



# Enhancing open innovation: Managing not invented here syndrome in collaborative projects

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## ABSTRACT

Despite having consensus on the negative relationship between individuals' biased attitude towards externally generated ideas and the applicability of inbound open innovation (OI) as a strategy, we find a gap in the literature regarding how individual unwillingness – not-invented-here syndrome (NIHS) – actually affects the innovation performance achieved through collaboration and what management tools are available to counter it. This study addresses these two questions by testing the relationship between NIHS and innovation performance and the impact of innovation climate as a way to reduce this negative attitude. Based on quantitative survey data collected from 250 firms across France, Italy, Spain, and Sweden, we confirm that innovation climate is a useful management tool for managing NIHS by opening individuals towards external ideas, ultimately helping firms to improve their innovation performance through collaboration. Most interestingly, we also find that the impact of NIHS on inbound open innovation performance achieved through a collaborative project is mediated through external social capital rather than having a direct impact. Since external social capital serves as a link between two collaborating firms, it's weakening caused by NIHS, subsequently leads to reduced project performance achieved through the inbound OI strategy.

## 1. Introduction

“Not all the smart people work for you. By leveraging the discoveries of others, companies can produce spectacular results” (Silverthorne, 2003). However, almost two decades later, we are still discussing the frictions and challenges of absorbing external ideas (Dahlander et al., 2021). Several studies have attributed various organisational factors, including partner number, transaction cost and type of partner, as challenges in expanding the knowledge base through open innovation (henceforth, OI) (Ismail et al., 2022; Seo and Park, 2022). While insights from these studies are significant, limited attention has been given to the exploration of challenges associated with individuals and how their attitudes can shape the success or failure of collaboration carried out through OI (West et al., 2014).

Building relationships with external partners does not guarantee OI's success. Instead, the absence or presence of certain moderating and/or mediating factors determines the outcome. For example, if the individuals in charge of managing and integrating knowledge within the relationship are not fully convinced, the true potential of the partnership may not be realised. In other words, if employees resist or show biases

against accepting new or external ideas, this can undermine the effectiveness of the OI strategy (Lucas and Goh, 2009). This bias, known as ‘not-invented-here syndrome’ (NIHS, Katz and Allen, 1982), is defined as “an individual's negative attitude towards knowledge that originates from a different field of expertise, from another organizational entity, ... and thus, is considered ‘outside’ or ‘external’ to the group(s) or organisation (s) in which the individual is embedded” (Hannen et al., 2019, p. 2).

NIHS is most frequently associated with the absorption of external ideas since it deters the internalisation of knowledge and, ultimately, the effectiveness of the inbound OI strategy. On the contrary, an outbound OI strategy is about the externalisation of internal ideas and is affected by the fear of losing competitive advantage over ideas, also known as the not-sold-here syndrome (Amann et al., 2022).

In most instances, employees facilitate the inbound OI process by spanning boundary, interpreting, absorbing and bringing external ideas to use. While these roles are distinct, more often, they overlap and are performed by the same members of the workforce (Lichtenthaler and Ernst, 2006). If some of these employees are resistant towards the internalisation of external ideas, they can create severe difficulties in deploying the organisation's OI strategy (Burcharth et al., 2014; Clagett,

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1967). In the context of collaborative projects, the effect of individual resistance is amplified even further as firms come together to achieve a targeted objective within a limited period of time (Perkmann and Walsh, 2007).

Unfortunately, our understanding of how NIHS impedes innovation, and its evolutionary process is restricted. Most of the studies that mention NIHS do it very briefly in support of their hypotheses without exploring its deeper implications (Antons and Piller, 2015). Therefore, there is limited understanding of why NIHS reduces a firm's ability to innovate when it is involved in collaborative projects. And more work is needed for identification of factors that could act as explanatory variables (i.e. mediators) of the relationship between NIHS and innovation performance (Antons et al., 2017). Hannen et al. (2019) recently demonstrated that a firm's absorptive capacity plays a key mediating role in the link between NIHS and innovation performance. However, the need to explore further still remains. In this regard, the paper aims to make a step further by testing the role of a specific, potential explanatory factor that is the level of the external social capital (Kogut and Zander, 1996). In particular, the idea behind the paper is that NIHS negatively influences innovation performance because it impedes just the development of the external social capital.

However, a deep understanding of the entire phenomenon is not possible without shedding light on the determinants of NIHS. Indeed, studies also stress the need for identification of the antecedents that explain the behaviour of individuals (as being open or resistant to external knowledge) and what can be done to facilitate inbound OI strategy (Corbo et al., 2022; El Maalouf and Bahemia, 2022; Markovic et al., 2020; Obradović et al., 2021).

Prior research has highlighted the importance of establishing connections or "ties" with external partners as a base for accessing their knowledge. These ties facilitate the exchange and they promote the flow of information between organisations (Lin, 1999). However, since these ties are built upon individuals, their actions have significant consequences on the quality of the mentioned relationship. For example, constantly rejecting external partners' ideas can cause frustration amongst the external partners, thereby weakening the 'organisational social relationship' and ultimately reducing the benefits derived from an inbound OI strategy (Lin, 2007; Steinmo and Rasmussen, 2018). Using the lens of social capital (Inkpen and Tsang, 2005), the first part of this study begins by examining how NIHS negatively affects the external social capital and subsequently project performance achieved through inbound OI strategy.

The second part of the study aims to analyse antecedents of NIHS and how it evolves. The literature highlights various factors that can cause individuals to become resistant against external knowledge. For example, not offering enough recognition for their contributions can breed resistance against acceptance of foreign ideas (Katz and Allen, 1982). Similarly, individuals working too long within same teams can begin to gravitate their reliance in favour of internal ideas over the external ones (Grosse Kathoefler and Leker, 2012). Additionally, offering unfair incentives, and not sharing sufficient information with the individuals can induce fear of replacement, thereby discouraging them from prioritising someone else's ideas over their own (Keinz et al., 2012; Saebi and Foss, 2015). Conversely, fostering an innovation-oriented climate that values individuals, their ideas, and focuses on sharing knowledge can help in reducing NIHS (Hannen et al., 2019). Hence, individuals' perception of the environment in which they operate can significantly influence their openness and the willingness to modify their behaviour (Edmondson 1999). A positive change in their behaviour can collectively enhance a firm's absorptive capacity, consequently leading to higher innovation performance under the inbound OI setting.

Building upon this discussion, we answer two important questions. 1) What is the role of external social capital in the association between NIHS and innovation performance of projects achieved through inbound OI, and 2) can a 'supportive innovation climate' act as antecedent of NIHS in order to reduce the internal resistance against external

knowledge? If so, the entire chain of relationships, i.e. internal climate and NIHS; NIHS and external social capital, should work to benefit the innovation performance achieved through collaborative projects.

Overall, this work makes a significant contribution to the existing OI and NIHS literature by providing an in-depth discussion on NIHS and its relationship with the inbound OI strategy, thereby advancing the overall understanding of this phenomenon. In developing this understanding, this research reveals two significant findings. Firstly, the impact of NIHS on innovation performance in collaborative projects is mediated by external social capital rather than having a direct effect. Secondly, an organisational climate that is oriented towards innovation and empowerment is negatively correlated with NIHS, thus potentially reducing the internal resistance to accept external knowledge.

The empirical analyses were carried out using OLS regression based on data collected through a specialised survey of 250 manufacturing firms across France, Italy, Spain and Sweden. This survey was carefully designed after an in-depth review of the literature and the gaps present in the current large-scale database. The notable merits of this database are its geographical diversity and the exploration of the effect of NIHS on project-level performance. The innovation performance at project level allows for better analysis, since the effect of inbound OI activity and the factors influencing the performance may perhaps be more visible at project level than at firm level.

The paper is organised as follows. The next section consists of an in-depth discussion of NIHS and its relationship with innovation, which leads to the development of the hypotheses. This is followed by a description of the data and the empirical model. The last section consists of a discussion of the results and the implications of this study.

## 2. Literature review and hypothesis development

### 2.1. Not-invented-here syndrome of firms involved in inbound open innovation projects

The abundant references to NIHS throughout various fields of study reflect the importance of this phenomenon (Antons and Piller, 2015). The demise of Kodak is an indicator of what can occur as a result of employee rigidity and resistance towards acceptance of novel ideas and technologies (Lucas and Goh, 2009). This resistance is potent enough to jeopardize the growth and even the continuity of a firm. NIHS is formally defined as an attitude-induced bias towards knowledge that originates outside the boundaries of a group or a firm. Literature recognises NIHS as a serious challenge against implementation of OI strategy, and in particular the inbound OI strategy. NIHS is found to have serious implications on firm's ability to absorb external ideas, thereby limiting the acceptance and the internalisation of the external knowledge and, consequently, the effectiveness of the inbound OI strategy (Amann et al., 2022).

Rather than being inherent in a person, NIHS develops over time (Clagett, 1967). The literature highlights various antecedents responsible for its development, but mainly it is driven by a need to maintain self-esteem, to have an affirmation of one's own value and/or even to maintain social identity (Ajzen, 2001; Eagly and Chaiken, 1993).

Human beings constantly seek security, and they tend to feel threatened by uncertainty, which can manifest in the form of new external ideas and technologies. By opposing this knowledge, they strive to maintain their status within a firm and counter the threat of insecurity (Burcharth et al., 2014). In this case, the rejection of an idea is not based on its content but on an individual's attempt to solidify their contribution and commitment to the firm. This results in more weight being given to their own ideas or those collected within the organization, as well as reducing reliance on external sources (Katz and Allen, 1982; Grosse Kathoefler and Leker, 2012). As a result, the collective impact of this bias leads to a loss of ideas that the firm could otherwise have benefitted from.

Similarly, accepting external ideas and making them part of a project

could shatter a research group's esteem and leave them with a feeling that the external ideas are superior to their own (Grosse Kathoefer and Leker, 2012). In an attempt to protect their prestige, prejudices may emerge against externally generated ideas, ultimately resulting in selection of in-house knowledge over what is created elsewhere. This is particularly relevant in cases where firms have an internal R&D department that is perceived as being highly capable within the firm. To protect this image, or indeed sometimes in the deeply held belief that internal ideas are better than the external, key individuals could persuade the organisations to outrightly reject the entire idea of OI (Lichtenthaler and Ernst, 2006).

In addition to the self-perception of foreign ideas, the behaviour of group members is also driven by the need for conformation. This need is based on the emotions and values that the members place on being associated to a group (Hogg and Terry, 2000). Despite being part of multiple groups at one time, members tend to lean in their association towards a particular group at any given time (Hogg, 2006). Having an elevated sense of identification with a firm or a group, they are more likely to sustain their engagement within its boundaries by limiting their reliance on external ideas (Langner and Seidel, 2015). Thus, in the process of shielding and maintaining their social identity as a group, its members might go as far as carrying out biased evaluations of ideas generated outside the firm's walls, eventually triggering rejection due to NIHS (Michailova and Husted, 2003).

Persistent resistance against external knowledge can be a major barrier to organisational learning and external knowledge absorption. By its nature, NIHS restricts users' perception and creates a disposition towards acceptance of external knowledge based on biased criteria (Burcharth et al., 2014), implying that not only will they voluntarily ignore external knowledge, but also their ability to objectively identify and assimilate ideas might become enduringly restricted.

Inbound OI is not solely a technological phenomenon that can be bought and made part of the business, but rather a strategy that involves multiple organisational factors that perform different tasks throughout the innovation process. (Chesbrough, 2007; Van de Vrande et al., 2009). The process begins when agents representing the firm span the knowledge boundaries and capture insights from distinct and disparate organisations (Whalen, 2018). In most instances, the same employees then communicate these ideas within the firm to bring them into use (Enkel et al., 2017). Considering the frontline role of employees, it could be argued that the 'collective' impact of their bias could reduce a firm's actual capacity to explore, interpret, and exploit external ideas (absorptive capacity), thus limiting the performance under a collaborative project (Hannen et al., 2019; Cialdini et al., 1981; Szulanski, 1996).

Finally, while NIHS is generally perceived as something negative, it can sometimes generate alternative results. Identifying and utilizing external ideas under collaborations in OI is not without challenges (Bierly et al., 2009). These obstacles can take various forms, such as inappropriate incentives to catalyse and facilitate the adoption of ideas or facing transactional costs higher than the benefits reaped from implementing the idea itself (Lee et al., 2010; Manso, 2017).

## 2.2. External social capital as a mediator between NIHS and innovation performance under inbound open innovation projects

Arguably, implementation of an inbound OI strategy can enhance the availability of ideas and hence innovation performance. However, mere exposure to external knowledge does not guarantee its internalisation (Pennings and Harianto, 1992). Coordination and communication of ideas are lubricated through what is referred to as social capital. Social capital is defined as trust, norms, and collective objectives that enhance the efficiency of resource exchange (Putnam, 1994). Social capital is built upon three dimensions: relational density, cognitive coherence, and structural embeddedness. Jointly, these factors shape the quality of the relationship that a firm has with its external partners (Gulati et al.,

2000). In the absence of these common foundations, firms cannot form a connection, which can then hinder the process of knowledge transfer (Dingler and Enkel, 2016). The strength of social capital regulates the effectiveness of interaction and relates directly to ease of communication and the exchange of knowledge that is held by individuals or by a group (Kogut and Zander, 1996).

Although social capital with external actors (henceforth external social capital) is perceived as being inter-organisational, it is rooted in individual-level relationships. In fact, a large amount of socialising takes place during informal gatherings and meetings amongst actors from each side (Inkpen and Tsang, 2005). A firm on its own is merely an institution that benefits from the collection of social actions carried out by its workforce (Grant, 1996). Similarly, it is the employees who socially link organisations together by spanning their boundaries, enabling the exchange of resources and facilitating knowledge flow before bringing them into use (Whalen, 2018). Literature associated with innovation clearly recognises that intermediary phases (like championing and elaboration) exist between ideation and implementation of ideas. Moreover, consistent social interaction between providers and receivers of ideas across all these stages is a prerequisite for joint innovation success (Perry-Smith and Mannucci, 2017). This implies that for successful implementation and use of ideas (developed by external creators), receiving or letting the ideas inside the gates of the firm is not enough, and collaboration at later stages of innovation is pertinent for the success of joint innovation.

Although the role of employees at each stage of innovation might seem distinct, in practice, they overlap and are often performed by the same staff (Lichtenthaler and Ernst, 2006). Hence, these multiple roles assigned to the same people put them in a crucial position, as they can directly influence the quality of social relationships between firms by lowering or raising the barriers to knowledge sharing between partners (Leal-Rodríguez et al., 2014). The significance of these workers is even greater if firms collaborate on specific projects since they require a high level of involvement to achieve their goals in a given time period (Perkmann and Walsh, 2007).

Having a negative predisposition towards foreign ideas can lead to hesitation among individuals in forming strong relationships with their external counterparts. This can eventually weaken organizational-level relationships and reduce the likelihood of achieving targeted innovation performance (Benzidia et al., 2021). Even if a firm is successful in initiating a relationship, it may continue to struggle to maintain it, as the representing agents of the organisation may consistently exhibit a lack of trust and openness towards the exchange of knowledge (Lyu et al., 2022). As a result, in the long run, these biases can hinder a firm's ability to establish a lasting communication channel with its external counterparts and limit the intake of information in an inbound OI strategy (Lyu et al., 2022). In other words, the existence of biases can objectively create difficulties in developing and maintaining external relations (external social capital), making it difficult for firms to communicate and benefit from external ideas.

At the sub-level, the impact of this bias can be traced to each dimension of the external social capital: relational, cognitive and structural. For example, the relational dimension of external social capital is driven by the mutual respect, reciprocity, and closeness amongst the knowledge gatekeepers, who are willing to interact and bring in ideas from collaborative partners (Adler and Kwon, 2002). Any component of distrust or attitudinal bias towards foreign ideas could, in turn, make external counterparts hesitant to take part in future projects or to form a dense relationship. Attitudinal resistance can therefore pose difficulties in the shape of constant rejection or excessive barriers causing prolonged delays, as well as frustration amongst the supporters of the collaboration and external partners (Grosse Kathoefer and Leker, 2012; Lüttgens and Pollok, 2014). In such situations, external partners will find it challenging to depend on the relationship, leading to difficulty in building trust. In other words, the impact of NIHS in the form of reduced innovation performance is passed on through the relational

dimension, ultimately causing a firm to have less access to and use of external ideas.

Similarly, goal incongruence and divergent interests can shake up the cognitive dimension of social capital and can be a potential cause of conflicts (Inkpen and Tsang, 2005). As the teams involved in project innovation have different goals (i.e., one is aiming for joint collaboration and the other is trying to produce something based on in-house and their own ideas, [NIHS]), this may lead to the rejection of most of the ideas presented by foreign partners, leading to a sense of defeat for external collaborators (Steinmo and Rasmussen, 2018). Even if the partnership somehow continues to exist, the negative atmosphere is not ideal or conducive to the exchange of knowledge (Inkpen and Tsang, 2005).

Likewise, when a firm enters a collaboration to exchange knowledge, the process is structured and split into stages. At each stage, different members hold varying responsibilities, ranging from sharing problems to evaluating and integrating ideas (i.e., the structural dimension of social capital; Lüttgens and Pollok, 2014). These structures are vital and scaffold the entire knowledge-exchange process; however, employees failing to comply at various stages (due to their resistance) could eventually lead to the creation of holes and inefficiency in the knowledge-exchange structure.

Overall, external social capital acts as a link between a firm and its partners for the exchange of novel ideas. The shared language, norms and goals mean they can exchange intellectual ideas in a less formalised manner, thus leading to low dissemination costs and an increased knowledge base (Nahapiet and Ghoshal, 1998). Thus, the expected influence exerted by the external social capital on innovation performance, achievable in collaborative projects, is positive. However, NIHS reduces the (level) of external social capital by weakening the communication channel between two firms and this circumstance, in turn, negatively affects the innovation performance. Such logical chain means to argue that NIHS negatively influences innovation performance by means of the external social capital, that acts as a mediator.

Hence, we hypothesise the following (depicted as Fig. 1).

**H1.** External social capital mediates the negative impact of NIHS on innovation performance of inbound OI project.

2.3. Innovation climate and NIHS

The concept of climate can be traced back to social psychology as a phenomenon that explains how individuals, their motivation and behaviour can be influenced by the work environment (Banagou et al., 2021). Internal climate can be described as the prevailing quality of a firm’s internal environment, which is largely a result of managers’ policies and behaviour (Abbey and Dickson, 1983). In the literature associated with innovation, scholars show that internal climate influences the behaviour of R&D teamwork in terms of their attitude and performance (Abbey and Dickson, 1983; Gonzalez-Roma et al., 2009).

This is because having a certain type of internal innovation climate can instigate lateral thinking and hold the potential to encourage members to take constructive actions using external ideas and technology that enhance the innovation performance of the firm (Popa et al., 2017). Diesel and Scheepers (2019) define internal innovation climate (or innovation climate) as the one where individual’s ideas are valued and in which they feel enabled to thrive.

For ease, the internal climate for innovation can be described as a context or situation that offers both constraints and opportunities. Exposing certain aspects of this context to individuals can cause them to behave differently. A climate within an organisation based on sharing and interaction can positively affect individuals’ attitude and behaviour towards knowledge exchange (Banagou et al., 2021). Similarly, a climate that accepts errors and allows individuals to be confident in using their knowledge can enhance their curiosity and willingness to test unconventional ideas, leading to innovation in the form of products or work methods (Gonzalez-Roma et al., 2009). More recently, studies have revealed the importance of internal climate in supporting innovative behaviour by extending autonomy and freedom and making specialised knowledge available (Banagou et al., 2021; Shanker et al., 2017).

Under the inbound OI, a firm’s aim is to optimise the internalisation and exploitation of external knowledge. Internal climate is important in allowing a firm to tap its own potential for innovation, using external ideas and collaborating to ensure the success of its OI strategy (Kim and Ahn, 2020). Having routines that favour knowledge sharing, providing autonomy to employees and/or allowing them to continually develop can improve the inter-organisational collaboration and the internalisation of ideas (Lewin et al., 2011).

In addition, certain internal activities can eventually create the type of internal context that can change individuals’ attitudinal behaviour (Burcharth et al., 2013), which affects their individual unwillingness (NIHS) to internalise the external ideas that directly impair a firm’s absorptive capacity (Hannen et al., 2019).

Social theorists suggest that humans base their decisions and attitudes on the social cues they perceive from their environment (Fainshmidt and Frazier, 2017). Employees are influenced by the organization they are embedded in, and their attitudes are shaped accordingly (Cameron and Webster, 2011). In the same vein, Lewin et al. (2011) demonstrated that if employees are accustomed to working in a climate where they are encouraged to share ideas, communicate openly, and collaborate, their acceptance of using external ideas would be much higher.

Similarly, providing autonomy and the freedom to take timely decisions encourages employees to use external ideas, whereas continuous consultation or too much intervention from managers can cause external ideas to be rejected (Katz and Allen, 1982; Burcharth et al., 2013). Not having enough autonomy creates resistance amongst employees against the use of external ideas, favouring outright rejection (Burcharth et al.,

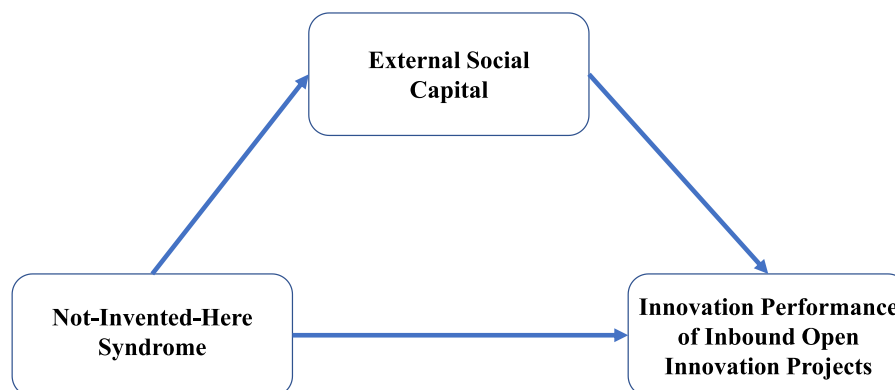


Fig. 1. First hypothesis.

2013). Similarly, having an internal climate that is positively perceived by the people concerned is the most likely way to enhance their motivation and commitment towards the firm’s goals (Shanker et al., 2017).

Finally, an innovation climate encourages people to experiment with their ideas and provides appropriate recognition (Diesel and Scheepers, 2019), enhancing confidence and reducing the potential fear of being seen as incompetent, which is another reason why employees become resistant towards accepting external ideas (Antons and Piller, 2015). Innovation climate is not limited to promoting openness, a positive attitude and acceptance of new ideas; it is also capable of changing a person’s cognition (Hannen et al., 2019). This signifies, therefore, that an innovation climate could have a positive impact on employees’ ability to process external knowledge and reduce their fear of having to experiment with the unknown.

Based on these arguments, we propose the following hypothesis (depicted as Fig. 2)

**H2.** Internal Innovation climate is negatively associated with NIHS.

Overall, the two hypotheses try to unpack the studied phenomenon, i.e. the relationship between NIHS and innovation performance achievable through inbound OI projects: NIHS negatively affects innovation performance since it reduces the level of external social capital; but internal climate provides a way to restrain this effect as it stems the NIHS.

**3. Methodology**

**3.1. Data and sample**

The data were collected through an international survey on OI conducted during 2018. The objective of this survey was to gather data in the manufacturing industry regarding ‘OI choices’, the ‘drivers’ of such choices and consequent ‘performance’ in a ‘collaboration framework’. The data from this survey have also been used in previous studies related with OI (see Lazzarotti et al., 2016; Lazzarotti et al., 2017). The survey overcomes a current limitation in large-scale databases, which do not include questions regarding NIHS (Marullo et al., 2021). NIHS is an attitudinal bias, so measuring it through direct questions may lead to response bias and is therefore discouraged in the literature (Ajzen, 2001; Fazio and Olson, 2003). Taking this into account, NIHS is constructed based on indirect questions in our survey.

To ensure the representativeness and generalizability of analysis, the data were collected in a probabilistic manner based on responses from manufacturing firms in France, Italy, Spain, and Sweden. These specific countries were selected to maintain consistency and avoid over heterogeneity because the size and technological intensity amongst firms are alike (according to the technological intensity guidelines of the OECD (2005)). After the initial country selection, methodological protocols were shared amongst researchers from the selected countries to maintain a uniform approach. As a starting point, the population was built on firms having more than 10 employees. The minimum number to survey from each country was set at 1000 firms. Following the guidelines, the Spanish and Italian teams sent out 2000 surveys, whereas the French and the Swedish researchers sent out 3000 and 1000 surveys, respectively. The target samples were coherent with the population of each country (see Appendix 2). The survey was sent through emails along with a cover letter requesting CEOs or R&D or technology managers or those aware of the firm’s innovation decisions and collaborative

projects to respond to the survey.

Of the 8000 firms, 334 responded, i.e., 4.18% of the targeted sample. In an important step, we subsequently cleaned the collected samples, out of which 84 had missing data for more than 15% of all the questions; these were dropped. The final sample of 250 firms came from four countries (see Table 1): 30 from France (12%), 113 from Italy (45%), 41 from Spain (16%) and 66 from Sweden (27%). Table 1 also illustrates the distribution of firms based on technological intensity from high (15) to medium (107) and low (128). Table 2 shows the size-wise distribution of firms based on the total number of employees; firms that fall into the large category (more than 250 employees) make up 41%, followed by firms with 51–250 employees at 24% and those with less than 50 employees at 31%. The overall distribution of the data seems satisfactory because most come from firms that are medium to low on the technological scale and of small or medium size.

**3.2. Measures and variables**

Unless stated otherwise, all of the constructs were developed using a seven-point Likert scale based on responses ranging from ‘strongly disagree’ to ‘strongly agree’. Appendix 1 itemizes each specific item used for the construction of variables, along with the corresponding values of their factor loadings, average variance extracted (AVE), composite reliability (CR) and Cronbach’s alpha. Innovation performance is regarded as the introduction of a new or significantly improved product or entrance into new markets (Alegre et al., 2006). To capture this definition, we applied a six-item scale based on previous work carried out by Lazzarotti et al. (2011) and subsequently enhanced/split items to fully capture the definition. The questions focused on capturing the actual performance of the project against what was intended when entering the collaboration with external partners. Hence innovation performance of inbound OI strategy is represented in our study through the innovation performance of a collaborative project.

External social capital is based on the concept elaborated by Nahapiet and Ghoshal (1998) and Inkpen and Tsang (2005), which consists of three dimensions (relational, cognitive, and structural). To measure the strength of the relationship with collaborative partners, we adopted items similar to those in the study carried out by Lazzarotti et al. (2016), giving attention to each dimension of social capital. The five questions used in our survey captured the overall firm-level experience with respect to the project carried out in collaboration with external partners.

An internal innovation climate is defined as an environment that encourages the exchange of knowledge and where individuals are given autonomy and the freedom to use their ideas (Shanker et al., 2017). The five items used for constructing the variable are based on the items used in the study carried out by Scheepers and Storm (2019) and further enhanced to cover the definition.

NIHS is defined as the attitudinal bias of employees towards external

**Table 1**  
Distribution of firms used in the final analysis: Country and technology.

	High Tech	Medium Tech	Low Tech	Total	Percentage
<b>Italy</b>	0	13	100	113	45%
<b>France</b>	7	22	1	30	12%
<b>Spain</b>	1	28	12	41	16%
<b>Sweden</b>	7	44	15	66	27%
<b>Total</b>	15	107	128	250	



**Fig. 2.** Second hypothesis.

**Table 2**  
Distribution of firms used in the final analysis: Firm size.

Firm Size	Frequency	Percentage
Small firms < 50 employees	79	31%
Medium firms 50 to 250 employees	59	24%
Large firms > 250 employees	112	45%
<b>Total</b>	<b>250</b>	<b>100%</b>

ideas, and the impact was captured through questions focused on the average attitude of employees. The questionnaire thus specified that managers focus on the general difficulties they face while deciding to collaborate for innovation because they are most knowledgeable about the difficulties they directly or indirectly face while opting for collaboration. Different ways to assess attitude have been adopted in the literature – that is, through both direct and indirect measures (Bohner and Wänke, 2002). Direct involves simply asking the employees questions directly and assessing their behaviour; however, because the aim of our study was to gauge the general bias among employees, we adopted the indirect method which has been used in a recent study (see Arias-Perez and Velez-Jaramillio, 2022). The scale was rephrased to capture both aspects of NIHS: acceptance of ideas and their implementation (Lichtenthaler and Ernst, 2006). The distribution of averaged NIHS intensity over the final sample can be seen in Appendix 3.

Firm size has a significant influence on innovative capabilities and performance (Cassiman and Veugelers, 2006) by allowing large firms (which may possess heterogeneous groups of skilled workers) to exploit economies of scale. Firm size was thus controlled for its impact by dividing the firms according to the total number of employees working for them: firms with under 50 employees were categorised as small, those with 50–250 employees were characterised as medium and firms with more than 250 employees were considered large. Small firms were taken as the base for the analysis. Similarly, a firm’s internal R&D capability can also have a significant influence on its absorptive capacity, which in turn can affect innovation performance. R&D intensity is therefore controlled for because it can directly affect a firm’s innovation performance (Kobarg et al., 2019); this was calculated as the natural log of the percentage of R&D expense over sales.

Firms’ innovative behaviour can also be affiliated with the industry in which they operate (Martinez et al., 2017); hence, we controlled for industry effects by following the OECD classification, which distinguishes industries with respect to technology and knowledge intensity (OECD, 2005). This yielded three dummy variables representing high-technology, medium-technology, and low-technology firms. For the purpose of the analysis, low-tech firms were taken as the base. Finally, the country-wide difference was controlled because each country is inclined towards having varied R&D expenditure, which may expose firms to opposing knowledge environments (Sofka and Grimpe, 2010). To incorporate the impact of each country, we introduced a dummy variable for each of the four countries (France, Italy, Spain, and Sweden). Spain was taken as the base in the final analysis.

**Table 3**  
Correlation between Variables and their Respective Significance Levels.

	Mean	St. Dev.	1	2	3	4	5
1. R&D intensity	10.9%	11.4%	1				
2. NIHS	2.85	1.67	−0.002	1			
3. Innovation performance of inbound collaborative project	5.36	1.43	0.370***	−0.123*	1		
4. Internal innovation climate	5.20	1.38	0.488***	−0.210***	0.679***	1	
5. External social capital	5.34	1.25	0.285***	−0.201***	0.586***	0.631***	1

\*Significant at 0.1, \*\* Significant at 0.05, \*\*\* Significant at 0.01. St. Dev. = Standard Deviation, NIHS = Not-Invented-Here Syndrome.

## 4. Estimation and results

### 4.1. Reliability and validity

Table 3 contains the correlation matrix amongst all of the variables; NIHS is negatively related to external social capital, project performance and internal climate, as suggested in the hypothesis. The strength for all of the values for the correlation between variables is lower than the unsafe limit value of 0.75 (Tsui et al., 1995).

The initial factor development was based on the principal component method; descriptive analysis and ordinary least squares (OLS) models were carried out through STATA 16.0. Before carrying out the analysis, several robustness tests were employed to assess the reliability and validity of the variables. As an initial step, the variables were based on established items used in the previous literature. Further, the item loadings for all of the variables were greater than 0.6, confirming the content validity requirements (Nunnally, 1978). Similarly, we checked the values for composite reliability (should be  $\geq 0.7$ ) and Cronbach’s  $\alpha$  value, all of which were above 0.8. Additionally, to measure the convergent validity of the items, we examined the AVEs, all of which were greater than 0.5 (Fornell and Larcker, 1981; see Appendix 1). Subsequently, we ran exploratory factor analysis with varimax rotation, loading all final items together, and this clearly yielded four factors, as theoretically suggested. The Kaiser–Meyer–Olkin (KMO) test (value = 0.90) and Bartlett’s test of sphericity ( $\chi^2 = 3127.186$ ;  $df = 153$ ,  $p < 0.01$ ) also indicated the adequacy of these items and factors.

After confirming the validity of the variables and the items representing them, we also carried out Harman’s one-factor analysis test to examine the existence of any common method variance because the data for all measures came from one source (Podsakoff and Organ, 1986). In a four-factor analysis, the explained variance from all of the items loaded together was around 41%, which is substantially lower than 50%, which would imply that the risk of self-report bias was absent. As a robustness test, we ran the final model through the Process macro in SPSS (Hayes, 2012) to test the significance and beta value of external social capital’s mediation between NIHS and project performance, which turned out to be similar and significant, thus validating our results. Finally, the values for  $R^2$  and adjusted  $R^2$  for all of the models are closer to the higher moderate side, implying satisfactory strength for the models (Chin, 1998; Henseler et al., 2009).

### 4.2. Main results

This study assessed the relationship of NIHS with the innovation performance achieved through inbound collaborative project, with external social capital considered as a mediator. Also, it tested the impact of the innovation climate on NIHS. The estimations from the regression model are presented in Tables 4 and 5, with the innovation performance of inbound collaborative project, external social capital and NIHS set as dependent variables across different models. The analyses were carried out using STATA 16.0 and the Process macro in SPSS (Hayes, 2012). Both methods are based on OLS regressions and provide similar results, except that indirect effect (mediation) is accurately provided along with its confidence intervals through the Process macro.

The first hypothesis investigated the mediating role of external social

**Table 4**  
Regression model results.

Dependent Variable	Innovation Performance of Inbound Collaborative Project				
	NIHS	External Social Capital			
Controls	I	II	III	IV	V
<i>Constant</i>	-0.554** (0.224)	-0.361* (0.203)	-0.168 (0.359)	-0.193 (0.184)	-0.343 (0.209)
<i>R&amp;D Intensity</i>	-0.005 (0.079)	0.090 (0.071)	0.083 (0.064)	0.079 (0.064)	0.026 (0.074)
<b>Firm Size</b>					
<i>Large Firms</i>	-0.581*** (0.199)	-0.151 (0.184)	-0.213 (0.163)	-0.249 (0.166)	0.222 (0.190)
<i>Medium Firms</i>	-0.217 (0.174)	-0.145 (0.159)	-0.198 (0.182)	-0.211 (0.143)	0.161 (0.164)
<b>Country Indicators</b>					
<i>Italy</i>	1.285*** (0.269)	0.832*** (0.250)	0.461** (0.220)	0.529** (0.228)	0.652** (0.259)
<i>Sweden</i>	-0.773 (0.188)	-0.202 (0.171)	-0.162 (0.154)	-0.162 (0.154)	0.0002 (0.177)
<i>France</i>	0.679** (0.270)	0.401 (0.249)	0.380* (0.220)	0.427* (0.224)	0.079 (0.257)
<b>Industry Indicators</b>					
<i>High Tech</i>	0.375 (0.309)	-0.154 (0.283)	-0.018 (0.254)	-0.003 (0.255)	-0.367 (0.291)
<i>Medium Tech</i>	0.589*** (0.169)	-0.192 (0.158)	-0.166 (0.138)	-0.211 (0.143)	-0.170 (0.163)
<b>Independent Variables</b>					
<i>NIHS</i>		-0.139** (0.056)		-0.054 (0.050)	-0.191*** (0.058)
<i>External Social Capital</i>			0.452*** (0.056)	0.440*** (0.056)	
<i>Internal Innovation climate</i>	-0.387*** (0.082)				
<i>R<sup>2</sup></i>	0.191	0.305	0.438	0.441	0.259
<i>Adjusted R<sup>2</sup></i>	0.160	0.279	0.417	0.418	0.231
<i>Number of Observations</i>	250	250	250	250	250
<i>Prob &gt; F</i>	***	***	***	***	***

NIHS = Not-Invented-Here Syndrome, \* Significant at 0.1, \*\* Significant at 0.05, \*\*\* Significant at 0.01, Standard Errors in Parenthesis.

**Table 5**  
Results from process macro in SPSS.

	Indirect Effect
<i>NIHS → External Social Capital → Innovation Performance of Inbound Collaborative Project</i>	-0.082 (-0.1467 to -0.334)

Confidence interval in parenthesis.

capital in the relationship between NIHS and innovation performance achieved through a collaborative project. In the first step, we assessed the impact of NIHS on the innovation performance achieved through a collaborative project. The  $\beta$  value for this relationship was negative (-0.139) and significant at  $p < 0.05$  (Model II), validating the existing literature and implying that attitudinal bias amongst individuals towards acceptance of foreign ideas that could be useful for a firm's innovation leads to reduced innovation performance achieved under inbound OI. Similarly, we ran analyses to determine the impact of NIHS on external social capital and the impact of external social capital on innovation performance, respectively. The results for the relationship between NIHS and external social capital can be found in the last column of Table 4 (Model V). The value for  $\beta$  was -0.191, and it was highly significant at  $p < 0.01$ , confirming the relationship between NIHS and external social capital. The impact of external social capital on the innovation performance of a collaborative project was positive and highly significant at 0.452 ( $p < 0.01$ ). This implies that external social capital plays a key role in allowing firms to enhance their innovation performance based on ideas collected through collaboration with external partners.

As a final step, we ran a full model (IV), which included innovation performance as a dependent variable and external social capital and NIHS as independent variables. This was done to assess the impact of external social capital on the relationship between NIHS and innovation performance in a collaborative project (Baron and Kenny, 1986). In other words, we wanted to assess the relationship between NIHS and innovation performance in the presence of external social capital as a mediator. As seen in Model IV, the  $\beta$  value for NIHS now becomes insignificant, whereas the  $\beta$  value for external social capital is still strong at 0.440 and highly significant at  $p < 0.01$ . This demonstrates that the negative impact of NIHS on the innovation performance of a collaborative project is fully mediated through external social capital (Aguinis et al., 2017), implying that NIHS negatively affects a firm's ability to

communicate with external partners and eventually causes reduced innovation performance under an inbound OI strategy.

While testing mediation through the method proposed by Baron and Kenny (1986) is largely acceptable, we also ran the same analysis through the Process macro in SPSS (Hayes, 2012), as shown in Table 5. Process is an OLS-based path computational tool. Unlike the conventional technique of comparing beta strength, this method enables the computation of a mediation analysis based on the values obtained for the indirect effect. This technique captures multiple mechanisms at the same time and is likely to produce identical results to observed-variable SEM models (Coutts and Hayes, 2022).

The values obtained through this method for the direct effect of NIHS on innovation performance and the full model with NIHS, external social capital and innovation performance remain the same, as shown in Table 4. The only additional information we receive from this technique is that the value of the indirect impact of NIHS on the innovation performance through external social capital is  $\beta = -0.089$ , with a confidence interval of between -0.1585 and -0.0377, thereby confirming the assertion that external social capital mediates the negative impact of NIHS on innovation performance achieved under a joint project.

The second hypothesis was based on the investigation of the impact of the internal innovation climate on NIHS. The results are laid out in Model I; the  $\beta$  value yielded a strong and highly significant effect, with a value of -0.387 at  $p < 0.01$ , confirming that innovation climate is negatively correlated with NIHS. In other words, an internal climate that encourages and empowers individuals to be creative and test and share their ideas leads to the reduction of the resistance they hold towards external ideas.

## 5. Discussion

The article is aimed at advancing the literature by focusing on two important aspects: first, the role of external social capital in the association between NIHS and project performance achieved through inbound OI, and second, how a supportive innovation climate can mitigate NIHS and its negative influence on external social capital and, consequently, on innovation performance. This logical chain allows, overall, to enhance the performance of such inbound OI collaborative projects.

Regarding the first issue, contrary to the previous evidence, our study reveals that NIHS does not have a direct influence on OI performance. Instead, the combined effect of the negative attitude of firm agents (that span boundary, carry knowledge inside, and use it) towards

external knowledge weakens the external social relationship, ultimately reducing the benefits of an inbound OI strategy. Based on an indirect measurement of NIHS (Arias-Pérez and Velez-Jaramillio, 2022; Burcharth et al., 2014), our research findings show that it is essential for companies to gain a deeper understanding of individuals' predispositions and attitudes prior to implementing collaborative initiatives. This understanding is crucial for successfully establishing an OI strategy. Developing external social capital and fostering effective collaboration necessitate the presence of mutual trust and a willingness to share knowledge and ideas. Conversely, resistance, which creates imbalances, can undermine this relationship and have a detrimental impact on the exchange of knowledge. This can ultimately result in a decreased density of knowledge exchange, as highlighted by Adler and Kwon (2002).

Regarding the second question, our study analyses antecedents of NIHS and how it evolves. The focus is on how NIHS can be contained. In line with the previous literature, our findings suggest that lack of recognition and participation in decision-making, limits their ability to see the scope of their work, and fuzzes their motivation, or in other words makes them more resistant towards accepting or learning novel ideas (Katz and Allen, 1982). Similarly, being associated with a team for too long makes individuals accustomed to similar kind of ideas, thereby limiting their ability to recognise and accept ideas other than their own (Grosse Kathoefer and Leker, 2012). Likewise, lack of fair incentives is seen as a sign of replacement and discourage them from adopting external ideas (Keinz et al., 2012; Saebi and Foss, 2015). Similarly, lack of professional training limits their confidence and elevates fear of making mistakes while adopting novel ideas (Burcharth et al., 2014). On contrary, an internal innovation climate, defined as an environment that encourages the exchange of knowledge and where individuals have autonomy and the freedom to use their ideas, can reduce individuals' resistance and induce them to accept external ideas. Our findings show that fostering an innovation-oriented climate that values individuals, their ideas, and knowledge sharing can shape their attitudes (Cameron and Webster, 2011), inducing trust and openness towards collaboration. These results strengthen the idea that implementing an open innovation strategy without backing it with an environment that ensures the involvement of participating individuals could lead to its failure (Diesel and Scheepers, 2019).

## 6. Conclusion

Inbound OI strategy largely relies on external knowledge to move the wheel of innovation. The ability of a firm to explore and later make use of this knowledge is, therefore, critical for the success of an inbound OI strategy. However, unwillingness on the part of employees to accept external ideas (NIHS) acts as a barrier against the firm's ability to absorb novel knowledge, leading to unsatisfactory innovation results (Antons and Piller, 2015; Laursen and Salter, 2006). While the phenomenon has extensively been mentioned in various themes related to management science, the reference is merely cursory and it is scattered (Antons and Piller, 2015). Our understanding concerning the presence of certain moderating and/or mediating factors, how they link NIHS and innovation, and its evolutionary process is restricted.

Although, various authors have pointed towards the lack of discussion on NIHS (Antons et al., 2017; Hannen et al., 2019). However, the literature remains limited in terms of understanding how NIHS hampers a firm's capability to innovate and how it evolves, particularly concerning the role of mediating factors in this relationship (Antons et al., 2017).

This work contributes to the theoretical understanding of NIHS in the context of an inbound OI strategy. It provides insights into how NIHS can reduce the level of innovation performance, particularly by impacting the density and quality of their relationships with the partners (external social capital). External social capital, which is developed through interactions between individuals, can be significantly impaired

by employees' resistance to accepting external ideas. Hence, one of the key contributions of this work is the identification of the factors that mediate the effect of NIHS on innovation performance under an inbound OI strategy. In particular we found that the impact of NIHS on inbound open innovation performance achieved through a collaborative project is mediated through external social capital rather than having a direct impact. In other words, NIHS weakens the ties and channel of communication between firms, thus impeding the development of the social capital, crucial condition to share knowledge and make open innovation successful.

Similarly, the knowledge that an organisational climate based on innovation can counteract resistance to learning is a contribution to the literature and provides a direction for future research. While earlier studies point towards innovation climate being a possible countermeasure for NIHS (Hannen et al., 2019), empirical validation of this connection remains limited. These findings have theoretical significance in advancing the understanding of NIHS within the context of an inbound OI strategy and can serve as a reference for further research on NIHS and its mitigation strategies.

From a practical perspective, this study holds important implications as NIHS is a real-life issue faced by organisations relying on individuals for generating or integrating innovative ideas. Practitioners encounter various challenges, such as difficulties in implementing process-level changes in a timely manner or gaining acceptance for new innovations or technologies (Lucas and Goh, 2009; Wells, 2000). To begin with, the decision to adopt an open innovation strategy is jointly determined by a knowledge 'need' and by the 'absorptive capacity' of a firm (Barge-Gil, A. 2010), which implies that the negative impact of NIHS on absorptive capacity could outright prevent the adoption of an open strategy. In other words, even if the organisation decides to implement open innovation strategy, NIHS can pose challenges in its execution, by causing frictions against use of external ideas during various stages of innovation (e.g., ideation, development: Lüttgens and Pollok, 2014). Furthermore, the issue of NIHS is not limited solely to firms consuming external ideas; it is also prevalent in universities, and it keeps different teams from collaboration, despite their role as idea generators (Burcharth and Fossuri, 2015). Similarly, the previous literature also rightly points out that innovation doesn't happen solely within the boundaries of the firms. This is especially true in the case where the firms are constrained by resources and rely more on ideas that are generated outside the boundaries of the firm (Hervas-Oliver et al., 2011). While the prior focuses more on the innovation from production perspective, Hervas-Oliver et al. (2014) found out in their study that process innovation makes even greater the use of external ideas, since there is no dedicated R&D team for this purpose. This strengthens the importance of NIHS even further, since it hinders innovation from multiple dimensions and at multiple stages. Therefore, understanding NIHS and exploring tools to minimise its impact are highly relevant for practitioners. By understanding the triggers and consequences of NIHS, managers can address the weaknesses present in their organisations and develop strategies to mitigate their effects.

## 7. Limitations and future research

This study provides structure to the understanding of NIHS, and in a theoretical sense, it answers an important question about how NIHS affects OI performance. However, the work has several limitations as well, and these may present an opportunity for future work. From a methodological point of view, the responses were gathered from the same source, which could lead to possible bias, although we checked for the possibility of having common method bias and were satisfied there were no serious concerns. We also measured project success through a relative scale instead of an absolute measure; although the scale we used was based on the established literature, we cannot exactly measure the precise contribution of NIHS towards project delays or failures.

Moreover, our study suggests that the attitude of organisations,



manifested through the actions of their employees, is crucial. However, it is not necessary that employees' NIHS through each stage of innovation has an effect on performance. Therefore, we aim to extend our work by identifying the impact of NIHS through different stages, especially at the boundary spanning and idea usage stages. The development of a specific questionnaire for this purpose will be the next step of our research. In addition, as we know from past studies, no two partners are the same, and some partners have features that are different from others. Thus, a deeper understanding of the impact of NIHS on innovation with respect to different partner types could improve the future understanding of this phenomenon and the role of different boundary spanners. Similarly, the social and cultural context could also be an interesting perspective for assessing NIHS, as countrywide differences may yield different attitudinal resistance levels.

Apart from developing studies that overcome the limitations of this work, we would like to draw the attention of researchers to the negative impact of NIHS on absorptive capacity, which is one of the most important aspects of the OI literature. We encourage researchers to

explore for implications of NIHS and the tools available to manage it. Further, it would also be interesting to explore whether culture or geographical differences have any relationship with NIHS. Similarly, it is also probable that individuals hold different views of each partner that a firm may collaborate with, for example in terms of cognition, resources, culture, or knowledge. Hence, future studies can also incorporate different collaborating partners to assess if there is any difference.

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**Data availability**

The data that has been used is confidential.

**Appendices**

*Appendix 1. Specific survey items*

	PCF	AVE	CR	CA
<b>Innovation Performance of Inbound Collaborative Project: Project you selected has actually performed (1: strongly disagree, 7: strongly agree)</b>		0.686	0.929	0.906
1. Develop new products/services	0.820			
2. Improve existing products/services	0.728			
3. Enter new markets	0.831			
4. Increase sales (in k€)	0.835			
5. Extend the product/service portfolio	0.879			
6. Offer a wider product/service range	0.869			
<b>NIHS – Individual Level (1: Not at all, 7: Extremely)</b>		0.713	0.881	0.895
1. Reluctance of R&D staff to work with external partners	0.915			
2. Reluctance to accept technologies/knowledge generated outside the company	0.931			
3. Potential detrimental impact on internal R&D resources and competences	0.870			
<b>Internal Innovation Climate – Firm Level (1: Not at all, 7: very important)</b>		0.739	0.934	0.910
1. We give our staff time and resources to generate new ideas	0.896			
2. We set our staff creative and challenging objectives	0.889			
3. We allocate resources for our staff's continuous professional development	0.880			
4. Our staff easily adapt to new situations	0.826			
5. There is a high level of collaboration within functional areas to identify and resolve emerging issues in innovation activities	0.803			
<b>External Social Capital – Firm Level (1: Not at all, 7: very important)</b>		0.632	0.896	0.845
1. There is a high level of trust among partners	0.802			
2. We have access to our partners' knowledge resources	0.862			
3. The resources and capabilities of our partners complement our resources and capabilities	0.742			
4. We share a similar management style with our partners	0.778			
5. Our knowledge is similar to our partners' knowledge	0.787			

PCF= Principal Component Factor, AVE = Average Variance Extracted, CR= Composite Reliability, CA= Cronbach Alpha, NIHS= Not Invented Here Syndrome.

*Appendix 2. Population Composition(Data Elaborated from Eurostat, 2018 )*

Number of companies per country manufacturing Size	Italy	France	Spain	Sweden	Total population
<b>Small firms &lt; 50 employees</b>	85.54%	72.01%	81.04%	73.02%	
<b>Medium firms 50-250 employees</b>	12.43%	19.79%	15.80%	20.10%	
<b>Large firms &gt; 250 employees</b>	2.03%	8.20%	3.17%	6.88%	
<b>Total for country</b>	67,993	16,019	29,036	5668	118,716
<b>% of total population</b>	57%	14%	24%	5%	100%

*Appendix 3. Distribution of Averaged NIH Intensity Reported by Firms*

Level of NIHS	Sample Size	Percentage
Low (1–3)	178	71%
Medium (4)	13	5%
High (4–7)	59	24%

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