question, we have adopted the theory of planned behaviour (TPB) as a framework (Ajzen, 1985, 1991, 2012). This specific and reputable model assumes that an individual's choice to adopt a certain behaviour is intentional (Tetlow et al., 2015). It then analyses the variables that influence this intention (Fishbein and Ajzen, 2010). TPB is reliable and useful in settings, where it is necessary to change or influence an individual's behaviour with interventions based on communication or persuasion (Hardeman et al., 2002).

We propose a research model based on TPB. In particular, we tested the statistical significance of the impact of the three main constructs used in TPB—namely attitude, perceived behaviour, behavioural control, and subjective norm of the intention of the entrepreneur to start a partnership with a large company. We distributed a self-administered questionnaire to CEOs of companies listed in the Italian register of start-ups (accessible at <https://start-up.registroimprese.it/>). Data were

collected between June and December 2022, and we obtained 145 valid responses. Data were analysed, using Partial Least Squares Structural Equation Modelling (PLS-SEM) (Hair et al., 2019) and the software R. All hypotheses formulated are supported by the results, allowing us to extend TPB to the case of start-uppers decisions to collaborate with large companies while providing valuable insight into this phenomenon. In particular, while subjective norm and perceived behavioural control have been found to have a significant but weak impact, the attitude has a statistically significant and strong impact on the start-upper intention to start a partnership with a large company.

Our research can be valuable for innovation managers of established companies interested in collaborating with start-ups because it provides an understanding of the motives that drive entrepreneurs' decisions to collaborate (Allmendinger and Berger, 2020). For the same reason, it is valuable for purchasing and supply managers of innovative companies interested in integrating innovative start-ups into their supplier base (Kurpjuweit et al., 2021).

On the other hand, it can be of use to the start-uppers themselves, because it makes explicit aspects of their behaviour they might be not aware of. Finally, it can support policy-makers interested in facilitating the emergence of innovation ecosystems, involving both start-ups and established companies to improve the innovation performance of territories and economies (Onetti, 2021; Scuotto et al., 2017a; Scuotto et al., 2017b).

The paper is structured as follows: Section two presents the theoretical background, the research model and hypotheses; section three discusses the methodology for data collection and analysis; the fourth section presents the empirical results; section five includes the discussion of our findings as well as implications for theory and practice, limitations and directions for future research; and section six is dedicated to the conclusions.

2. Theoretical background

2.1. Conceptual framework

Interorganizational collaboration has been studied, using different theoretical perspectives. Among others, the theory of transaction costs (Gulati et al., 2012), also considering the embeddedness of transactions in the social network (Powell, 1990), institutional theory (Bouncken et al., 2016), and the resource-based view (Das and Teng, 2000). Most studies using these theories adopt organization as the unit of analysis. However, in the case of small businesses of an entrepreneurial nature, such as start-ups, the formation of partnerships is often determined by the entrepreneur's individual decisions. Analysing the reasons for these decisions can prove valuable for understanding the phenomenon.

Individual-level factors driving start-ups to partner with large firms have rarely been investigated in the previous literature. Studies have focused on economic reasons, such as the possibility of obtaining financing (e.g. De Groote and Backmann, 2020), paying customers (Gutmann et al., 2020; Corvello et al., 2021), or strategic ones, such as the possibility of having access to new markets (Simon et al., 2019), obtaining new knowledge (Das and He, 2006; Riepe and Uhl, 2020), or improving one's reputation (Gutmann et al., 2020; Hernández-Chea et al., 2021).

Among the few scholars who have considered the perspective of entrepreneurs, Simon and colleagues studied the impact on the intention to collaborate in the perception of start-uppers of the advantages and disadvantages of collaborating with large companies (Simon et al., 2019). Among the advantages are, for example, the access of large companies to technologies and markets, while among the risks are misappropriation and becoming dependent on the customer. Allmendinger and Berger (2020) also investigated the factors that push start-ups to collaborate with large companies and combine organizational factors (such as the level of openness of the company) and relational factors (such as the compatibility of the portfolio between the large

company and the start-up), with an individual factor, i.e. entrepreneurial self-efficacy. This factor moderates the relationship between organizational-level variables and the willingness to collaborate. In doing so, the authors emphasize the importance of individual factors when studying the behaviour of start-ups.

These studies have the merit of posing the problem of collaboration between start-ups and large companies, highlighting the central role of the entrepreneur's perceptions and decisions. In particular, the study by Simon et al. (2019) indirectly introduces the theme of those factors that favour or hinder a positive attitude of start-uppers towards collaboration. However, none of the studies cited addresses the issue of the entrepreneur's intention to collaborate directly and systematically.

Several theories have analysed the factors that explain an individual's intention to adopt a certain behaviour. Among the main ones is the theory of reasoned action and its extension (Fishbein, 1967), namely the theory of planned behaviour (Ajzen, 1985). The theory of planned behaviour (TPB) aims to explain and predict human behaviour. First proposed by Icek Ajzen in 1985, it suggests that people's behaviour is determined by their intentions (Ajzen, 1985). Intentions are in turn influenced by people's attitudes, subjective norms, and perceived behavioural control.

Attitude is "the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question" (Ajzen, 1991). According to the TPB, people's attitudes about behaviour are influenced by their beliefs about the behaviour and the outcomes it produces, as well as their evaluations of those outcomes (Eagry and Chailen, 1993). Subjective norms refer to people's perceptions of social pressure to perform or not perform a behaviour (Hee, 2000), while perceived behavioural control indicates people's perceived ability to perform a behaviour (Ajzen, 1991). Together, these three factors (attitudes, subjective norms, and perceived behavioural control) determine people's intentions to perform a behaviour, which in turn predicts their actual behaviour.

The theory of planned behaviour has been analysed in a large variety of fields, to understand the factors that determine specific behaviours and possibly design interventions to modify them. For example, it has been used in the health sector, to analyse the intention to smoke e-cigarettes (Dobbs et al., 2019) or to predict health-related behaviours (Godin and Kok, 1996); in the context of education (Cooper et al., 2016; de Leeuw et al., 2015; Hosen et al., 2023); in marketing to analyse consumer purchasing behaviour (Moons and de Pelsmacker, 2012); in workplace studies, to analyse environmental behavioural intentions (Greaves et al., 2013); and in entrepreneurial studies, to build an entrepreneurial intention questionnaire with a view towards analysing its psychometric properties (Liñán and Chen, 2009).

In the field of innovation and entrepreneurship, the TPB has often been used to study the entrepreneurial intention of various categories of individuals, such as students (Maresch et al., 2016), managers (Karadağ and Şahin, 2021) or researchers (Drăgan et al., 2022). In other cases, it has been studied to analyse the behaviour of corporate decision-makers (Acedo and Galán, 2011).

Entrepreneurs who have launched a start-up are those decision-makers whose choices have a strong impact on the behaviour of the companies in which they work (Mueller et al., 2012). Indeed, in a large company, structured decision-making processes mediate between the decisions of the top management and the effective adoption of a certain measure. In start-ups, the entrepreneurs' decision-making processes have a much more direct effect.

The theory of planned behaviour offers coherent theoretical support for systematically analysing this issue. Following the logic of the TPB, it is necessary to analyse the factors that exert a positive influence on the attitude of start-uppers towards collaboration with large companies and identify the subjects who can exert social pressure on them and the levers that affect an entrepreneur's level of confidence in his ability to successfully lead a collaborative project.

Overall, the variables considered by TPB can be what drives a start-

up to collaborate with a large company. Consequently, we have built a theoretical model that applies the TPB to this phenomenon to be tested through a subsequent empirical investigation.

2.2. Research model and hypotheses

In the following paragraphs, we propose a model based on TPB to explain the intention of start-up entrepreneurs to participate in collaborative projects with large companies. In particular, we will explain which elements determine the three central variables of TPB, namely attitude (ATT), subjective norm (SN), and perceived behavioural control (PBC) in this case.

The overall model is reported in Fig. 1. Each of the following paragraphs provides arguments, supporting one of the causal hypotheses represented in the model.

2.2.1. Attitude towards collaboration with large companies

In the theory of planned behaviour, attitude is considered a function of an individual's behavioural beliefs. In other words, attitude is determined by the expected consequences of a specific behaviour (Eagry and Chailen, 1993). The attitude will be positive if the expected consequences are evaluated positively, and it will be negative if not (Cheng et al., 2006). In the case analysed here, it is expected that the attitude depends upon the consequences that the start-upper expects following the collaboration with a large company.

The existing literature has identified several possible consequences of cooperation with a large company. Among them are: access to financing (Enkel and Sagmeister, 2020a; Sears et al., 2020; Huang and Madhavan, 2020) and new markets (Hora et al., 2017; Boni and Joseph, 2019; Gutmann et al., 2020; Huang and Madhavan, 2020; Hernández-Chea et al., 2021), better reputation (Stern et al., 2014; Riepe and Uhl, 2020), learning from partners (Corvello et al., 2021; Hübel et al., 2022), and improving R&D skills (Kamuriwo et al., 2017; Bereczki, 2019). For example, Hora and colleagues point out that being associated with a large company helps start-ups improve their reputation, while at the same time, it facilitates the acquisition of new customers (Hora et al., 2017). Riepe and Uhl, on the other hand, point out that start-ups see collaboration with large companies as an opportunity to acquire

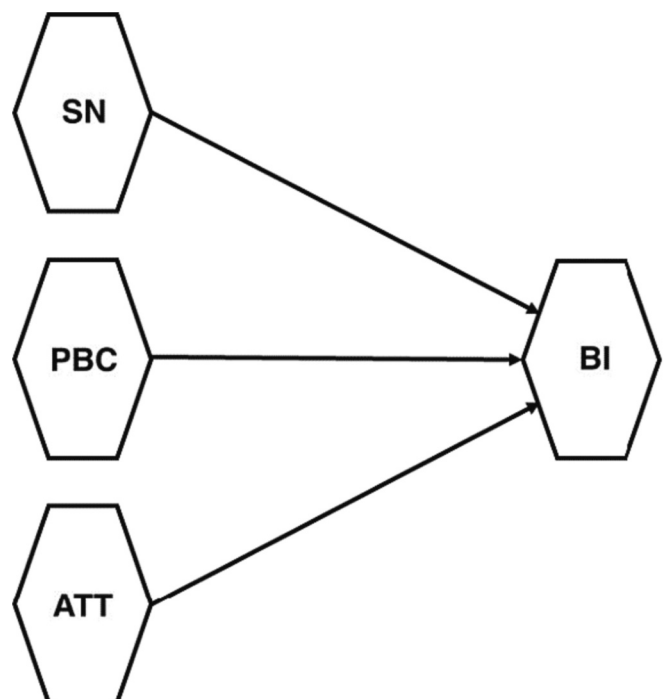


Fig. 1. The overall model.

knowledge of how an industry works (Riepe and Uhl, 2020).

An entrepreneur's attitude is, therefore, expected to be positive to the degree that he/she considers it probable that positive consequences such as those listed above will occur, and the more he attributes value to these results.

More formally we can assert that:

H1. Attitude towards collaboration with large enterprises has a positive impact on the behavioural intention of start-uppers to collaborate with a large enterprise.

2.2.2. Subjective norm

The subjective norm is a well-known concept that emphasizes decision-making processes within the behaviour principle and corresponds to the perception of social pressure upon an individual to adopt (or not) a certain behaviour (Ajzen, 1991; Hee, 2000). Each individual is influenced by the others around him/her or, better said, a person's behaviour is influenced by his/her beliefs about what people important to him/her think is right or wrong (Ajzen, 1985). The latter is composed of influencing people in his/her life and his/her decisions, for example, by family members or friends. These subjects are better known as social groups.

Subjective norm prioritizes the beliefs of these social groups, especially about individuals' levels of engagement in entrepreneurial activities (Kautonen et al., 2015). In other words, SN reflects the pressure from the above-cited social groups to agree or disagree towards having specific entrepreneurial behaviours (Ajzen, 2002), such as potential collaborations, and, therefore, to comply with certain (specified) norms. Concerning uppers, it is expected that the decisions of these entrepreneurs, including that of partnering with a large company, are to some extent influenced by the opinions of significant people around them.

Among the subjects who can exercise this type of influence, the literature on TPB has identified, for example, family and friends or public opinion (Laroche et al., 2001). In the case of entrepreneurs and, in particular, start-uppers, the likely influencers are lenders, investors, partners, and customers. In this case, SN reflects the perceptions of these categories about an entrepreneur's decision to collaborate with a large company. Inevitably, these are conditioned by the strength of his/her motivation to conform to such perceptions.

According to TPB forecasts, when the start-upper believes that people around him/her belonging to these categories see collaboration with start-ups positively, then the value of the "subjective norm" variable will be higher. The stronger the subjective norm, the more likely it is that the entrepreneur intends to start a partnership with a large company. Instead, if the above-cited relevant categories perceive such partnerships as risky or unfavourable, entrepreneurs are less likely to enter into this type of alliance. Given the importance of these categories in the life of a young venture, it is reasonable to assume that SN may play a positive and important role in explaining the intention to collaborate with a large company and—hopefully—to create mutual and long-term benefits (as well as a priority of success for startups) (Spender et al., 2017).

Formally we can assert that:

H2. Subjective norm has a positive impact on the behavioural intention of start-uppers to collaborate with a large enterprise.

2.2.3. Perceived behavioural control

Perceived behavioural control expresses the perception that an individual has of being able to control a certain situation (Ajzen, 1991). More specifically, the subject believes that a series of actions must be completed to achieve the behaviour analysed. The PBC expresses how much the subject feels able to carry out those activities. The presence or absence of adequate resources and expertise can influence PBC (Chang, 1998). The TPB assumes that the perception of being able to carry out preparatory activities, given that one has adequate resources and skills, is associated with the behavioural intention to assume the behaviour in question. The PBC emphasizes either ease or difficulty in conducting

entrepreneurial activities (Ajzen, 2002) such as entering into a partnership with a large company, and it reflects past experiences or anticipated impediments/obstacles (Ajzen, 1991). Entrepreneurs often face difficulties and challenges in the early stages of their startup journey. In fact, the ease of handling such difficulties/challenges is related to the PBC levels: higher levels lead to greater entrepreneurial intentions to enter into alliances with large companies on behalf of the firm and vice-versa.

In our specific case, PBC refers to an entrepreneur's perception of the ease or difficulty of entering into alliances with large companies on behalf of his/her firm. The TPB model includes variations of the PBC depending upon the situations and actions of the subjects. Specifically, contextualizing, entrepreneurs may believe that their entrepreneurial actions or outcomes are, potentially, the result of their internal 'locus of control' (Jennings and Zeithaml, 1983).

In the present case, a start-upper may or may not feel ready to enter into a business alliance with a large company. This behaviour is influenced by his/her confidence in his/her abilities, and the choice of entrepreneurial activities towards entering into such an alliance can be influenced by his/her PBC. In this sense, the efforts made by the entrepreneur in these activities (including thoughts and emotional actions) to achieve a sense of control are also important. Confidence in his/her technological skills, the quality of its products/services, and the ability to interact with the market—particularly in terms of new market opportunity identification, customer satisfaction and management of marketing activities (Liñán and Chen, 2009; Hau and Kang, 2016)—can determine higher confidence in its ability to effectively manage the partnership (Allmendinger and Berger, 2020).

The decision to enter new partnerships with large companies must therefore be preceded by the existence (or not) of required resources and opportunities (Ajzen, 1987), thus considering potential constraints or limitations and the identification of the personal skills possessed by the entrepreneurs (Hsieh et al., 2017). The perception of these skills/abilities is related and based on the entrepreneurs' confidence level, concerning the intention to enter such partnerships. The entrepreneur's degree of confidence in his/her ability to manage the partnership thanks to the skills, market knowledge, and equipment in terms of resources, acts as a relevant and non-negligible antecedent of the formation of the decision to enter the partnership.

In line with the forecasts of the TPB, we expect that a start-upper with a higher PBC, determined by confidence in his business capabilities, is more readily available to collaborate with a large company.

In other words:

H3. Perceived behavioural control has a positive impact on the behavioural intention of start-uppers to collaborate with a large enterprise.

3. Methodology

3.1. Sample and data collection

Many countries have introduced specific regulations for startups in recent years. For example, the U.S. (Jumpstart Our Business Startups Act, Public Law 112–106) (Hamel, 2016), Spain (the new Startup Law 28/2022 on the promotion of the startup ecosystem) (Ushakova, 2023), India (Startup India Initiative) (David et al., 2021), and Italy (The Italian Startup Act) (Biancalani et al., 2022). We decided to focus on cases from a single country, i.e. Italy, because specific regulations and government support may impact startup behaviour differently. Moreover, the availability of complete and clear information on Italian start-ups allowed us to get in touch with these companies and administer the questionnaire correctly (Corvello et al., 2023a). Thus, to answer the research questions, we collected data from Italian start-ups. Italy represents a case of considerable interest since it has implemented a specific regulation (Decree Law 179/12) and a special registry for innovative

start-ups, resulting in a terrific growth in the number of innovative start-ups in the last ten years (Troise et al., 2022).

We used the special register for innovative start-ups (available at <https://start-up.registroimprese.it/>) to identify a list of start-ups to be contacted for our survey. Not all companies on the register provide contact details. At the beginning of September 2022, we managed to find contact details for 1312 companies. Data collection had been carried out through a self-administered questionnaire (Evans and Mathur, 2018). First of all, to assess the correctness and completeness of the survey (Podsakoff et al., 2012), we performed a pilot test on five start-ups. We received feedback to make the questionnaire clearer (Ruel et al., 2016).

The survey was performed between September and November 2022. To involve knowledgeable informers, we addressed the survey to the company CEO (or other comparable figures, e.g. the general manager). We obtained 152 answers, with an overall response rate of about 11 %. We discarded 7 responses, classified as outliers according to the Mahalanobis distance test. We obtained a final sample of 145 start-ups. Annex T1 reports a characterization of the sample.

The sample is mainly made up of men (84.83 %) while women are only 13.79 %. This subdivision is in line with the Italian panorama consisting of a strong prevalence of male start-uppers (Ammirato et al., 2023). As for the educational level, the educational qualifications held by the interviewees were a master's degree (26.21 %) and an MBA (25.52 %). 19.71 % of interviewed people held a PhD (19.71 %). Less frequent was the high school diploma (16.79 %), followed distantly by the middle school diploma (1.46 %). The prevalent form of financing to which start-ups had access was in most cases (37.93 %) made up of own funds, i.e., capital made available by the owners of the company, then public funds (13.79 %) and the capital provided by business angels (10.34 %). Respondents also indicated the amount raised in the case of external funding. For many (30.34 %) the external support was negligible, if not non-existent, contributing not exceeding 10,000 euros. For many others (23.45 %), however, the amount provided was between 100,001 and 500,000 euros.

3.2. Measures

To measure constructs in our model, we adapted measures that have been proven reliable in previous studies; they are reported in Annex 2. The measures were anchored on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The items adopted in the questionnaire were developed by adapting measures that had been previously validated by other researchers. Measurement items adopted in this study have been used in previous studies in management, with slight modifications and extensions to reflect the context of collaboration between start-ups and large corporations.

Items of attitude were adapted and developed from (Bock et al., 2005; Hau and Kim, 2011; Perri et al., 2020). Items for subjective norms were adapted to this research starting from items proposed in (Bock et al., 2005; Kolvereid and Isaksen, 2006), while items for perceived behavioural control were derived from Liñán and Chen (2009) and Hau and Kang (2016). Finally, the items for the dependent variable—behavioural intention—were adapted from Liñán and Chen (2009) and Puerta-Sierra et al. (2022) research.

Since the questionnaire was administered in Italian and the original scales were in English, we followed standard translation and back-translation procedures. Moreover, we decided to intermix, throughout the questionnaire, items related to the different constructs, to reduce common method bias (Podsakoff et al., 2012).

4. Results

This study employed the partial-least squares approach to structural equation modelling (PLS-SEM), as it is well suited for small sample sizes (Willaby et al., 2015) and exploratory studies (Hair et al., 2019). PLS-SEM is widely applied in many organizational studies (Hair et al.,

2012; Richter et al., 2015; Rigdon, 2016) as it enables researchers to deal with it complex models without imposing distributional assumptions on the data. Moreover, it overcomes the dichotomy between explanation and prediction, which is the basis for confirming hypotheses and developing managerial implications (Hair et al., 2019). This approach 'perfectly fits today's research environment, which is not only concerned with testing hypothesized models but also with deriving managerial recommendations that are predictive by nature' (Becker et al., 2023, p. 322). Moreover, this approach is recommended for datasets with a limited number of indicators per latent variable (Hair et al., 2019). The analysis for this study was carried out using R with SEMinR package.

We carried out a full-collinearity analysis to assess the presence of common method bias (Koch et al., 2014). The Variance Inflation Factor (VIF) values between the latent variables were calculated. Since all VIF values are less than 5, we can now assert that the structural model does not present collinearity problems (Hair Jr et al., 2017) PLS-SEM was performed according to two main steps: (1) evaluation of the quality of the measurement model, and (2) evaluation of the structural model's predictive power (Henseler et al., 2009; Hair Jr et al., 2017).

4.1. Measurement model

We evaluated the outer model's quality by testing its reliability indicators. As reported in Table 1, we found that none of the items had an outer loading lower than 0.6, (Chin, 1998; Henseler et al., 2009).

We also assessed the composite reliability (Hair Jr et al., 2017), Dillon-Goldstein's rho (Chin, 1998), and Cronbach's alpha (Hair Jr et al., 2017). We found that all values were higher than 0.7, indicating that the constructs are reliable. Additionally, we examined the average variance extracted (AVE) and found that all values were higher than 0.50, with the lowest value for subjective norms. Finally, following suggestions provided by Ravand and Baghaei (2016), we used the cross-loading approach to ensure discriminant validity proposed by Ravand and Baghaei (2016). Overall, the measurement model validity tests yielded positive results.

Table 2 reports the reliability and validity of the measures, while Table 3 shows a detail of discriminant validity.

Discriminant validity was further tested using the Fornell-Larcker criterion (Table 4). In particular, the Fornell Larcker Criteria table reports the square root of AVE on the diagonal and constructs correlations on the lower triangle. The results show that the square root of the AVE of each construct is greater than its highest correlation with any other construct, so the Fornell-Larcker criterion has been verified (Hair Jr et al., 2017).

Finally, an analysis was performed, using the HTMT (Heterotrait-Monotrait Ratio) method. As shown in Table 5, the constructs are all below the threshold value; therefore, the discriminant validity between pairs of reflexive constructs is confirmed. This last verification was made even more complete by testing the statistical significance of HTMT with

Table 1
Outer loadings.

	ATT	SN	PBC	BI
BI1				0.797
BI2				0.918
BI3				0.845
ATT1	0.857			
ATT2	0.921			
ATT3	0.896			
ATT4	0.862			
SN1		0.660		
SN2		0.706		
SN3		0.717		
SN4		0.737		
PBC1			0.758	
PBC2			0.956	

Table 2
Reliability and validity of the measures.

		OL	Cr. Alpha	rho_C	AVE	rho_A	R ²
ATT	ATT1	0.857	0.907	0.935	0.783	0.909	-
	ATT2	0.921					
	ATT3	0.896					
	ATT4	0.862					
SN	SN1	0.660	0.672	0.799	0.501	0.681	-
	SN22	0.706					
	SN33	0.717					
	SN4	0.737					
PBC	PBC1	0.758	0.696	0.852	0.744	1.020	-
	PBC2	0.956					
BI	BI1	0.797	0.814	0.890	0.731	0.814	0.597
	BI2	0.918					
	BI3	0.845					

Table 3
Discriminant validity.

ITEM	ATT	SN	PBC	BI
ATT1	0.857	0.407	0.188	0.645
ATT2	0.921	0.412	0.125	0.691
ATT3	0.896	0.377	0.197	0.670
ATT4	0.862	0.433	0.242	0.638
SN1	0.186	0.660	0.108	0.270
SN2	0.274	0.706	0.051	0.287
SN3	0.320	0.717	0.055	0.330
SN4	0.455	0.737	0.270	0.424
PBC1	0.092	0.114	0.758	0.142
PBC2	0.233	0.194	0.956	0.317
BI1	0.680	0.412	0.196	0.797
BI2	0.654	0.393	0.227	0.918
BI3	0.572	0.416	0.336	0.845

Table 4
Discriminant validity – Fornell-Larcker criterion.

	ATT	SN	PBC	BI
ATT	0.885	.	.	.
SN	0.460	0.706	.	.
PBC	0.211	0.189	0.863	.
BI	0.747	0.477	0.294	0.855

Table 5
Discriminant validity – Heterotrait-Monotrait Ratio (HTMT).

	ATT	SN	PBC	BI
ATT
SN	0.558	.	.	.
PBC	0.235	0.230	.	.
BI	0.867	0.624	0.352	.

Table 6
Heterotrait-Monotrait Ratio (HTMT) – Confidence intervals.

	Original Est.	Bootstrap Mean	Bootstrap SD	2.5 % CI	97.5 % CI
ATT -> SN	0.558	0.561	0.089	0.378	0.732
ATT -> PBC	0.235	0.255	0.089	0.101	0.440
ATT -> BI	0.867	0.864	0.050	0.755	0.949
SN -> PBC	0.230	0.287	0.094	0.132	0.500
SN -> BI	0.624	0.630	0.100	0.425	0.817
PBC -> BI	0.352	0.367	0.089	0.197	0.549

the Bootstrapping procedure (Rousselet et al., 2021).

The results shown in Table 6 further confirm that no discriminant validity problems are present.

4.2. Structural model and hypotheses testing

We analysed the structural path coefficients retrieved through the bootstrapping method, based on 5000 resamples (Hair Jr et al., 2017). Through the R² value, we then evaluated the related predictive power of the constructs. Table 7 shows the R² values of the endogenous constructs. We found a good predicting power for behavioural intention (0.597).

All the hypotheses proposed in this paper received support based on the results of our research. In particular, ATT (0.65***), SN (0.154**), and PBC (0.127**) have an impact on behavioural intention.

The results of the tests of the hypotheses are reported in Table 6, and the corresponding data can be found in Fig. 2.

Results show that attitude, subjective norms, and perceived behavioural control have a fairly high ability to predict a startup's behavioural intention to engage in a collaboration with a large corporation. The R² value shows that 59.7 % of the variance of behavioural intention is explained by the three independent variables adopted in this study. Furthermore, it is possible to observe that the exogenous constructs, Perceived Behavioural Control and Subjective Norms, have a small effect on behavioural intention while the effect of Attitude is considerably high.

5. Discussion

The main aim of our study was to enrich the understanding of the mechanisms of alliance formation between large companies and startups (Dushnitsky and Lenox, 2005; Weiblen and Chesbrough, 2015; Kurpjuweit and Wagner, 2020a; Kurpjuweit and Wagner, 2020b). In particular, we chose to focus on the start-up point of view and investigated the factors driving entrepreneurs to develop the intention to collaborate with large companies (Allmendinger and Berger, 2020; Riepe and Uhl, 2020; Corvello et al., 2021). The underlying idea was that once the entrepreneur has developed the intention to collaborate, there are few obstacles for the start-up to enter into a collaborative relationship.

To analyse the phenomenon, we chose the TPB (Ajzen, 1985, 1991, 2012) as our reference theory. It proved to be effective in explaining, in many fields, an individual's intention to adopt a certain behaviour. We then analysed the impact of the three main constructs considered by the TPB—namely attitude, subjective norm, and perceived behavioural control—on the intention of a start-upper to collaborate with a large company.

The results of our PSL-SEM analysis demonstrate that all three variables have a significant impact on behavioural intention to cooperate.

The variable that has the strongest impact is attitude. TPB holds that attitude is a function of an individual's behavioural beliefs. In this study, we have hypothesized that a start-upper expects some positive

Table 7
Hypothesis testing.

HP	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
ATT -> BI	0.650	0.637	0.065	9.983	0.000
PBC -> BI	0.154	0.167	0.062	2.470	0.004
SN -> BI	0.127	0.134	0.053	2.399	0.005

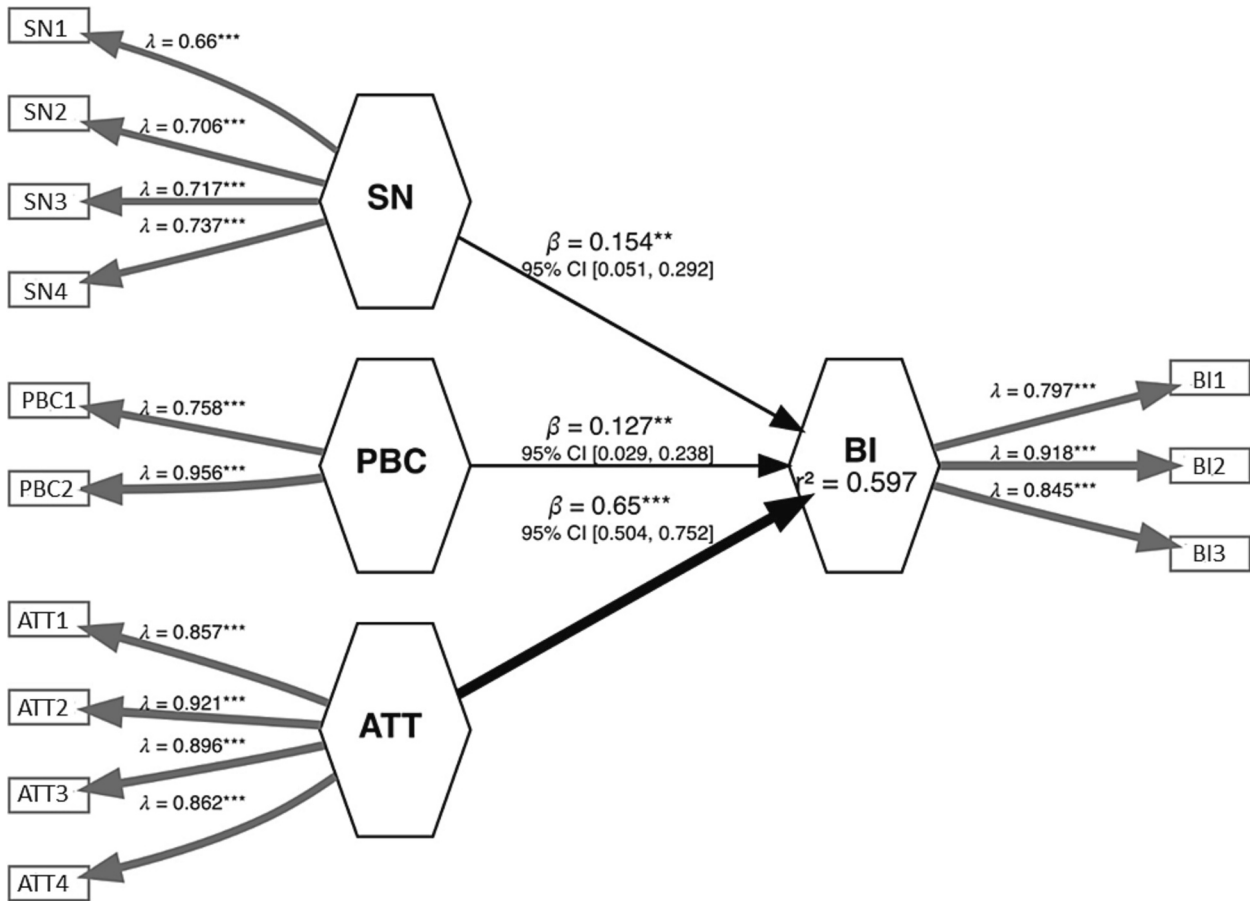


Fig. 2. Final model.

consequences from collaboration with large companies, including access to financing (Enkel and Sagmeister, 2020a; Huang and Madhavan, 2020) reputation (Riepe and Uhl, 2020), and learning and innovation (Hübel et al., 2022; Kamuriwo et al., 2017). Our results support the idea that attitude, driven by the belief that collaboration with large companies brings such positive consequences, has a positive impact on the intention to collaborate. In other words, the results indicate that when a start-upper has positive perceptions of collaboration with large companies, it is more likely that he intends to enter a partnership with them. In this respect, the study also confirms the importance of factors like funding (Riepe and Uhl, 2020), access to a larger market (Rothaermel, 2002), and improvement of reputation (Hernández-Chea et al., 2021).

The subjective norm has a statistically significant impact on behavioural intention, although this link is weak. Subjective norm reflects the perception of social pressure to adopt a certain behaviour (Hee, 2000). Specific groups, like family and friends or public opinion (Laroche et al., 2001) can exert an influence on an individual's decisions. Specifically, start-uppers can be influenced by the perception they have of the opinions of significant subjects such as funders, customers, or partners. This perception has an impact on their intention to collaborate with large companies. Contrary to what has been found in other cases (e.g. Laroche et al., 2001), this influence is not as relevant as that of the personal perception of the obtainable benefits, expressed by the attitude. In this respect, our findings confirm only partially what has been found in previous studies on the impact of subjective norms on the behaviour of entrepreneurs (e.g. Yousaf et al., 2015; Aloulou, 2016; Tiwari et al., 2017; Khan et al., 2023; Hosen et al., 2023): the impact exists but the effect is relatively small.

Finally, PBC also has a significant impact. The perception of not being able to manage a business relationship with a large company can

limit the start-upper's willingness to enter into a partnership. However, this effect seems to have less relevance than attitude; therefore, the personal perception of the benefits that the collaboration offers to the start-up. This confirms the results of prior literature on the role of PBC in determining the behaviour of entrepreneurs (e.g. Ferraris et al., 2020; Malodia et al., 2023). It seems to confirm the results of Allmendinger and Berger who see the entrepreneur's confidence in their in-view abilities as a relevant factor for the formation of alliances between start-ups and large companies (Allmendinger and Berger, 2020).

5.1. Theoretical contributions and implications

The study investigates the factors that drive a start-up to develop the intention to collaborate with large companies. Using the TPB as a theoretical framework, we assumed that the intention to collaborate was a relevant antecedent of actual collaboration (Ajzen, 1985). Our study also confirms the validity of the TPB in the present case: as in other cases (e.g. Curtis et al., 2010; Hardeman et al., 2002; Scott et al., 2019), the intention to adopt a certain behaviour is shown to be determined by the variables attitude, subjective norm and perceived behavioural control. In other words, a start-upper's intention to collaborate with a large company depends upon his perception of the advantages that collaboration would bring to his company (attitude), that this behaviour would be approved by people significant to him (subjective norm), and he could effectively manage the collaboration (perceived behavioural control).

Our results enrich the literature that studies entrepreneurial decisions by adopting the TPB as a framework. The study is of particular interest because, unlike the majority of existing studies (e.g. Maresch et al., 2016; Karadağ and Şahin, 2021; Drăgan et al., 2022), it does not

resort to an analyse of an individual's decision to undertake an entrepreneurial activity in general. Rather, it studies the intention to undertake a specific entrepreneurial behaviour, i.e., collaborating with a large company.

Moreover, this study advances knowledge on the phenomenon of collaboration between start-ups and large companies. It is part of those studies that analyse the mechanisms of the formation of alliances and, in particular, of asymmetric alliances (Simon et al., 2019; Allmendinger and Berger, 2020; Noguti et al., 2021). Responding to the invitations of other authors, it adopts the point of view of start-ups, which in the previous literature had often been overlooked in favour of that of large companies.

It is one of few studies that consider the role of individual factors in explaining the formation of alliances between young innovative firms and large established firms. In particular, it analyses which factors are perceived by the start-upper as having the greatest weight on the decision to collaborate. Although all three antecedents analysed have a significant impact, the results highlight that the strength of the relationship between subjective norm and behavioural intention and the relationship between perceived behavioural control and behavioural intention is low, while the strength of the relationship between attitude and behavioural intention is high. This seems to suggest a utilitarian attitude of start-uppers, influenced predominantly by perceived benefit, and less by the actors around them or by psychological aspects such as PBC. In this sense, our article confirms and reinforces what Simon and colleagues found (Simon et al., 2019).

5.2. Implications for practice

The findings of our work have relevant implications for corporate managers, intermediaries, start-up entrepreneurs, and policymakers. The programs that large companies activate to engage with start-ups, for example, corporate accelerators, have increased considerably in recent years (e.g. Gutmann et al., 2020; Shankar and Shepherd, 2019). Although collaboration with a large company always represents a good opportunity for start-ups, it is also true that these initiatives are not always successful. As the phenomenon spreads, start-ups become aware of the possible negative consequences, such as misappropriation or dependence upon a single customer, and they can choose not to join partnerships (Sears et al., 2020).

Furthermore, the fact that many large companies seek the collaboration of the same start-ups, especially the most promising ones, means that the latter can choose. For managers who deal with collaboration with start-ups in large companies, therefore, it is important to understand the levers upon which to act to push a start-up to collaborate with their own company. Our study, therefore, provides the managers of large companies with the conceptual tools to be effective in involving the most promising start-ups in their collaboration programs.

All this entails the need for those large companies that want to involve high-potential start-ups to invest resources in building dynamic ecosystems, with rich knowledge flows and a climate of mutual trust (Prexl et al., 2018). For the same reason, our study is important for managers of those intermediaries that support large companies in the implementation of programs such as start-up accelerators, start-up supplier programs, or innovation hubs (Schepis, 2020).

Our results highlight a greater importance of utilitarian factors than social pressure or irrational psychological factors. For the start-up, factors such as the perception of being able to learn from the partner are important. This means that large companies must focus on the correct exchange of knowledge with start-ups. Transparency, which creates a climate of trust, is also important. Only given a rich exchange of knowledge and the possibility of establishing a climate of mutual trust will the entrepreneur feel well-disposed towards collaboration.

The observations just made underline the importance of our study for start-uppers. The results can increase knowledge of the motivations driving start-uppers to collaborate with large companies. In the face of

campaigns aimed at inducing them to collaborate, entrepreneurs of innovative start-ups can be more aware and avoid being excessively conditioned.

Building effective innovation ecosystems is a goal for policymakers (Alänge et al., 2022). Financing and facilitation programs have been launched in many countries to facilitate collaboration between large companies and start-ups. Understanding the factors that push entrepreneurs to participate in these programs allows public decision-makers to be more effective in designing these programs and in involving a greater number of start-ups.

5.3. Limitations and future research

Our study has some limitations that provide opportunities for further research. First, the sample analysed concerns only Italian companies. National policies and local characteristics of the economy can influence the behaviour of start-ups in many respects, including the willingness to collaborate with large companies (Corvello et al., 2023b). Future studies should evaluate how extendable the results are to other national contexts, either by replicating the study or by considering international samples.

The proposed model considers the three variables of TPB: attitude, subjective norm, and perceived behavioural control (Ajzen, 1985). Other variables could be introduced to increase the predictive power of the model. Future research could look into other factors related to entrepreneurs' perceptions. For example, the fear of misappropriation and dependence upon the customer has been cited in the literature as a brake on collaboration (Allmendinger and Berger, 2020; Sears et al., 2020). Future research could introduce the perception of these variables as additional study elements.

In our research, we evaluated the intentions of start-uppers as individuals. Many start-ups, however, are led by teams of entrepreneurs who influence and limit each other (e.g. Jin et al., 2017). The study of interaction dynamics in start-upper teams is a promising line of research for future studies. Finally, the research is limited to evaluating the start-upper will to collaborate. The model could be extended also considering how often this intention translates into effective collaborations, possibly confirming the predictions of the TPB also in this case.

6. Conclusion

Collaboration between start-ups and large companies can accelerate innovation for both actors involved. This type of alliance favours the exchange of knowledge between partners with complementary resources (Rothaermel, 2001a; Rothaermel, 2001b). The effectiveness of these exchanges, however, presupposes a climate of trust among the participants.

This study analysed the factors that push entrepreneurs in start-ups to collaborate with large companies. To reach this aim, we proposed a model based on TPB to explain which elements determine the three central variables of TPB (namely attitude, subjective norm, and perceived behavioural control). The PLS-SEM approach has been used to evaluate the quality of the measurement model and the structural model's predictive power. Results confirm the hypotheses that attitude, subjective norms and perceived behavioural control have a fairly high ability to predict a startup's behavioural intention to engage in a collaboration with a large corporation.

The results of this study provide managers of large companies with the conceptual tools to effectively involve start-ups in their partnership programs and, at the same time, make start-uppers more aware of the levers that can be used to push them to enter a partnership. Awareness of each other's expectations, perceptions, and goals can foster the trust referred to above and thus the effectiveness of knowledge exchanges.

This is particularly important in complex and dynamic contexts, where the speed of innovation is a decisive competitive factor; for example, contexts of crisis or rapid technological development and

digitization (Schepis, 2020). The creation of cohesive and dynamic innovation ecosystems is a way to not become overwhelmed by this complexity.

Finally, our findings highlight practical future scenarios and may be useful for strategic planning and forecasting. The importance of this study is accentuated by the uncertain and challenging scenario currently faced by start-ups and companies, along with the related need to improve their mutual knowledge.

Declarations of competing interest

None.

Annex 1

Characterization of the sample.

	Frequency (%)		
Gender			
Man	123 (84.83 %)		
Woman	20 (13.79 %)		
Prefer not say	2 (1.38 %)		
Educational level			
Middle School diploma	2 (1.38 %)		
High school graduation	23 (15.86 %)		
Bachelor's Degree	17 (11.72 %)		
Master's Degree	38 (26.21 %)		
MBA	37 (25.52 %)		
PhD	28 (19.31 %)		
The main form of financing			
Own funds	55 (37.93 %)		
Public Funds	20 (13.79 %)		
Business angels	15 (10.34 %)		
Venture capital	9 (6.21 %)		
Accelerators	8 (5.52 %)		
None	8 (5.52 %)		
Grants and/or prizes in competitions	8 (5.52 %)		
Bootstrapping	7 (4.83 %)		
Friends and/or family	5 (3.45 %)		
Corporate venture capital	3 (2.07 %)		
Seed financing	3 (2.07 %)		
Crowdfunding	2 (1.38 %)		
Equity Crowdfunding	1 (0.69 %)		
Turnover and margins	1 (0.69 %)		
Financing amount			
From 0 to 10,000 euros	44 (30.34 %)		
From 10,001 to 20,000 euros	13 (8.97 %)		
From 20,001 to 100,000 euros	24 (16.55 %)		
From 100,001 to 500,000 euros	34 (23.45 %)		
From 500,001 to 1,000,000 euros	12 (8.28 %)		
More than 1,000,000 euros	18 (12.41 %)		
	YES	NO	
Possession of IPOs	76 (52.41 %)	69 (47.59 %)	
Participation in an Incubation program	31 (21.38 %)	114 (78.62 %)	
Participation in an Accelerator program	62 (42.76 %)	83 (57.24 %)	
Participation in Start-up Competition	96 (66.21 %)	49 (33.79 %)	
Past involvement in Open Innovation projects	31 (21.38 %)	114 (78.62 %)	
Past collaborations with large companies	81 (55.86 %)	64 (44.14 %)	

Annex 2

Measures

Participating in an open innovation project with a big corporate, for my startup would be			Source
ATT1	Extremely negative	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	Extremely positive (Bock et al., 2005; Hau and Kim, 2011; Perri et al., 2020)
ATT2	Extremely undesirable	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	
ATT3	Extremely unuseful	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	

(continued on next page)

(continued)

Participating in an open innovation project with a big corporate, for my startup would be		Source
ATT4	Extremely inappropriate	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> Extremely appropriate
		Do not Agree <————> Fully Agree
SN1	I think our company's most relevant customers would be positive if we started a collaboration in open innovation projects with large international companies	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
SN2	I think our company's most relevant business partners would be positive if we started a collaboration in open innovation projects with large international companies	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
SN3	I think our company's most relevant employees would be positive if we started a collaboration in open innovation projects with large international companies	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
SN4	I think public opinion would be positive if our company started a collaboration in open innovation projects with large international companies	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
SN5	I think investors be positive if our company started a collaboration in open innovation projects with large international companies	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
SN6	I think our Family and Friends would be positive if we started a collaboration in open innovation projects with large international companies	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
		Do not Agree <————> Fully Agree
PBC1	My company is good at identifying new market opportunities for new products and services	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
PBC2	My company can see opportunities that other companies do not see	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
PBC3	My company can market a product or service that will satisfy customer needs and wants	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
PBC4	My company can design and manage an effective marketing/advertising campaign for a new product or service	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
		Do not Agree <————> Fully Agree
BI1	I am willing to carry out collaborative open innovation projects with large companies	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
BI2	if the opportunity arises, I would participate in an open innovation project with a big company	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>
BI3	I am determined to collaborate with a large company in an open innovation project	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>

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