
Not invented here: how institutionalized socialization practices affect the formation of negative attitudes toward external knowledge

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Management literature highlights several potential benefits of institutionalized socialization practices that attempt to increase cohesiveness among employees. This article posits that such practices might also contribute to a biased perception of internally generated knowledge and therefore to a greater reluctance to adopt external knowledge, enhancing the so-called not-invented-here (NIH) syndrome. Drawing on multi-informant survey data, the authors find that institutionalized socialization practices are associated with the NIH syndrome. This association is, however, muted in highly technologically specialized companies.

JEL classification: O32, M12.

1. Introduction

Recognizing the tendency of individuals to identify psychologically with their peers and thus favor their own group (Ferguson and Kelley, 1964; Tajfel, 1982), vast management literature has investigated channels through which firms can acculturate their employees, to infuse them with common values and collective identities (Sacks and Gruman, 2012). Organizational socialization, particularly in the form of institutionalized practices that lead to cohesiveness among employees, thus has been recommended as a means to improve the satisfaction of individuals and, accordingly,

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the effectiveness of the organization (Ashforth and Mael, 1989; Bauer et al., 2007; Fang et al., 2011). Despite the emphasis on the benefits of such practices (Bauer and Erdogan, 2012), institutionalized socialization practices have downsides too. They lead to identification with a specific group (i.e., colleagues from the same organization or department), so they inevitably increase the perceived distance from external groups. As social identity theory predicts (Mullen et al., 1992), greater identification with the company likely leads employees to develop an evaluation bias (Ferguson and Kelley, 1964), in favor of the internal elements of the organization and against externally generated practices and routines.

This bias is particularly salient when companies need to leverage opportunities outside their boundaries to be successful. As literature on openness has advocated for the past decade or so (Chesbrough, 2003; Laursen and Salter, 2006), this demand applies to the management of innovation. The growing complexity and interdisciplinary nature of research and development (R&D) activities (Kline and Rosenberg, 1986), combined with reduced technology life cycles (Barczak *et al.*, 2009) and the expansion of technology markets (Arora *et al.*, 2001), means that companies increasingly must acquire external knowledge to sustain their innovation activities (Nelson and Winter, 1982; Lundvall, 1992; Powell *et al.*, 1996).

With this study, we investigate whether, and in what context, institutionalized socialization practices, which extend their influence to a firm's scientists and engineers, are associated with the emergence of a negative predisposition toward externally generated knowledge, usually referred to as the not-invented-here (NIH) syndrome (Katz and Allen, 1982; Burcharth *et al.*, 2014). The challenge of seeking and using external knowledge (Bierly *et al.*, 2009; Bresman, 2010) has been rationalized in different ways, such as in terms of high transaction costs, inappropriate incentives, agency conflicts within the firm, and a lack of relevant capabilities (Arrow, 1963; Cohen and Levinthal, 1990; Arora *et al.*, 2013). Sometimes, disregarding external technology options might serve to commit the corporation to develop technologies invented by the firm's in-house R&D department, thereby providing the appropriate incentives to the researchers (Rotemberg and Saloner, 1994). Here, we adopt a sociopsychological perspective, according to which members participate in groups and strive to maintain a positive social identity to the detriment of outsiders (Tajfel and Turner, 1986; Mullen *et al.*, 1992). In fact, the very same scientists and engineers who are responsible for creating new knowledge within a company are also the recipients (and thus the evaluators) of knowledge flows from outside.

Although previous studies call attention to the importance of in-group favoritism and identity creation as major drivers of the NIH syndrome (Katz and Allen, 1982), understanding of the role of the social environment on the evaluation of external knowledge remains incomplete. On one hand, insights from existing literature have been based largely on indirect inferences, which make it difficult to assess whether there is any direct association between organizational socialization and protective attitudes toward knowledge. In their seminal work, Katz and Allen (1982) use data

on technical communication both within and outside the organization to suggest the existence of the NIH syndrome. Hansen *et al.* (2005) and Reinholt *et al.* (2011) draw on findings related to the impact of within-team relations on knowledge search to explain NIH tendencies, whereas Reitzig and Sorensen (2013) rely on geographical co-location to account for in-group biases at the subunit level. On the other hand, some research investigates socialization practices without accounting for the context in which they are implemented; therefore, it has been difficult to assess when these practices contribute to increased organizational commitment and when they amplify knowledge provincialism within firms. The contrasting evidence of preferences for internal knowledge, as detailed by Menon and Pfeffer (2003), underlines the need to specify the nature of environments, which may determine choices between internal and external knowledge.

We seek to extend these valuable research streams in two ways: by providing more direct measures to assess the association between the social environment and attitudes toward knowledge, and by studying the context that should lead to a weaker or stronger relationship between institutionalized socialization practices and NIH syndrome. We investigate the context in terms of the firm's knowledge base, as characterized by its level of *technological specialization* (extent to which knowledge loses value if not applied to a given context). Borrowing from the social identity theory (Ashforth and Mael, 1989; Mullen *et al.*, 1992; Dutton *et al.*, 1994), we assert that this is a key contextual characteristic, insofar as it relates to competition among groups, which should have substantial impact on the dynamics of intergroup relations. We test these predictions using multi-informant survey data, collected from a sample of small- and medium-sized (SME) manufacturing firms in the medium-tech and high-tech sectors in Denmark. This study thus contributes to the existing literature by discerning an important determinant of the NIH syndrome (Katz and Allen, 1982) and the context in which it operates. In tandem, it contributes to the identity literature (Gioia *et al.*, 2000) by exposing one of the potential drawbacks of a strong corporate culture. This is important because the NIH syndrome might negatively affect the innovative behavior of organizations, particularly in the circumstances of open innovation, and understanding its causes is a first step toward its cure.

2. Socialization and NIH syndrome: theory and hypotheses

Organizational socialization refers “to the process by which newcomers make the transition from being organizational outsiders to being insiders” (Bauer *et al.*, 2007: 707). The socialization process begins with the initial contact between an individual and an organization and continues for some time after the person actually enters the organization (Epstein, 1983). Through social interaction experiences, new employees learn which behaviors, attitudes, work styles, and norms an organization considers acceptable (Bauer *et al.*, 2007). Two important socialization factors—newcomer

proactivity and organizational practices—work independently to influence the adjustment of new employees. Whereas newcomer proactivity refers to self-initiated steps by new employees to effect their own personal comfort, organizational practices encompass the methods and approaches that organizations use to disseminate information and structure newcomers' experiences (Fang et al., 2011; Ashford and Nurmohamed, 2012).

Socialization practices implemented by companies have been classified according to the extent they attempt to reduce newcomers' ambiguity about how they should behave, ranging from individualized to institutionalized approaches (Fang *et al.*, 2011; Cable *et al.*, 2013). With individualized socialization, newcomers receive a unique, informal, sporadic set of learning experiences that encourage them to develop differentiated responses and adopt innovative orientations toward their roles. With institutionalized socialization, new recruits go through common learning experiences with clearly defined, sequenced, and timed orientation activities that are designed to produce standardized responses to situations (Jones, 1986). Such practices “adjust” new employees to the organizational reality to a greater extent, encouraging them to accept preset roles, conform to organizational norms, and reproduce the organizational status quo (Epstein, 1983). Examples of institutionalized practices include mentorship programs with senior colleagues and team-building activities. Research shows consistently that “institutionalized practices result in more positive socialization outcomes than individualized socialization tactics” (Sacks and Gruman, 2012: 37).

A key outcome of institutionalized socialization is the generation of a sense of belonging or strong group affiliation with the firm (or subunit) among employees. In addition to learning their job tasks (role clarity) and gaining confidence in performing them (self-efficacy), the extent to which new employees feel liked by peers and integrated into the social environment is a crucial adjustment indicator. This indicator is known as “acceptance by insiders” and affects their very identity (Sacks and Gruman, 2012). Employees socialized by institutionalized practices not only are knowledgeable and skilled but also fit in with prevailing norms and show a growing identification with the organization, including internalization of its values (Bauer and Erdogan, 2012). In this sense, “Organizational socialization, then, can be seen under the SIT [social identity theory] perspective as an attempt to symbolically manage newcomers' self-, if not situational, definitions by defining the organization or subunit in terms of distinctive and enduring central properties” (Ashford and Nurmohamed, 2012: 29).

Although a strong group identity and collective interpretations of reality attained through institutionalized socialization practices may be instrumental for various firm activities, such as strategy implementation, employee motivation, cooperation, job satisfaction, internal exchange of knowledge, and performance (Gioia *et al.*, 2000; Beyer and Hannah, 2002; Jansen *et al.*, 2005; Bauer *et al.*, 2007), they also can be detrimental to others. For example, they can lead to a bias in favor of organizational

members just because they seemingly belong to the same group (Summer, 1906; Jones, 1986). Institutionalized socialization thus serves the dual function of preserving in-group solidarity and creating attitudinal and perceptual biases in favor of one's own group that justify the exploitation of out-groups. Membership and exclusion go hand-in-hand (Ferguson and Kelley, 1964). Institutionalized socialization practices have been associated with hostility and suspicion to outsiders, resistance to new entrants, and a pronounced propensity to conformity and groupthink (Rowley and Moldoveanu, 2003).

In-group bias influences, among other things, the adoption of ideas from outside,¹ in the sense that it encourages an emphasis on internal knowledge and negative attitudes toward external knowledge. As a consequence, members might reject external knowledge because the R&D group considers it more legitimated and prestigious to create new knowledge in-house, instead of using knowledge invented elsewhere (Michailova and Husted, 2003). The effects of in-group bias imply that knowledge evaluations often occur independent of the actual content of the knowledge itself, shaped by sociopsychological forces. That is, knowledge gets evaluated not exclusively on the basis of objective criteria, such as quality and content, but also according to the equally important subjective criteria that stem from affect, cognition, and social relationships—that is, attitudes. Institutionalized socialization practices bias the way firm scientists judge internally developed knowledge, such that they may be predisposed to promote their own and peer members' innovation capabilities, in a form of self-enhancement. Tajfel and Turner (1986) argue that sharper demarcations between in- and out-groups enhance identification, but that identification may cause external knowledge to appear less legitimate, such that its adoption potentially would cause the loss of identity and group cohesion.

Institutionalized socialization practices lead to the creation of a strong corporate identity. To the extent that R&D employees see themselves as members of one organization, they will be biased against ideas proposed by outsiders. Outside knowledge, because it belongs to the out-group, cannot be a source of identification for in-group members. Putting these arguments together, we expect that the valuation of external knowledge depends on the social environment of the firm. Thus:

Hypothesis 1: Institutionalized socialization practices positively associate with the formation of NIH syndrome.

2.1 *The moderating role of the firm's knowledge base*

Having noted the direct association of institutionalized socialization practices with the emergence of NIH syndrome, we also qualify our argument by identifying the context in which the hypothesized link may be stronger or weaker. This effort is

¹ For this study, outsiders are R&D teams external to the focal company because we discuss firm-level processes and effects centered around R&D departments.

especially important because the costs of institutionalized socialization practices must trade-off against their expected benefits. Managers need a more nuanced understanding of the impacts on different types of companies. A better understanding of the context also can help establish the boundaries of applicability of our theoretical framework. We thus examine the context in terms of the knowledge base of the firm (Beyer and Hannah, 2002; Bauer *et al.*, 2007), as characterized by its level of *technological specialization*. The focus on the knowledge base of the firm is a natural choice, in that extramural knowledge must be integrated with internal knowledge to be exploited. Drawing on the social identity theory (Ashforth and Mael, 1989; Mullen *et al.*, 1992; Dutton *et al.*, 1994), we selected this characteristic of the knowledge base because it relates to intergroup competition and it is likely to influence the extent to which R&D employees experience stronger or weaker levels of organizational identification and, in turn, their tendencies for in-group biases. As argued by Ferguson and Kelley (1964), the extent to which people perceive themselves as dealing with a competitive situation is a key mechanism to explain biased preferences for internal products.

Institutionalized socialization practices may have less impact when the company is more *technologically specialized*, that is, its knowledge base loses value if applied to a different context. The degree of technological specialization of a firm may revise its functional relation to the outside world, by increasing its levels of interdependence and competition with other scientific groups. Companies with a highly specialized knowledge base cannot rely on their internal knowledge to develop new products and enter new lines of business. Their scientists will therefore be less inclined to see outsiders as direct rivals or perceive external knowledge as a threat (i.e., the extent of overlap with other organizations' knowledge is naturally limited) when they are exposed to institutionalized socialization practices. Competitive threats trigger strong emotions against the out-group, such as antagonism, derogation, and hostility, which may lead to biased attitudes (Hewstone *et al.*, 2002). The absence of competitive threat instead implies a reduced degree of in-group/out-group polarization (Tajfel, 1982).

According to experimental research on intergroup discrimination (Brewer, 1979), bias diminishes as a result of modifications to the nature of the functional relationship between groups. For example, the use of common superordinate goals and greater intergroup contact can revise functional relationships to decrease competitive pressures while also intensifying the need for cooperative interaction (Brewer, 1979). Greater dependence on the external world thus should modify the relation of specialized firms to outsiders by weakening group-serving biases.

Firms with a more general-purpose knowledge base can benefit from cross-fertilization and reutilization of in-house knowledge by operating in various markets and technological fields; they are thus more likely to survive on the basis of their own internal knowledge. In addition, their technological breadth increases their chances of intersection and similarities with other organizations' knowledge. In turn, they

should develop stronger sentiments of rivalry and competition with outsiders, exacerbating the predisposition for in-group positivity and enhancement, along with “we know better” attitudes, that institutionalized socialization practices help create. In a competitive situation, people may overevaluate their own-group output, simply out of a desire to win (Ferguson and Kelley, 1964).

The cooperative interdependence typical of firms that operate in very specialized technological fields thus leads to less intergroup discrimination and prejudice. Because specialized knowledge bases promote open attitudes toward external knowledge (Yayavaram and Ahuja, 2008), they reduce the effects of a strong social identity acquired through institutionalized socialization. Thus:

Hypothesis 2: Technological specialization attenuates the relationship between institutionalized socialization practices and NIH syndrome.

3. Methods

3.1 Sampling and data

The empirical evidence is based on a sample of 169 SMEs from medium-high to high-tech manufacturing sectors in Denmark. First, following the classification of sectors applied by Eurostat (2008), we focused on pharmaceutical products, consumer electronics, medical equipment, computers, machinery, and chemicals—sectors known for using advanced technology and complementing internal investments in R&D with external knowledge acquisition (Cassiman and Veugelers, 2006). Second, to identify relevant enterprises, we used NACE trade codes in a nationwide electronic database (NED), which offers the most complete, detailed, and up-to-date catalog of companies in Denmark. Third, size and age criteria were applied. Only companies that fell into the category of SMEs (i.e. 10–249 employees) and were more than 3 years old (i.e., established before 2006) were selected. We consider SMEs a good test bed for our theory because they are more susceptible to the consequences of institutionalized socialization; the pressure to conform to external values and views likely is stronger among smaller groups. Very young companies are not a suitable sample because the implementation of socialization practices is gradual and requires time. After we applied these selection criteria, the final population consisted of 1206 companies.

To limit the potential for common method bias, we collected data from two informants in each company for our independent and dependent variables (Podsakoff *et al.*, 2003). We administered two completely distinct questionnaires to increase study validity. Through preliminary interviews conducted in the pilot phase, we identified suitable informant profiles: general managers or chief executive officers (CEOs) were identified as the first group of informants for the independent variable (institutionalized socialization practices) because they have a very good

overall sense of their respective companies. We identified chief technology officers (CTOs) as the second group of informants for the dependent variable (NIH syndrome) and the moderator (technological specialization) because they are responsible for R&D activities and therefore most knowledgeable about the technological aspects of their companies.

We conducted a pilot study with four companies in July 2009 to test the effectiveness of the questionnaire. No major comprehension problems or complaints were reported, and only minor modifications were suggested. During the data collection, carried out between September and November 2009, we first contacted the companies by telephone to introduce the study, identify the right informants, obtain their consent, and encourage their participation. Those who consented immediately received an e-mail with an invitation letter and a link to the Web-based survey, which was accompanied by an executive summary of the research project. The questionnaires were administered online with the software Inquisite version 9.0 in English; the existing measurement scales had been developed exclusively in English. Although most respondents were not native speakers, nearly all of them used English as a working language, and the pilot tests revealed no indications that the language of the survey caused problems. To boost response rates, we also sent two reminder e-mails. Of the 1206 companies initially contacted, 645 (53%) agreed to participate and received a link to the survey. We received 527 returned questionnaires, for a response rate of 40.9%. Of these responses, 282 pertained to the first survey and 245 to the second survey, so we had 169 matched pairs with data from both respondents, for a final response rate of 26.2% (circa 14% of the initial population). The respondents' mean company tenure was 3–5 years and mean industry tenure was 6–10 years, suggesting sufficient competence.

As a test of nonresponse bias, we examined differences between respondents and nonrespondents, using the objective variables of firm size, firm age, and industry affiliation. A *t*-test showed no significant differences ($P < 0.05$) with respect to age or distribution across industries; respondents tended to be slightly larger than nonrespondents (significant difference at 1% level). Nevertheless, we find broad overall correspondence between the underlying population and our sample on these objective measures.

3.2 Measures and operationalization

Except for the NIH syndrome, the scales used are perceptual measures borrowed from previous research. The scales constitute multi-item measures with Likert-type scales, as presented in Tables A1 and A2 in the appendix. The constructs were computed by calculating the arithmetic averages of their respective items so that they could be treated as observed indicators. In addition, the constructs were standardized for the hierarchical regression analysis to reduce potential multicollinearity problems.

3.2.1 Dependent variable: the NIH syndrome

The two-item scale of the *NIH syndrome* ($\alpha = 0.41$) is the only one for which a survey-based measure was not available in the existing literature; therefore, it had to be developed exclusively for this study (previous investigations in the field, such as Clagett (1967) and Menon and Pfeffer (2003), are based on qualitative fieldwork). We proceeded using the following logic: first, in line with current advances in sociopsychology research, we developed items as instruments for both *direct and indirect* attitude measures. The former (direct measure) used a single question about a person's general evaluation of the attitude object; the latter (indirect measure) relied on behavior to draw inferences about attitudes, consistent with previous studies (Bohner and Wänke, 2002; Bohner and Dickel, 2011) that indicate feelings and beliefs related to attitudes are internal to the person and cannot be observed directly (Ajzen, 2001; Albarracín *et al.*, 2005).² Second, we designed items that could capture the valuation of attitudes toward external knowledge, in a way both closely and distantly related to the knowledge base of firms, on the basis of an implicit notion of boundaries between different technological domains (Rosenkopf and Nerkar, 2001).³ We thus derived two items for this scale: (i) "We favor the application of technologies from outside which overlap to a great extent to what we already know" and (ii) "We often work with new technologies which lie outside our domain of expertise" (both reverse-coded). The first item reflects preferences for closely related knowledge (as indicated by the use of the word "favor"), whereas the second refers to behavior related to the adoption of distant knowledge.

We validated the scale with pilot studies, which confirmed that the questions were intelligible to respondents and posed no comprehension difficulties. We also conducted interviews before the collection of survey data; they confirmed our postulation that an open attitude to knowledge encompasses willingness to use external knowledge that is both distant and closely related to a firm's knowledge base. As one R&D employee explained, "One thing is of course to have scientists like me in the company who are able to read the scientific literature, and give some feedback into the organization of what is really possible To be open-minded is very necessary. If you are a conformist type of person who is more likely to do what you are secure with and what you know works, that is not the right kind of person to have." Conversely, a director of another company reported resistance to outside technologies close to the firm's field of expertise: "It took us three or four meetings to convince them that we had a technology that they had to have. The first time we did a presentation of our technology, they were so negative that you wouldn't

² However, observed behavior might be driven by many different factors, including a firm's strategic choices, in addition to the biased perceptions (the NIH syndrome) of the decision-maker.

³ The underlying logic is that companies with open attitudes toward outside knowledge are willing to use knowledge that is located on both ends of the spectrum of the technological distance scale, and thus that can be either complementary or substitute for their own knowledge.

believe it. Because they had a nice technology, that they were using every day, they hadn't realized that it was destroying what it was measuring." Even with this evidence in support of the validity of our scale, it remains a first approximation to quantify attitudes toward external knowledge. We discuss further the limitations of the scale in the conclusion.

The CTO was the informant for this scale. Even though we rely on one informant to assess overall attitudes among employees, it is not a severe limitation for our study, which seeks to capture differences at the interorganizational, not intraorganizational, level. Furthermore, the CTO is a reliable informant, especially in SMEs, where she or he is likely to interact directly with all employees involved in innovation.

Finally, we do not regard the relatively low Cronbach's alpha statistic as a source of great concern for the internal reliability of the scale because it consists of only two items. When scales are restricted to three or four items, a Cronbach's alpha of 0.50 is satisfactory (Kristal, 2008). Therefore, we consider a value of 0.41 for a two-item scale acceptable. In addition, the bivariate correlation between the two items is 0.258, significant at the 0.01 level (two-tailed test). A confirmatory factor analysis further corroborated the validity of the construct.

3.2.2 Institutionalized socialization practices

We gathered information about institutionalized socialization practices from the first informant, namely, CEOs, using a measure tailored to fit both their knowledge and the type of companies they ran (i.e., SMEs). The construct was developed by Jones (1986) and offers the most widely applied and tested scale available. The items capture socialization processes at a general level, irrespective of the nature of the culture or the types of norms to which people are being socialized. This generality is not a concern for our study because we seek to assess the extent to which socialization practices drive homogeneity in behavior, not to evaluate specific characteristics of the culture of each surveyed organization. We corrected the scale to account for respondents who are general managers (not typical employees) but still tried to preserve the original phrasing as much as possible, mainly by replacing "employees" with "I" in each item ($\alpha = 0.67$).

3.2.3 Technological specialization

We used an adapted version of Anderson and Weitz's (1992) scale for specialized investments to measure the degree of *technological specialization* ($\alpha = 0.80$), or the extent to which a firm has invested in resources that lose value if not applied to a specific technology. The scale fundamentally relies on an assessment of the breadth of use of the existing technical base of the organization. Confirmatory factor analysis was performed on the moderator variable, and it corroborated the validity of the construct. This information was provided by the second informant, the CTO.

3.2.4 Control variables

Two groups of control variables were included: those related to organizational attributes and practices (lack of prior experience, absorptive capacity, formalization, relational skills, and technological resource accumulation) and more traditional controls related to firm characteristics.

To measure the *lack of prior experience with external knowledge* ($\alpha = 0.83$), we counted the number of external factors not used by the companies as information sources in their innovation activities. Similar to the method adopted by the Eurostat Community Innovation Survey, companies indicated, on a 4-point scale (“not used” to “high degree”) to what extent they had used 13 external sources of information for their innovative activities during 2006–2008 (see Table A1 in the Appendix). The 13 sources were coded as binary variables, equal to 0 if the company had used the source to some degree and 1 if it had not. The 13 sources were summed to form a single variable. This version is the opposite of the measure proposed by Laursen and Salter (2006) to assess “search breadth.” We assume that when more sources have been excluded, the company must be less experienced with using external knowledge. A binary variable thus is justified because we are not interested in the nuances related to the extent of use, but solely in the distinction of used versus not used. We include this control variable because direct experience is an important driver of attitude formation (Ajzen, 2001). The general manager or CEO was the respondent for this measure.

A 25-item scale, derived from Jansen *et al.* (2005), provided the proxy for *absorptive capacity* ($\alpha = 0.94$). Because it was designed to measure the ability to absorb external knowledge directly, despite the inherent difficulties of measuring such an abstract construct, it is more appropriate for our study than other, traditionally used proxies (e.g., R&D intensity, number of corporate researchers). In this way, we also sought to minimize potential overlap with the NIH syndrome measure. Although these conceptually distinct constructs refer, respectively, to the ability (absorptive capacity) and willingness (NIH syndrome) to use external knowledge, they both are difficult to compute and not directly observable, such that we must infer them from behavior. To ensure the validity of the measures, our absorptive capacity scale refers specifically to the execution of a set of activities, whereas the NIH syndrome scale refers to the way respondents evaluate such activities (i.e., include the word “favor” in the questionnaire).

The evaluation of *formalization* relied on a scale derived from work by Burton *et al.* (2002), who used the scale in a very similar setting, namely, among Danish SMEs, with the CEO as the respondent. Originally encompassing eight items, we reduced the scale to five items, to help keep the questionnaire lean ($\alpha = 0.69$). Formalization should diminish biased attitudes against outsiders because written rules and codes of conduct likely limit behavior based on individual feelings and beliefs.

To measure the ability of organizations to establish and maintain relationships with external partners, the *relational skills* scale proposed by Walter *et al.* (2006) was

used ($\alpha = 0.84$). Relational skills offer a means to account for firms' abilities to establish relations with outside partners because they likely affect attitudes toward others.

The measure of *technological resource accumulation* ($\alpha = 0.86$) came directly from Danneels (2008) and is designed to capture the extent to which firms have built new engineering, R&D, and technological expertise in new technical areas over the past 10 years, as evaluated by the CTO. This time span was identified during the pilot study, when respondents defined the average length (in number of years) of the technology cycles in their industry. Firms that are in the process of upgrading their technological resources and accumulating new expertise are likely to be more open to external sources of knowledge and thus suffer less from the NIH syndrome.

Confirmatory factor analyses performed on all the control variables related to organizational characteristics corroborated the validity of these constructs.

Finally, control variables describing firm characteristics were *firm size*, *firm age*, *R&D intensity*, *participation in holding groups*, and *industry* effects. Except for R&D intensity, all these variables were available in the NED database. Larger firms typically have more resources and a larger knowledge base, so we included the natural logarithm of the number of full-time employees to account for firm size. We also controlled for firm age, measured as the natural logarithm of the number of years since its foundation. Older firms may lack the flexibility to deal with new external knowledge and thus develop stronger negative attitudes. We included R&D intensity (i.e., R&D expenditures as a percentage of turnover) to measure internal knowledge availability, which influences the formation of attitudes (Menon and Pfeffer, 2003). This self-reported measure came from the second informant. A dummy variable for participation in holding groups was added (0 = "no participation in holding group," 1 = "participation in holding group") because being part of a group might affect a firm's inclination to deal with extra-organizational knowledge. Considering our cross-industry approach, we also controlled for industry effects using a dummy variable, medium-high-tech/high-tech sector (0 = "medium-high-tech," 1 = "high-tech").

4. Results

Table 1 contains the descriptive statistics and correlations for the study variables. The level of NIH tendencies is moderately high (average: 4.02 on a 7-point scale), in support of existing indications of the widespread incidence of the NIH phenomena.

Beyond these stylized facts, we conducted hierarchical regressions to test our hypotheses. In Table 2 we present the results of the hierarchical regressions for the effect of socialization practices and moderating role of technological specialization on the formation of NIH syndrome, including both the standardized coefficients and their significance. The variables were standardized to avoid potential

Table 1 Descriptive statistics and correlations of study variables

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. NIH syndrome	4.05	1.03												
2. Institutionalized socialization	5.05	0.89	0.01											
3. Absorptive capacity	4.82	0.85	-0.55**	0.19*										
4. Technological specialization	3.30	0.97	-0.14	-0.09	-0.19*									
5. Technological resource accumulation	3.42	1.00	-0.34**	0.16*	0.44**	-0.18*								
6. Lack of prior experience	3.17	2.93	0.35**	0.03	-0.30**	-0.08	-0.22**							
7. Relational skills	5.88	0.70	-0.17*	0.40**	0.21**	-0.02	0.17*	-0.10						
8. Formalization	2.92	0.62	-0.09	0.19*	-0.03	0.23**	-0.10	0.04	0.03					
9. Firm age	3.33	0.77	0.06	-0.16*	-0.02	0.07	-0.17*	0.09	-0.11	-0.04				
10. R&D intensity	1.93	0.96	-0.20**	-0.04	0.29**	-0.08	0.33**	-0.15*	0.01	-0.28**	-0.29**			
11. Firm size	3.67	0.88	0.02	-0.13	-0.08	0.02	0.02	-0.08	-0.08	-0.13	0.27**	-0.19*		
12. Part of holding group	0.80	0.40	-0.07	0.04	0.06	-0.06	0.09	-0.05	0.05	-0.01	0.06	0.01	0.25**	
13. Medium-high/high-tech sector	0.20	0.40	0.03	0.07	0.00	-0.03	0.12	0.06	0.09	-0.01	-0.26**	0.21**	-0.03	-0.04

Note: $N = 169$.

**Significant at the 0.01 level (two-tailed).

*Significant at the 0.05 level (two-tailed).

Table 2 Hierarchical regression analyses: Effects of socialization and moderator on NIH syndrome

	Model 1	Model 2	Model 3	Model 4
Controls				
Lack of prior experience	0.19***	0.16**	0.13**	0.13**
Relational skills	-0.05	-0.11	-0.10	-0.11
Formalization	-0.14**	-0.17**	-0.11	-0.09
Absorptive capacity	-0.43***	-0.46***	-0.50***	-0.50***
Technological resource accumulation	-0.09	-0.11	-0.13*	-0.13*
Firm age	0.01	0.03	0.05	0.04
R&D intensity	-0.07	-0.05	-0.03	-0.04
Firm size	-0.03	-0.02	-0.01	-0.01
Participation in a holding group	-0.02	-0.02	-0.03	-0.03
Medium-high/high-tech sector	0.05	0.04	0.04	0.05
Main effects				
Socialization		0.18**	0.16**	0.18**
Technological specialization (TE)			-0.21***	-0.21***
Interaction effect				
Socialization × TE				-0.14**
Model statistics				
<i>F</i>	9.411***	9.419***	10.03***	9.921***
Adjusted <i>R</i> ²	0.334	0.355	0.392	0.408
<i>R</i> ² change		0.024**	0.038***	0.019**

Note: Standardized coefficients reported ($N=169$)

Significance: * $P < 0.1$; ** $P < 0.05$; *** $P < 0.01$ (two-tailed t -tests)

multicollinearity issues. We also checked the variance inflation factors in each regression equation; the highest value is 1.91 (model 3), well below the recommended threshold of 10 (Wooldridge, 2009). Thus, multicollinearity is not a serious concern.

Model 1 in Table 2 refers to the base model, which encompasses only the control variables. Of the traditional controls, none was significant. Of the organizational controls, three are significant and with the anticipated signs, except for relational skills ($\hat{\beta} = -0.05$, $P > 0.10$). We note the relatively high coefficient of absorptive capacity ($\hat{\beta} = -0.43$, $P < 0.01$) and the fact that lack of prior experience ($\hat{\beta} = 0.19$, $P < 0.01$) remains significant in all models. Intuitively, this finding suggests that the more firms are accustomed to drawing on external sources, the less suspicious they are of outsiders, which constitutes the familiarity principle in sociopsychological literature. That is, the more often an object is encountered, the more pleasing and likable it becomes (Ajzen, 2001). Formalization ($\hat{\beta} = -0.14$, $P < 0.05$) is negatively

associated with the formation of NIH tendencies. This variable is subject to managerial intentionality and thus can be used to reduce unwanted attitudes. The effect of the technological resource accumulation variable is negative, and statistically significant (at 10% level) only in models 3 and 4 ($\hat{\beta} = -0.13$, $P < 0.10$), suggesting that firms that are in the process of upgrading their technological expertise might be less afraid of the threats associated with external knowledge.

Models 2–4 include the effects of the variables cited in our hypotheses. The models with full specifications show the highest explanatory power compared with the base, such that the level of negative attitudes toward external knowledge among Danish SMEs was better explained by accounting for the effects of institutionalized socialization practices in direct and indirect ways.

The results for the main effect in Model 2 affirm H1 because of the positive relation between NIH syndrome and institutionalized socialization practices. The coefficient of the key antecedent in our model is positive ($\hat{\beta} = 0.18$) and significant at the 5% level, corroborating the notion that institutionalized socialization practices that lead to a strong sense of social identity, and thus sentiments of in-group favoritism, may drive the formation of NIH tendencies.

In H2, we proposed that a firm's knowledge base moderated the effect of institutionalized socialization practices on NIH syndrome. Therefore, the variable technological specialization was first introduced in Model 3 to directly affect our dependent variable. The direct effect of the moderator is negative and statistically significant ($\hat{\beta} = -0.21$, $P < 0.01$), suggesting that firms with a highly specialized knowledge base are less subject to the NIH syndrome. This finding is consistent with the notion that specialization creates interdependencies and reduces competition with outside researchers, making it less likely that external knowledge is perceived as a threat. In Model 4, we introduced the interaction effect, namely, the joint effect between institutionalized socialization practices and technological specialization. It reveals a negative, significant coefficient ($\hat{\beta} = -0.14$, $P < 0.05$), in line with H2. It thus functions as a partial moderator with buffering interaction effects (Frazier *et al.*, 2004). For highly specialized firms, the effects of socialization practices on the NIH syndrome are less negative than for their general-purpose counterparts.

As a robustness check, we retested the results using an ordered logit model. With our dependent variable, we found it appropriate to recalculate our model and treat it as a count-ordered variable. The results were robust across the two model specifications (available from authors on request).

5. Discussion and conclusion

Our objective has been to empirically test the relationship between institutionalized socialization practices related to employee integration and the formation of negative

attitudes toward external knowledge, as well as to develop theory about the context of this relation.

Institutionalized socialization practices are positively associated with negative attitudes toward external knowledge because employee integration practices are designed to lead to shared social experiences and the congruence of values, needs, and beliefs. Individual employees thus receive encouragement to build collective interpretations of reality and align their perspectives on various matters—that is, to form a strong corporate identity (Crano and Prislin, 2006). The latter may be helpful in securing greater employee commitment and thus more effective implementation of firm strategies. However, it may also lead, as we show in this article, to a biased perception of the external world, such that employees tend to undervalue the usefulness of knowledge from outside while also favoring and exalting internal knowledge and its production. In face of these complexities, the potential benefits and downsides of institutionalized socialization must be assessed jointly.

Interestingly, we also show that one characteristic of the firm's knowledge base, namely technological specialization, has buffering moderating effects on the relationship between institutionalized socialization practices and attitudes toward external knowledge. It was found to mute this relation. In light of social identity theory, this result is explained by the fact that technologically highly specialized companies do not experience competition threats to a large extent and therefore are not likely to feel high polarization between the in-group and out-group.

Taken together, our results contribute to a more nuanced perspective of the process of knowledge valuation. In line with previous research (Menon and Blount, 2003), our study shows that not only the origin of knowledge per se but also the contingencies arising from the organizational context (i.e., the firm's knowledge base) affect the formation of NIH tendencies. This information is especially valuable for managers who need to assess the trade-offs related to establishing institutionalized socialization practices. In particular, managers of companies characterized by a broad technological base should be especially attentive to the downsides of such practices.

5.1 Implications to theory and practice

Our findings have implications for multiple theoretical streams. First, we contribute to innovation management literature by improving understanding of the formation of negative attitudes toward external knowledge. Understanding the context in which organizational socialization affects the formation of NIH syndrome is of fundamental importance from a theoretical perspective; this notion is central to understanding the knowledge-sharing behaviors of employees (Gioia *et al.*, 2000; Ackerman, 2010). It has been applied as a moderating variable to explain why the search, transfer, and assimilation of external knowledge is so challenging (Arora and Gambardella, 2010), as an essential trait of individual and group behavior (e.g., Szulanski, 1996;

Agrawal *et al.*, 2010) and as a pathology that affects companies that become too inward-looking (e.g., Sherman *et al.*, 2000; Wilkesmann *et al.*, 2009). More refined theory that identifies not only the consequences but also the drivers of this attitude is essential; it likely does not take place in all settings.

Second, for identity literature in the organizational behavior tradition, we offer a more nuanced perspective on the construct of corporate identity, exposing one of its drawbacks. By identifying an important trade-off, we balance the excessively positive and perhaps naive view of the consequences of institutionalized socialization practices and strong corporate identity that previously has dominated this research stream.

Finally, from a methodological perspective, we propose a perceptual scale for measuring NIH attitudes, which has some limitations but should be instrumental for encouraging further research into the influences of attitudinal responses on innovative activities.

On the practical side, practitioners need to know about the triggers of NIH syndrome and the contingencies in which their firm is more sensitive to its detrimental consequences. Our study encourages managers to undertake reflective inquiry about the way they integrate newcomers into their organizations. We recommend thinking critically about the extent to which managers encourage the development of a strong corporate identity and homogeneous values in their organizations, to the extent that they may not leave room for divergences or constructive dialogue. Particularly for SMEs, in which pressures to conform with existing roles and frames tend to be stronger than in larger organizations, the socialization of new recruits can have a lasting impact on the way those employees relate to the outside world and assess external knowledge. For practitioners, a clear trade-off exists in the development of strong corporate identity and value system, which they must recognize. This trade-off gets attenuated among firms that are technologically very specialized.

5.2 Limitations

This study has some noteworthy limitations that merit discussion. First, our empirical focus has been on Danish companies. Although nothing leads us to suspect that our results are country specific, supplementary research in other geographical contexts is required to confirm our claims. It similarly would be valuable to conduct studies in other settings to enable comparisons of our sample with other industries and other kinds of organizations, including large companies or universities. Second, we relied on a cross-sectional data set that constrained our inference of causality among the variables. Our causal relationships exclusively reflect an extensive theoretical rationale, such that they must be validated in longitudinal research. Third, though our hypotheses were confirmed, this study is somewhat exploratory, in that we developed a new scale for the dependent variable that, as we acknowledge, is far from perfect. Finally and related, our evidence is fully consistent with our theoretical arguments, but we cannot totally discard alternative explanations with our

cross-sectional data. For instance, a company might rationally commit to discount external knowledge to provide stronger incentives to its researchers (Rotemberg and Saloner, 1994). This strategic choice might be associated with an emphasis on institutionalized socialization practices, driving a correlation between the two variables that is not the outcome of biased perceptions. We hope ongoing research and future data collection will help eliminate these limitations.

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Appendix

Table A1 Constructs from first respondent: General manager

Construct	Items
Institutionalized socialization from Jones (1986)	<ol style="list-style-type: none"> 1. Experienced organizational members see advising or training newcomers as one of their main job responsibilities in this organization. 2. Employees typically gain a clear understanding of their role in this organization from observing senior colleagues. 3. Employees typically receive little guidance from experienced organizational members as to how they should perform their job (R). 4. Employees have little or no access to people who have previously performed their role here (R). 5. Employees are generally left alone to discover what their role should be in this organization (R). <p>(7-point scale, where 1 = strongly disagree and 7 = strongly agree)</p>
Relational skills from Walter et al. (2006)	<ol style="list-style-type: none"> 1. We have the ability to build good personal relationships with business partners. 2. We can put ourselves in our partners' position. 3. We can deal flexibly with our partners. 4. We almost always solve problems constructively with our partners. <p>(7-point scale, where 1 = strongly disagree and 7 = strongly agree)</p>
Formalization from Burton et al. (2002)	<ol style="list-style-type: none"> 1. There are clear-cut rules for how employees must perform their jobs. 2. We carefully control whether our employees follow the rules of the company. 3. Employees are allowed to deviate from rules. 4. Employees' work is to a high degree governed by standards. 5. Employees are allowed to deviate from standards <p>(5-point scale, where 1 = strongly disagree and 5 = strongly agree)</p>
Lack of prior experience from Laursen and Salter (2006)	<p>How important to your company's innovation activities during the 3-year period 2006–2008 were each of the following information sources?</p>

(continued)

Table A1 Continued

Construct	Items
	<p><i>Market sources</i></p> <p>(a) Suppliers of equipment, materials, components, or software</p> <p>(b) Clients or customers</p> <p>(c) Competitors</p> <p>(d) Consultants</p> <p>(e) Commercial laboratories/R&D enterprises</p> <p><i>Institutional sources</i></p> <p>(f) Universities or other higher education institutes</p> <p>(g) Government research organizations</p> <p>(h) Other public sector, e.g., business links, government offices</p> <p>(i) Private research institutes</p> <p><i>Other sources</i></p> <p>(j) Professional conferences, meetings</p> <p>(k) Trade associations</p> <p>(l) Technical/trade press, computer databases</p> <p>(m) Fairs, exhibitions</p> <p><i>(4-point scale, where 0 = not used and 3 = used to high extent)</i></p>

Table A2 Constructs from second respondent: Technology manager

NIH syndrome	<p><i>Please consider your company's core technological field in answering these questions</i></p> <p>1. We favor the application of technologies from outside, which overlap to a great extent to what we already know (R).</p> <p>2. We often work with new technologies, which lie outside our domain of expertise (R).</p> <p><i>(7-point scale, where 1 = strongly disagree and 7 = strongly agree)</i></p>
Absorptive capacity	<p>1. We frequently scan the environment for new technologies.</p> <p>2. We thoroughly observe technological trends.</p> <p>3. We observe in detail external sources of new technologies.</p> <p>4. We thoroughly collect industry information.</p> <p>5. We have information on the state-of-art of external technologies.</p> <p>6. We frequently acquire technologies from external sources.</p> <p>7. We periodically organize special meetings with external partners to acquire new techn.</p> <p>8. Employees regularly approach external institutions to acquire technological knowledge.</p>

(continued)

Table A2 Continued

	9. We often transfer technological knowledge.
	10. We thoroughly maintain relevant knowledge over time.
	11. Employees store technological knowledge for future reference.
	12. We communicate relevant knowledge across the units of our firm.
	13. Knowledge management is functioning well in our company.
	14. When recognizing a business opportunity, we can quickly rely on existing knowledge.
	15. We are proficient in reactivating existing knowledge for new uses.
	16. We quickly analyze and interpret changing market demands for our technologies.
	17. New opportunities to serve our customers w. existing technologies are quickly understood.
	18. We are proficient in transforming techn. knowledge from external sources into new prod.
	19. We regularly match new technologies from outside with ideas for new products.
	20. We quickly recognize the usefulness of new technological knowledge from outside for existing knowledge.
	21. Our employees are capable of sharing their expertise to develop new products.
	22. We regularly apply technologies developed externally in new products.
	23. We constantly consider how to better exploit technologies from outside.
	24. We easily implement external technologies in new products.
	25. It is well known who can best exploit new technologies inside our firm. (7-point scale, where 1 = strongly disagree and 7 =strongly agree)
Technolog. specializa- tion from Anderson and Weitz (1992)	1. Much of our technical expertise is insufficient for the application and implementation of new technologies.
	2. We have to significantly reinvent many of our operating procedures and protocols to successfully apply technologies developed externally into our business.
	3. To be successful in new outside technologies, we often need to change substantially the manner in which we carry many of our tasks.
	4. Our equipment and instruments are often not useful for our new developmental projects.
	5. Many of our manufacturing skills cannot be applied to new technologies.
	6. We usually have to retrain/lay off current employees or hire new ones in order to sucessfully develop new technologies. (5-point scale, where 1 = strongly disagree and 5 =strongly agree)

(continued)

Table A2 Continued

Technological resource accumulation from Danneels (2008)	<p><i>These questions ask to what extent your company built or developed new resources, skills, or competences that it did not yet have in the year 2000. Since the year 2000, we built:</i></p> <ol style="list-style-type: none">1. New kinds of production operations or facilities2. Technological expertise in new areas3. R&D skills and resources in new technical areas4. Engineering skills and resources in new technical areas <p><i>(7-point scale, where 1 = strongly disagree and 7 = strongly agree)</i></p>
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Note. (R) Means reversed coding.