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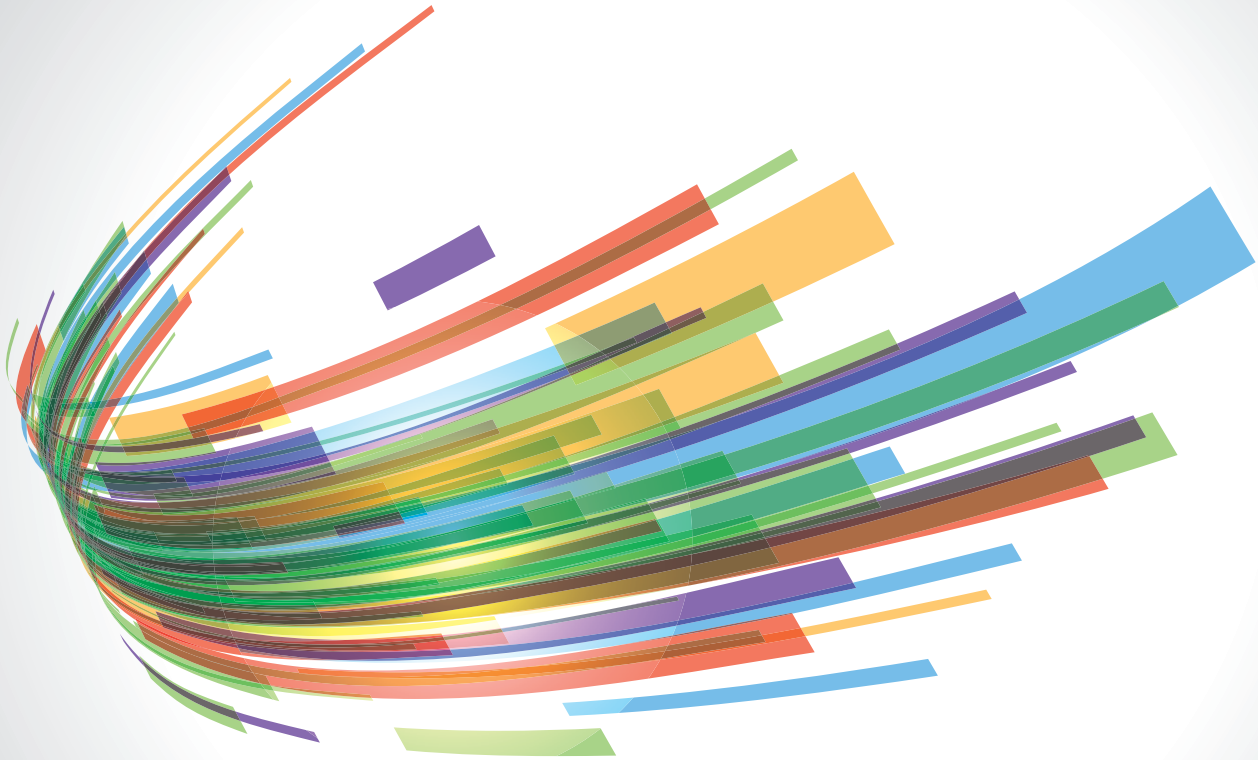
MANAGING OPEN INNOVATION IN LARGE FIRMS

SURVEY REPORT | EXECUTIVE SURVEY ON OPEN INNOVATION 2013



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MANAGING OPEN INNOVATION IN LARGE FIRMS

Survey report
Executive Survey on Open Innovation 2013

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May 2013

1 | EXECUTIVE SUMMARY

The Garwood Center for Corporate Innovation at the University of California, Berkeley, in the US and the Fraunhofer Society in Germany have teamed up to conduct the first large sample survey of open innovation adoption among large firms that we know of. Surveying large firms in both Europe and the US with annual sales in excess of US$ 250 million, we learned many important facts that show the extent to which large firms are now practicing open innovation. Here are some of the highlight results from our survey, along with the section of this report where these results are reported:

- 78 % of firms in our sample report practicing open innovation (3.1).
- No firms in our sample report abandoning their practice of open innovation (3.2).
- 71 % report that top management support for open innovation is increasing in their firm (3.2).
- 82 % report that, compared to three years ago, open innovation is practiced more intensively today (3.2).
- Inbound open innovation practices are more commonly practiced than outbound practices. The share of projects with an inbound component is 35 % on average. Only about 8 % of projects result in outbound activities (4.2).
- Customer co-creation, informal networking, and university grants are the three leading inbound practices in 2011. Crowdsourcing and open innovation intermediary services are rated lowest in importance (4.3).
- Joint ventures, selling market-ready products and standardization are the three leading outbound practices. Donations to commons and spin-offs play a minor role (4.3).
- Customers, universities and suppliers are the three leading open innovation partners reported by survey respondents (4.3).
- Firms are much more likely to receive "freely revealed" information than they are to provide such information (4.4).

- Establishing new partnerships, exploring new technological trends and identifying new business opportunities are the leading strategic reasons to engage in open innovation (4.5).
- Corporate R&D and product & process development units report more autonomy in budgeting for innovation activities (5.1).
- The typical large firm in our sample spends US$ 2 million annually on open innovation, and employees 20 full time equivalent people to do the work (5.2).
- Open innovation is not much formalized yet, and cultural norms are as important for open innovation as formal practices (5.3).
- The biggest challenges in managing open innovation are within the firm. The change process from closed to open innovation is rated as the most difficult task (5.4).
- Firms are not satisfied with their current open innovation metrics (6.1), though they are more satisfied with their overall open innovation performance to date (6.2).

We discuss these findings and additional analyses in more depth in the pages that follow. Overall, our survey results paint a picture in which open innovation is on the rise. While firms are somewhat satisfied overall with their open innovation experience (and their satisfaction increases with more experience), there is plenty of room for improvement. For example, inbound practices are more commonly utilized than outbound practices. Individual practices are not rated all that highly in their effectiveness and individual metrics are not rated very highly either. We surmise that firms are still early in their use and understanding of open innovation.

2 | ABOUT THE STUDY

Open innovation has become a widely discussed phenomenon in both Europe and the US in the ten years that have passed since the publication of Henry Chesbrough's book, Open Innovation.[1] There are many examples of individual companies that have adopted open innovation. But more systematic evidence of the extent to which open innovation has been adopted is surprisingly scarce.

There is also concern about whether open innovation is a fad, or something that will endure for some period of time. Some commentators have expressed the view that open innovation is becoming passé.[2] The empirical academic research that has been done on open innovation has largely confined itself to interpretation and analyses taken from the Community Innovation Surveys in various European countries. These studies, while well done, utilize survey data that was not constructed specifically to probe open innovation activities.[3]

This study is an initial attempt to address this void. It is the first large scale, quantitative survey of which we are aware that specifically probes the adoption of open innovation in large companies. It also explores some of the leading practices for both halves of the open innovation model: Inbound practices to bring in external ideas and technologies into a company's own innovation process; and outbound practices to enable unused internal ideas and assets to go outside for other companies to utilize. In addition, we also explored the role of monetary and non-monetary incentives in both halves of the open innovation model.[4] We then examined the management and organization of open innovation, and what measures respondent firms used to track its progress.

To perform the first quantitative study on open innovation in large firms we emailed our survey on open innovation to senior executives at the headquarters of more than 2,840 large and stock market listed firms. Our sample included all large companies in Europe and US, with revenues annually in excess of US$ 250 million and more than 1,000 employees. This sampling frame was drawn to fill a gap as there is no quantitative study on open innovation in very large firms. We received usable survey responses from 125 firms in November and December 2012. We sent the survey to at least one contact person at the company headquarters. Our primary

[1] Open Innovation: The new imperative for creating and profiting from technology, Harvard Business School Press, (Boston: MA), 2003.

[2] See the comments of Graham Barker in this thread: http://www.innovationexcellence.com/blog/2010/11/24/why-openinnovation-is-not-for-small-companies/

[3] See Laursen, K. and Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among U.K. manufacturing firms, Strategic Management Journal 27(2): 131–150.

[4] See e.g. Dahlander, L. and Gann, D. (2010). How open is innovation?, Research Policy 39(6): 699–709.

contact was the Chief Executive Officer or the Chief Operations Officer. We also sent our survey to the Chief Technology Officer or a senior executive responsible for strategy or business development (e.g. VP Strategy or Business Development) if contact details were available. We contacted our respondents via email and invited them to participate in the survey online via an online survey[5]. We also offered our respondents to fill in a PDF version of the questionnaire and to send it back via fax or email. The executives were asked to fill in the survey themselves or to designate it to the most appropriate senior person at the headquarters.

One response represents one survey per firm as we did not consider multiple responses per firm for consistency reasons[6]. The online survey was the preferred survey option. Only 13 of the useable survey responses were filled in via PDF. Survey respondents were top senior executives, with roles in technology and R&D (e.g. CTO or VP Innovation), operations (e.g. COO), strategy or business development. More than 10 surveys were filled in by the CEO. The median respondents reported to the CEO directly. Our respondents represent firms from manufacturing and services sectors. Both low-tech and high-tech firms are included in our sample. We report further details on the industry, size and age distribution in the annex of this report.

We performed a number of tests for sample bias. We learned that our sample is underweighted for service companies, and correspondingly overweighted towards manufacturing companies. However, our respondents did not differ significantly from the sample frame in the size and age of the responding firm. We also found that we had more respondents from Europe, relative to those from the US, relative to our sample frame. These sample differences need to be kept in mind when interpreting the results.

The remainder of this report is structured as follows: Section 3 explores the adoption and the pervasiveness of open innovation in large firms. Section 4 takes a closer look into the variety and nature of how large firms practice open innovation. Section 5 and 6 present insights into how large firms organize their open innovation activities internally, and measure and manage open innovation. Section 7 draws together the key findings and conclusions of the report.

[5] We used the online survey tool Lime Survey (www.limesurvey.org) to program our online survey

[6] In some cases we had two responses per company. We applied two criteria to select the respondents: Completeness of the survey and hierarchy level of the respondent.

3 | THE ADOPTION OF OPEN INNOVATION IN LARGE FIRMS – IT'S ON THE RISE

Open innovation is defined as: "… the purposive use of inflows and outflows of knowledge to accelerate innovation in one's own market, and expand the use of internal knowledge in external markets, respectively."[7] This is the definition we gave respondents for our survey. Using this definition, 78 % of respondents reported practicing open innovation, with 22 % reporting that they do not practice open innovation.

A closer look into different industry sectors indicates that open innovation is most widely adopted in high-tech manufacturing sectors and wholesale, trade and retail. Low-tech manufacturing sectors and financial services show the lowest rate of adoption (Figure 1).

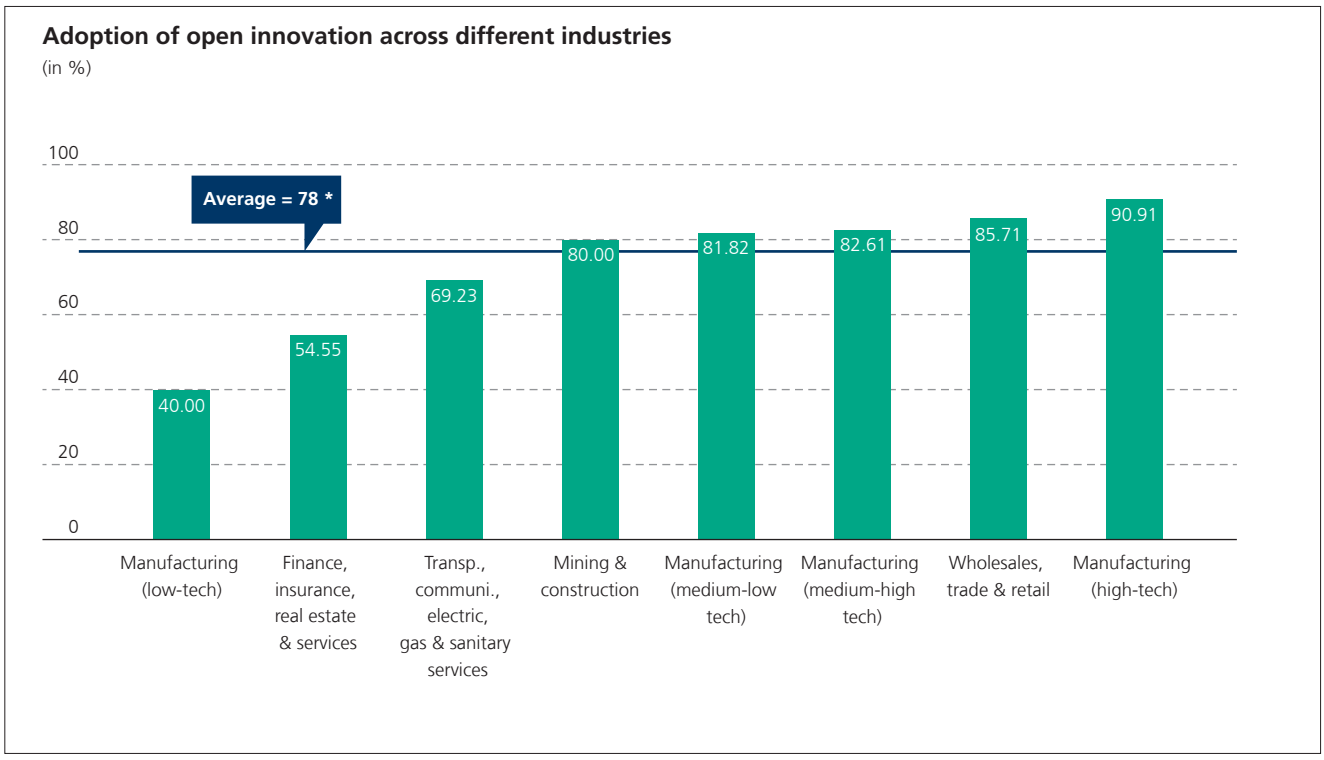


Figure 1: Adoption of open innovation across different industry groups

To get an even more detailed understanding of the validity of the concept, we also explored for how many years firms have been practicing open innovation. The median open innovation experience among our sample was about 5 years. More than 30 % of the firms claimed that they have been practicing open innovation even before 2003 (see Figure 2).

[7] See Chesbrough, Vanhaverbeke and West, Open Innovation: Researching a new paradigm, Oxford University Press, (Oxford: UK), 2006: p.1.

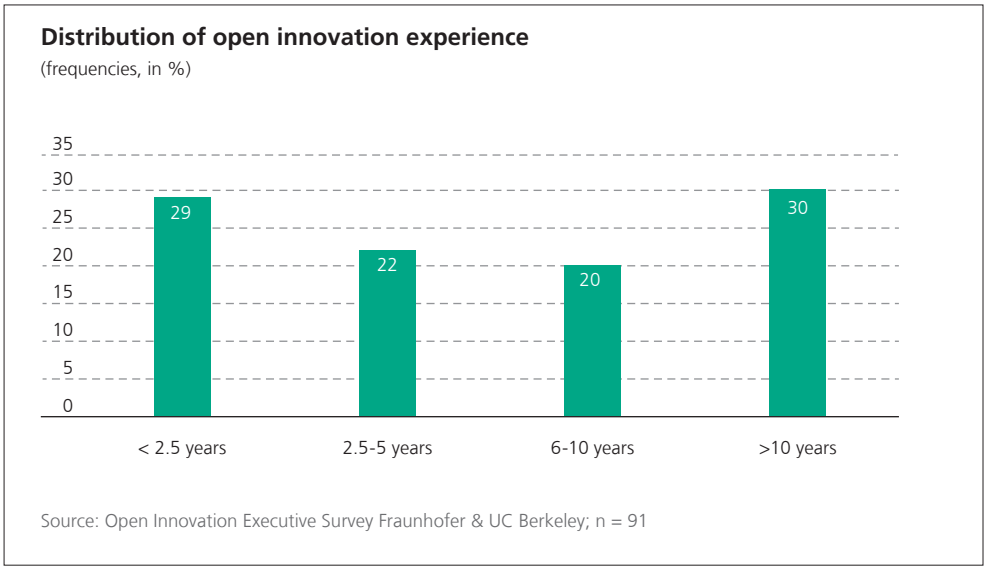


Figure 2: Distribution of open innovation experience

Another survey question addressed the extent of management support for open innovation. 71% of respondents reported that management support for open innovation was increasing (5 or greater on a 7 point scale), 25 % reported no change in management support (4 on a 7 point scale), and 4 % reported a decline in management support (3 or less on a 7 point scale).

We also asked about abandonment of open innovation. None of our sample reported abandoning open innovation, among those who reported practicing open innovation.

Furthermore, we explored the intensity with which open innovation is being used. 82 % of respondents reported that open innovation was being practiced more intensively than 3 years ago, 15 % reported no change in intensity, and 3 % reported a decrease in intensity.

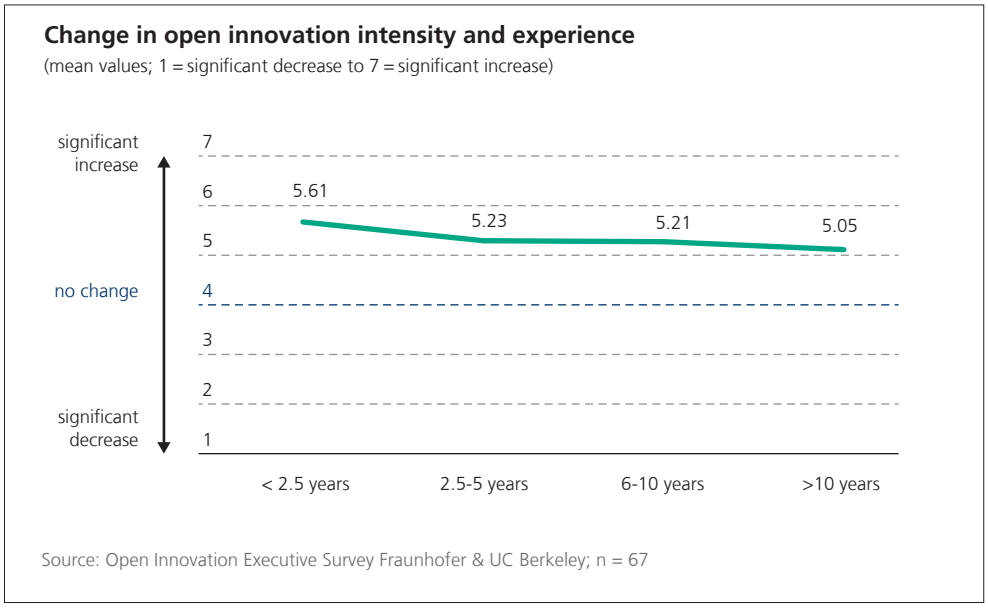


Figure 3: Change in open innovation intensity and experience

As shown the Figure 3, it is not just firms that recently engaged in open innovation that report an increase of their open innovation activities. Firms that have been practicing open innovation for several years have been increasing their open innovation activity as well.

These results in first conclusion of our survey: Open innovation is not yet pervasive among large companies, but is widely practiced. Management support and the intensity of its use suggest that open innovation is on the rise (vs. being on its way out, or being abandoned).

4 | DOMINANT MODES OF OPEN INNOVATION IN LARGE FIRMS

As open innovation is now widely practiced in large firms, it is important to understand how they engage in open innovation. Since 2003, a range of case examples highlight that firms have started to experiment with a variety of practices to make use of inflows and outflows of knowledge in innovation[8]. They range from customer co-creation, crowdsourcing[9], R&D services, and informal networking to out-licensing, spin-off activities, joint ventures, and donations. In the following, we provide new insights in the dominant modes of open innovation in large firms. Before reporting the results of our study we provide a general classification of different open innovation practices.

4.1. A classification of open innovation

In the existing discussion of open innovation, we usually differentiate between inbound open innovation where external knowledge flows inside the firm, and outbound open innovation where knowledge flows outside the firm. If these knowledge flows are non-pecuniary in nature, there is no direct financial reward and compensation associated with it. In a non-pecuniary mode of inbound open innovation firms source external knowledge without a full compensation of external ideas and contributions. In contrast, in a non-pecuniary mode of inbound open innovation firms freely reveal their knowledge e.g. via donations or participation in standards (Figure 4)[10]. Drawing from this classification we will now explore how large firms have been engaging in open innovation from 2008 to 2011.

[8] See for example Huston, L. and Sakkab, N. (2006). Inside Procter & Gamble's new model for innovation: Connect and develop, Harvard Business Review: 58–66.

[9] Crowdsourcing describes the act of outsourcing a task in the problem solving process to a "crowd," rather than to a designated "agent" (an organization, informal or formal team, or individual), such as a contractor, in the form of an open call; see for example Afuah, A. and Tucci, C. L. (2012). Crowdsourcing as a solution to distant search, Academy of Management Review 37(3): 355–375.

[10] Dahlander, L. and Gann, D. (2010). How open is innovation?, Research Policy 39(6): 699–709.

Source: Open Innovation Executive Survey Fraunhofer & UC Berkeley; n = 67

Figure 4: Classification of modes of open innovation

4.2. The dominance of inbound open innovation in the innovation portfolio of large firms

Our study investigates the role of inbound and outbound open innovation in the innovation portfolio of large firms. We measures the extent of inbound open innovation as percentages of projects that had an external contribution (e.g. external license, collaboration etc.) and the extent of outbound open innovation as percentage of projects that resulted in an outbound activity (e.g. out licensing, spin-off etc). We collected this data for 2011.

Our results suggest that large firms are more inclined to enrich their internal projects with inflows of knowledge rather than finding new paths to markets for ideas developed in internal projects. The share of projects with an inbound component is 35 % on average. Only about 8 % of projects result in outbound activities.

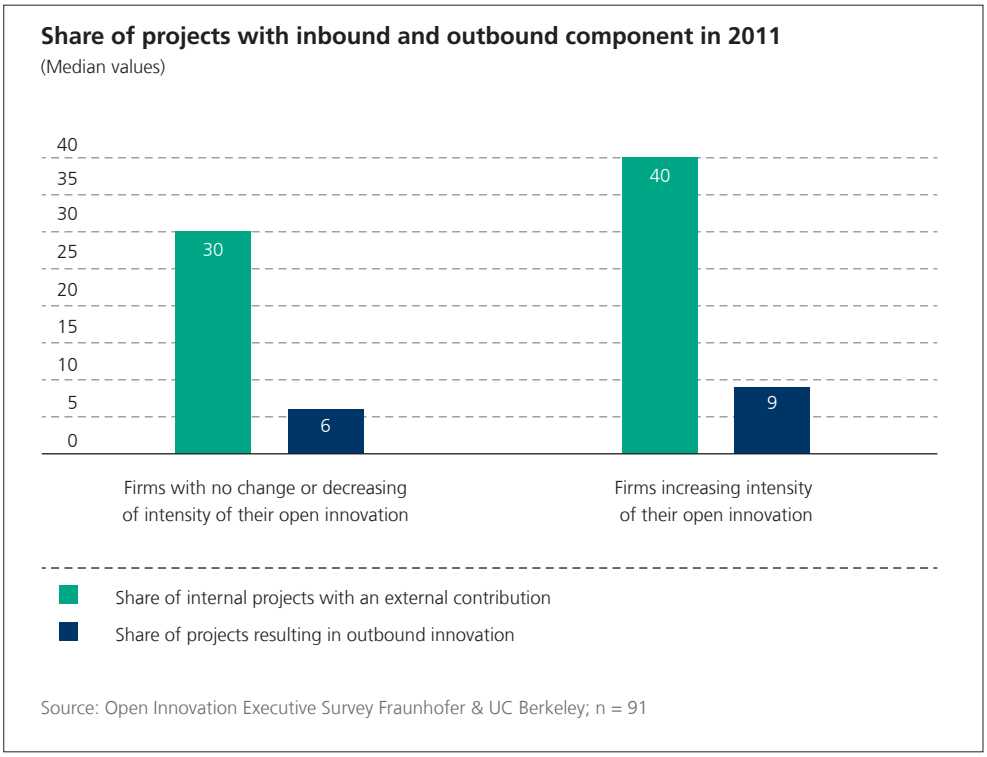


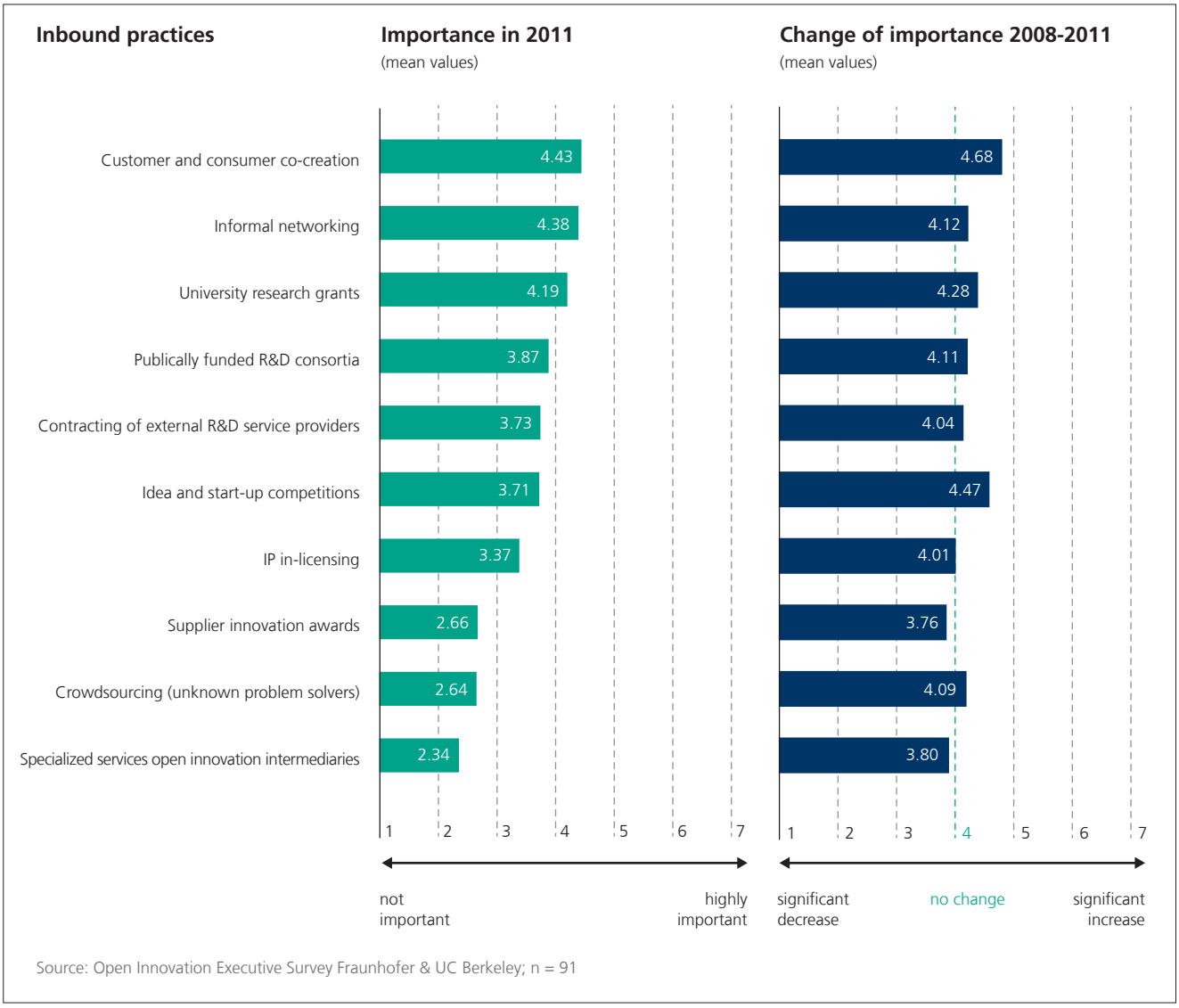
Figure 5: Share of innovation projects with inbound and outbound component

The dominance of inflows of knowledge remains across different experience levels. When comparing firms that haven't changed or even decreased their open innovation activities with those that have increase their open innovation activities since they started to engage it (measured on a scale 1 = significant decrease 4 = no change 7 = significant increase), we observe that the dominance of inbound open innovation remains. In firms with decreasing or stable open innovation intensity 30 % of projects have an external contribution, and 6 % result in an outbound open innovation activity. In firms with an increasing open innovation activity about 40 % of internal projects have an external contribution, and 9 % of projects find a new path to market via outbound open innovation.

4.3. The importance of different open innovation practices

Firms can make a choice among a range of different inbound and outbound practices. To explore these individual practices in more detail, we asked our respondents to rate the importance of different open innovation practices in 2011 and the change of their importance from 2008 to 2011. We asked them to evaluate 10 distinct inbound practices and 7 distinct outbound practices. In our list we considered both pecuniary and non-pecuniary activities. To make sure that we capture a holistic picture we included traditional practices such as R&D consortia as well as more recently emerging practices such as crowdsourcing, open innovation intermediaries or donations in our measurement.

Figure 6 reports the results for the respondents' ratings of the importance of individual inbound practices in 2011 and their changing role from 2008 to 2011. Large firms, on average, consider all inbound practices to be of modest importance (average score 3.25 of importance in 2011). On average, the perceived importance of these practices has also slightly increased from 2008 to 2011 (average score of 4.14 with 1 = significant decrease, 4 = no change, and 7 = significant increase).



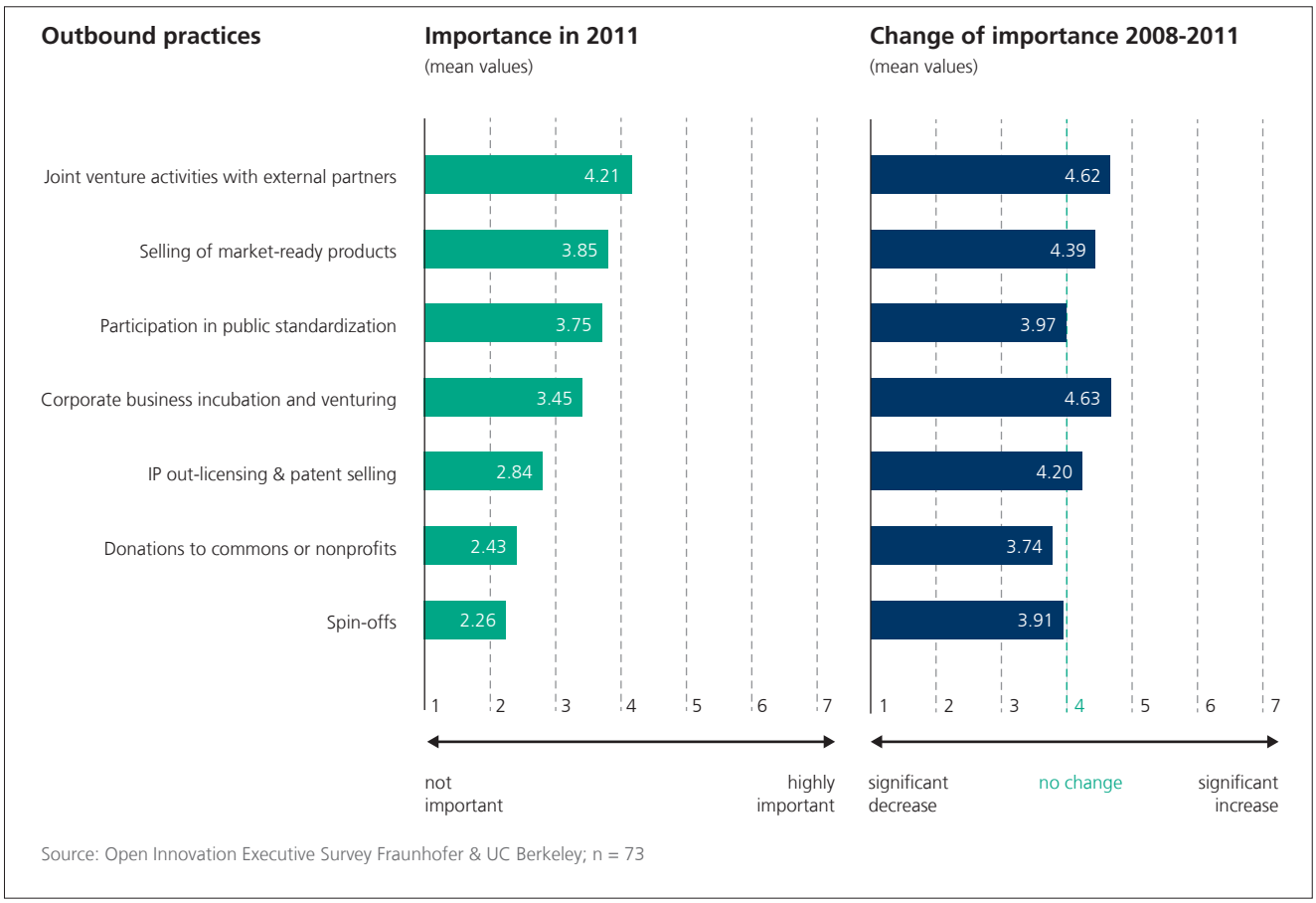
Source: Open Innovation Executive Survey Fraunhofer & UC Berkeley; n = 91

Figure 6: Inbound practices – Importance in 2011 and change of importance 2008 to 2011

For inbound practices, customer and consumer co-creation is one of the top rated practices in importance (4.43 on a 7 point scale). It has been growing in importance from 2008 to 2011. Informal networking and university research grants rank second and third. On the other end, crowdsourcing (among unknown innovation problem solvers) and specialized open innovation intermediary services are rated lowest in importance. The importance of services of open innovation intermediaries has slightly decreased from 2008 to 2011 (score of 2.34). Besides customer co-creation our respondents also report a growing importance of start-up and idea competitions in their portfolio of open innovation practices (score of 4.47).

Figure 7 reports the importance of individual outbound practices in 2011 and their change from 2008 to 2011. On average, outbound practices are less important than inbound practices to large firms. The respondents' average rating of seven outbound practices was lower than for inbound practices (average score 3.25 of importance in 2011). This is in line with our findings in chapter 4.2 on the higher share of inbound activities than outbound activities. However, we notice a slightly growing interest in outbound practices over the last years. On average, they respondents report a positive change of the importance of these outbound practices from 2008 to 2011 (average score 4.21). Apparently, outbound practices played an even less significant role in the past.

Figure 7: Outbound practices – Importance in 2011 and change of importance 2008 to 2011



Source: Open Innovation Executive Survey Fraunhofer & UC Berkeley; n = 73

Joint venture activities are the most highly rated practice (average score 4.21), and have been growing in importance over the past three years (average score of 4.62). The sale of market-ready products and participation in public standardization rank second and third respectively. Donations to commons or nonprofits and spin-offs are the least important

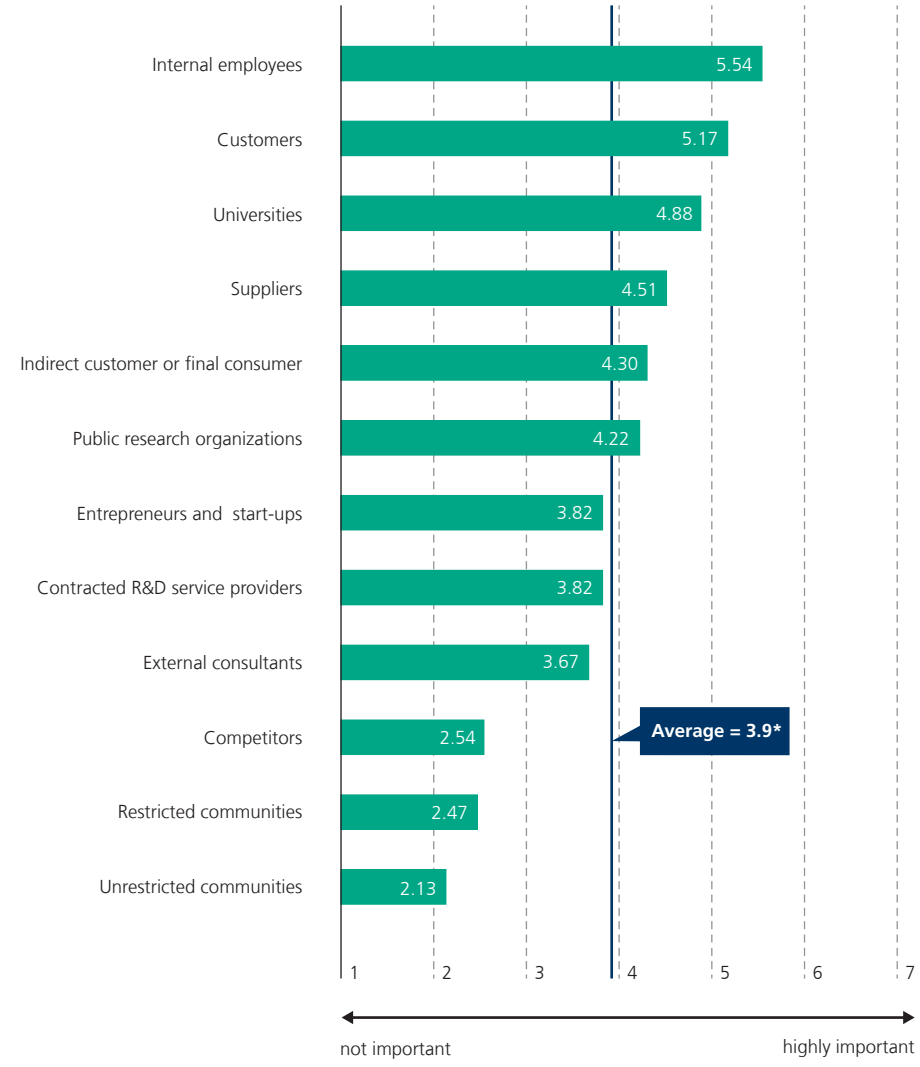


Figure 8:
Open innovation partners – importance in 2011

outbound practices. They receive the lowest rating in terms of their importance in 2011. Over the last years the importance of these two practices has even decreased (score of 3.74 and 3.91 for the change of importance 2008 to 2011). In contrast, business incubation and venturing (score of 4.63) – along with joint venture activities – have been receiving a slightly growing attention from firms practicing open innovation.

The type of partner for open innovation characterizes a firm's mode of open innovation. Thus, we also asked for information on the rated importance of each of a variety of prospective partners or collaboration sources for open innovation in 2011. We again utilized a 7 point scale. Figure 8 reports the respondents' rating of the average importance of each of the 12 open innovation partners individually. The average importance ranges from 2.13 to 5.54.

Internal employees are considered as the most critical source. When turning to external open innovation partners, we found that customers, universities, suppliers and the final consumers (for B2B companies) are all rated higher in importance than average. By contrast, competitors and communities of both kinds are rated as lowest in importance among the listed potential partners or sources above.

4.4. Non pecuniary inbound and outbound activities

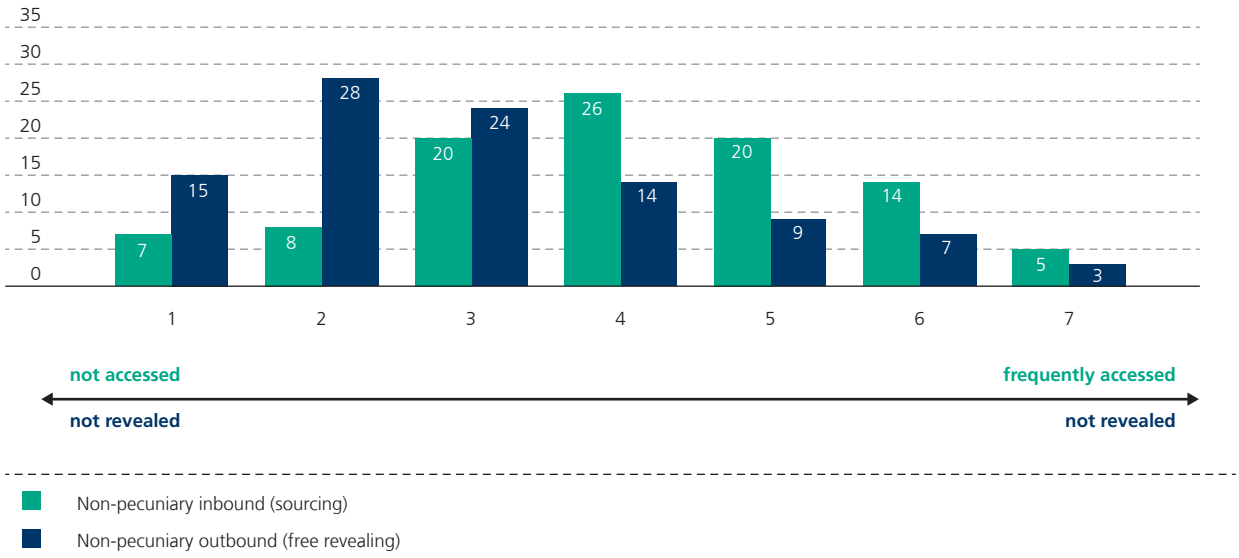
Recent academic work has examined the role of "free revealing" in innovation. Free revealing relies on the idea that firms may benefit from selectively revealing some part of their intellectual assets for free usage by others without any immediate compensation[11]. While this is a common practice in open source development, we have learned from case studies that large firms from other sectors are also experimenting with it. To shed lights on the role of non-pecuniary forms of open innovation, our survey took a closer look into non-pecuniary forms of inbound and outbound innovation (the right hand quadrants in our portfolio in Figure 4).

[11] E.g. Harhoff, D., Henkel, J., & Von Hippel, E. (2003). Profiting from voluntary information spillovers: How users benefit by freely revealing their innovations. Research policy, 32(10), 1753–1769.

We asked each respondent to report how regularly they have accessed external knowledge without any direct financial compensation to open innovation partner, and how regularly they have revealed internal knowledge to outsiders without any immediate compensation during the period 2008 to 2011. We used a scale from 1 to 7 to measure the extent of free access and free revealing. Figure 9 shows the responses we received. Firms are more likely to receive freely revealed information from outside participants than they are to provide it to others. In other words, large firms are net "takers" of such freely revealed information.

Figure 9:
Role of non-pecuniary inbound and outbound practices in 2011

Share of projects with inbound and outbound component in 2011
(Frequencies, in %)



Source: Open Innovation Executive Survey Fraunhofer & UC Berkeley; n = 91

4.5. Strategic objectives of open innovation

There are a variety of strategic objectives why large firms engage in open innovation activities. In our survey we explored the importance of different types objectives on scale from 1 to 7. We found that new partnerships for innovation and technology exploration are the most important objectives and drivers for innovation. They received an average rating of 5.42 and 5.32 respectively. Efficiency is not of high relevance: The reduction of R&D costs received an average score of 3.65 only.

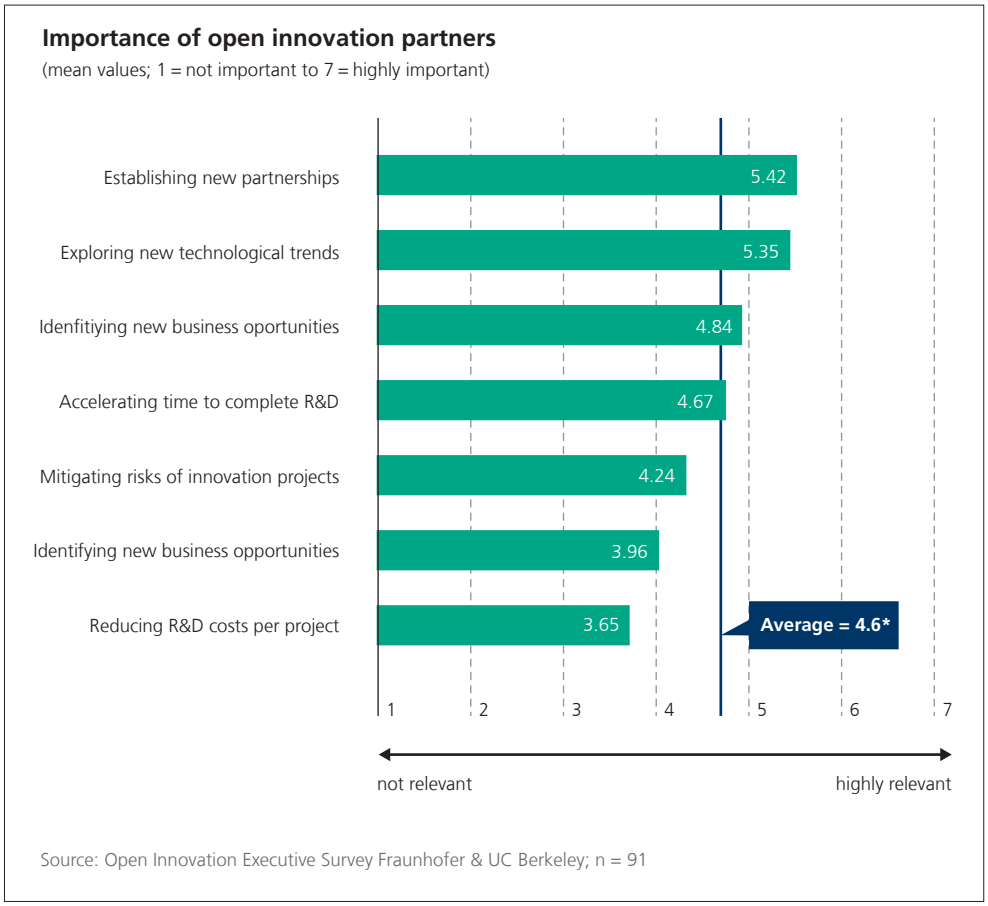


Figure 10: Strategic objectives for engaging in open innovation

4.6. Conclusion

In summary, large firms have a preference for inflows of knowledge into their innovation portfolio. Some internal projects are also commercialized via new paths to market. However, outbound activities play a secondary role.

Firms use a mix of pecuniary and non-pecuniary inbound and outbound practices. As they are interested in inflows of knowledge, inbound open innovation practices have been more important than outbound open innovation practices in 2011, even though the importance of the latter ones has increased from 2008 to 2011. Customer or consumer co-creation, informal networking and university research grants are the leading inbound practices. Joint ventures are the most important outbound practices. Interestingly, we found that "new" practices, such as crowdsourcing or specialized open innovation intermediary services, play a rather minor role despite the raising interest in business press and academic literature. To implement their open innovation practices, firms work with a variety of different innovation partners and sources, with customers and universities rated as the most important.

On balance, they take more "freely revealed" information from others than they provide to others. Firms are "net-takers". Overall, executives consider the relational and explorative dimension of open innovation of high importance. Firms engage in open innovation to build new partnerships and to explore new technological trends.

5 | THE INTERNAL DIMENSION OF OPENNESS: ORGANIZING FOR OPEN INNOVATION

Open innovation poses new managerial challenges.[12] Firms that shift from a closed towards open innovation model are exposed to central questions of how to organize and manage open innovation. Large firms, in particular, may face difficulties in aligning internal organizational units and divisions in response to open innovation activities. Our survey provides new insights in how large firms organize and manage open innovation internally.

5.1. Internal alignment and centralization of open innovation

In large firms managing open innovation is not a straightforward task as there are a range of different organizational units that potentially could be involved in open innovation. From case studies on large firms and our own observations we learn that open innovation often starts in a more decentralized manner, and some divisions are already practicing it to some degree. Indeed, a central question in organizing open innovation is the degree of centralization of open innovation and the autonomy level of different organizational units internally. To shed light on this critical issue, we explored the autonomy of different internal organizational units to initiate and implement open innovation. We addressed seven organizational units which are critical in open innovation: Corporate R&D, product & process development, marketing, production management, procurement, subsidiaries and human resource management (HRM).

The average autonomy level of organizational units is 3.9 measured on a scale from 1 to 7. A closer look into the individual units highlights that corporate research is the most autonomous unit in open innovation followed by product & process development groups (see Figure 11). They receive an average score of 5.1 and 5.04 respectively. In contrast, human resource management shows a very low level of autonomy (score 2.61).

[12] See Gassmann, O., Enkel, E. and Chesbrough, H. (2010). The future of open innovation, R&D Management 40(3): 213–221.

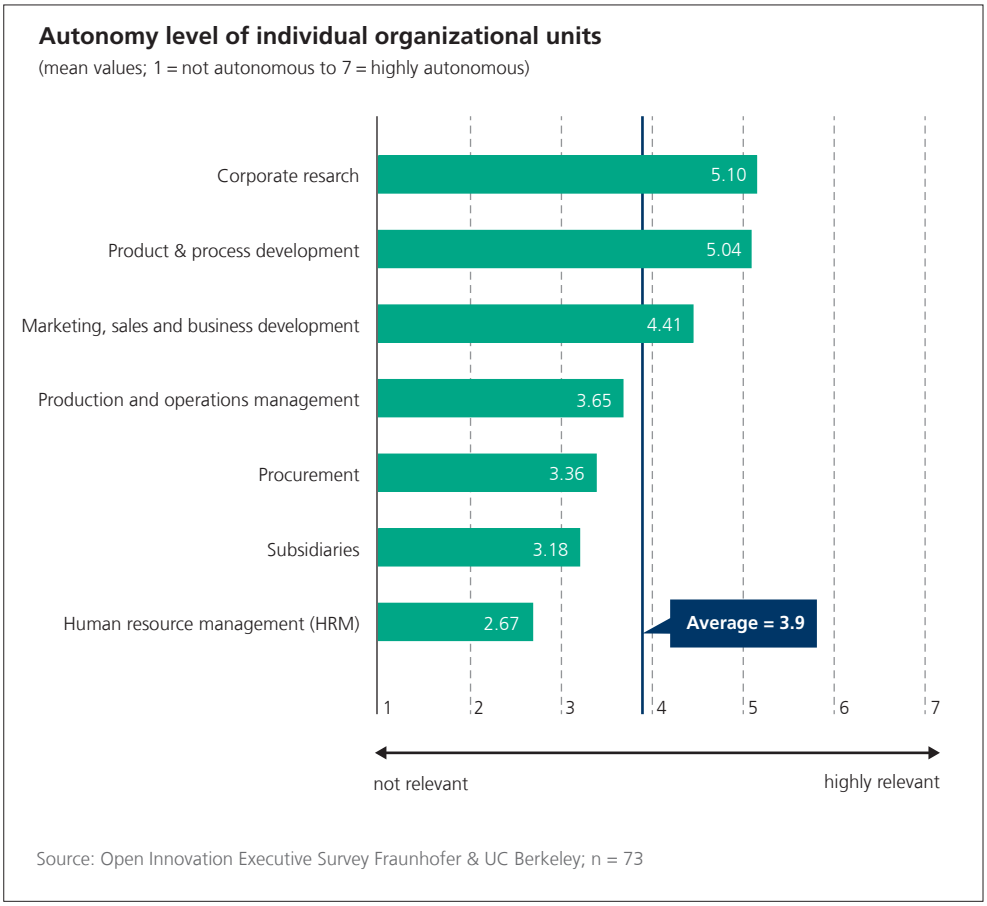


Figure 11: Autonomy level of individual organizational units

Organizing open innovation internally also relates to the question of organizational control and centralization in terms of different hierarchy levels. Senior executives need to make a decision on whether and how much concentration of decision making authority should be done at the top level. Alternatively, how much freedom in terms of budgeting decisions should lie with lower ranks of the organization?

Our study explores this issue in more detail. The size of the projects that is signed off by lower ranks, middle ranks or senior ranks spans projects sizes from US$ 10,000 to US$ 20 million (Table 1).

Project size in US$	Lower ranks	Middle ranks	Senior ranks
Min	10,000	10,000	10,000
Max	3 million	6 million	20 million
Mean	125,000	817,000	4.49 million

Table 1: Size of project signed off by different hierarchy levels (N=51) in US$

We learned that the financial autonomy of different hierarchy levels measured as the ratio of the project size signed off by lower ranks and the project size signed off by senior ranks varies across our samples. In extreme cases lower ranks have now autonomy to start open innovation projects autonomously. The average autonomy level is about 5 %. Lower ranks are entitled to sign off open innovation projects of the average budget size signed off by senior ranks.

5.2. Dedicating resources to open innovation

Existing studies on open innovation indicate that open innovation requires a firm's dedication to invest internally. It does not act as a substitute for internal R&D.[13] However, little is known about how many resources large firms set aside for open innovation explicitly. A quick search on the professional network LinkedIn[14] highlights that there are new jobs and functions for open innovations created within large firms: One quickly finds job posts for an "Open Innovation Manager" or a "VP Open Innovation", indicating that large firms take open innovation seriously and assign resources for it.
Our study provides a glimpse on how much resources large firms dedicate to open innovation. The median value of the open innovation budget 2011 was US$ 2 million and the median number of full-time people for open innovation were 20.

	Budget for open innovation in 2011 US$	**Human resources for open innovation in 2011 (number of full-time employees)**
Median	2 million	20

Table 2: Resources dedicated to open innovation in 2011 (N=51)

A firm's decision to invest in open innovation correlates with the support of the top management time. Those firms that show a higher degree of management support since they started to engage in open innovation (measured on scale from 1 = significant decrease and 7 = significant increase) also formally dedicate more human resources to open innovation. We find a significant strong positive correlation. Apparently, top management team support is associated with a higher dedication of budget towards open innovation.

[13] Laursen, K. and Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among U.K. manufacturing firms, Strategic Management Journal 27(2): 131–150.

[14] www.linkedin.com

5.3. Formal and informal practices for managing open innovation

In the early days of the era of open innovation, we observed that large firms engaged in open innovation more in a trial-and-error manner. Today, many practitioners and scholars argue that open innovation requires a more formal approach for managing various inflows and outflows.[15] A formal approach implies that firms have a clearly documented strategy for open innovation, use written and standardized processes for implementing open innovation, document their routines, and rely on different kinds of metrics for measuring and reviewing the impact of open innovation. In contrast to formal routines and practices there is a more informal dimension of managing open innovation: A firm's culture and its norms, values and personal relationships of individuals.

Our study provides new insights into the adoption of formal and informal practices for managing open innovation. We addressed six practices of managing open innovation in our executive survey and measured their adoption on a scale from 1 to 7 (1 = highly disagree, 4 = neutral, 7 = highly agree): Documentation of open innovation strategy, culture for open innovation, regular review of open innovation responsibilities, written procedures for open innovation, metrics for open innovation and standard procedures for managing open innovation.

On average, we observe a relatively low level of adoption of these six practices. On average, firms score 3.73. Apparently, new practices for managing open innovation have not yet been systematically adopted. Senior executives show a relatively low awareness towards managing open innovation.

[15] Lichtenthaler, U. and Lichtenthaler, E. (2009). A capability-based framework for open innovation: Complementing absorptive capacity, Journal of Management Studies 46(8): 1315–1338.

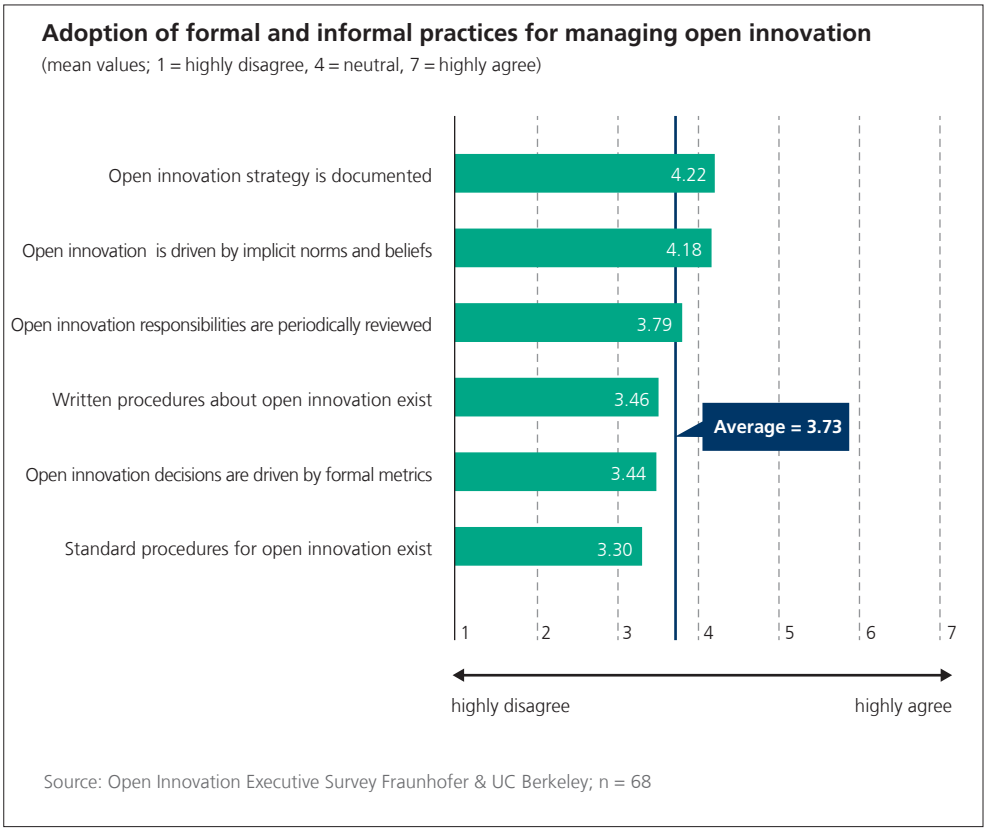
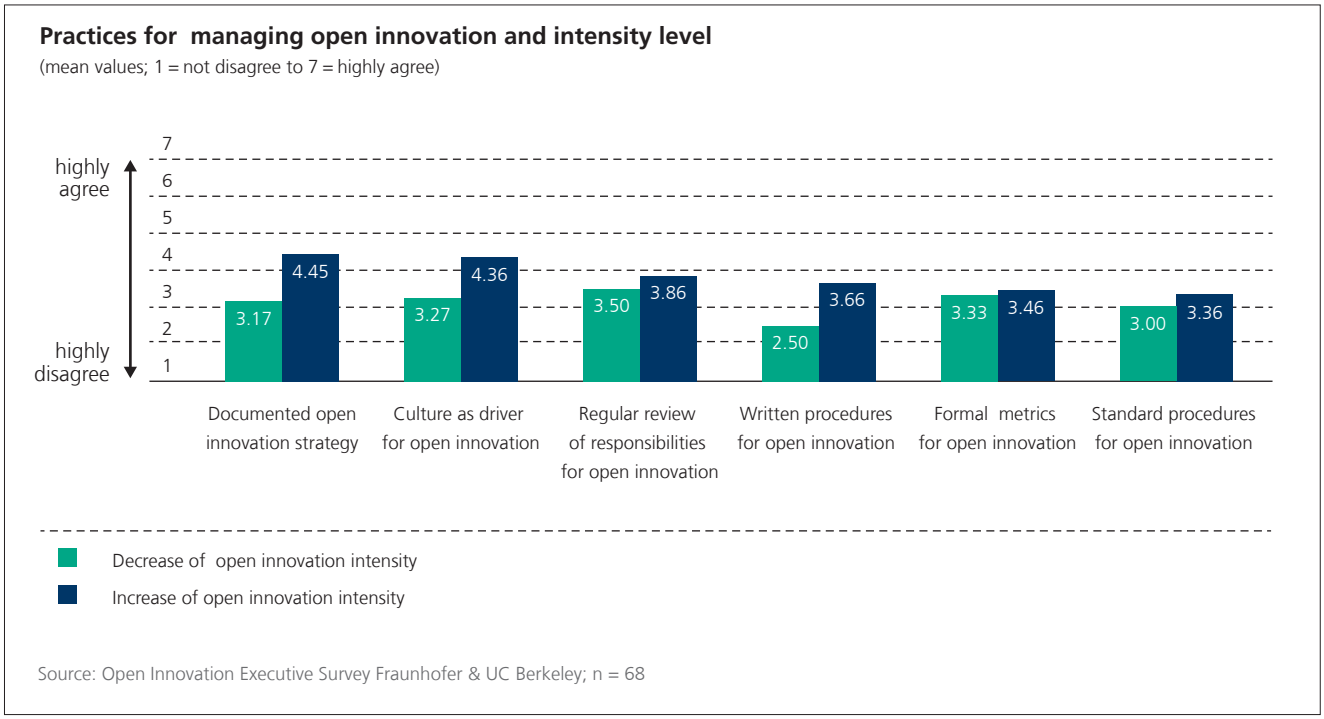


Figure 12: Adoption of different organizational practices for managing open innovation

As shown in Figure 12 not all practices receive the same level of attention. The strategic dimension is most widely addressed among the firms in our sample (average score 4.22). Cultural and more informal aspects of managing open innovation, which we added as a contrast to formal procedures, rank second (average score of 4.18). However, operational aspects and control of open innovation receive little attention so far. Standard procedures and metrics for open innovation are hardly put in place (average score 3.30 and 3.44). Apparently, open innovation is not perceived as a formalized "routine".

We also investigated how the intensity of open innovation is associated with a firm's approach towards managing open innovation. Here, our study indicates that the importance of internal routines and structure for open innovation goes hand in hand with a higher intensity in open innovation. We found a significant correlation between the adoption of formal and informal practices for managing open innovation and a firm's intensity in open innovation. Firms that have increased their open innovation activity at least to some extent (increase between 4 and 7 measured on a scale with 1 = significant decrease, 4 = no change, 7 = significant increase) show a different profile in how they manage open innovation internally than those firms that haven't changed or have decreased their activity.



Source: Open Innovation Executive Survey Fraunhofer & UC Berkeley; n = 68

Figure 13: Adoption of practices for managing open innovation and intensity level

As shown in Figure 13, firms that have increased their intensity in open innovation pay more attention to the strategic dimension and document their open innovation strategy (average score 4.45 versus 3.17). Furthermore, they also consider cultural aspects (norms, values and beliefs) as more important than those firms that have decreased their open innovation activity since they started to engage in it. Formalization of operational activities receives a higher attention among firms that have increased their activity (average score of 3.66 versus 2.50). Metrics for open innovation and standardization receive little attention among both groups.

To conclude, managing open innovation has not yet materialized as firms pay rather limited attention to different kinds of managerial practices. Managing open innovation doesn't imply making a decision on "either formal" or "informal". It requires both dimensions. Overall, strategic guidance and cultural values are more important than written and standardized routines for innovation or metrics for open innovation. In addition, we learned that firms pay more attention to managing open innovation both formally and informally if they increase their intensity in open innovation.

5.4. Past and today's challenges and constraints in open innovation – Barriers remain

There are a range of challenges and constraints that limit large firms to make use of open innovation. To explore these particular challenges we probed the senior executives on what they perceived as the major challenges when they started open innovation. Afterwards, we asked them to evaluate today's major challenges and constraints. We measured the role of six major challenges on a scale from 1 to 7: Identifying new innovation sources, the management of external relationship with innovation sources, organizational change internally, the protection of internal critical know-how, the effectiveness of intellectual property protection and avoidance of external or already existing knowledge (often referred to as the Not-Invented-Here Syndrome).

Figure 14 presents the firm's view about the importance of each particular challenge when they started to engage in open innovation, and today. Generally, speaking firms tend to consider organizational change (5.6 at start and 5.26 today) as the most significant challenge. The management of external relationships with innovation partners is a quite important challenge (4.97 at start and 4.89 today). Internal cultural issues and the avoidance of external or already existing knowledge (often referred to as Not-Invented-Here Syndrom) appear to be the least concern for our respondents (3.61 at start and 3.69 today).
Overall, executives consider many of these challenges as important. On average, the perceived importance at start is 4.59 and today 4.58. Apparently, the strength and the perceived relevance of challenges in open innovation haven't changed much. A closer look reveals that the firm's view about the importance of each challenge remains almost the same, some have slightly decreased, and others have slightly increased.

In summary, our study shows that large firms were exposed to quite significant challenges when they started to engage in open innovation. Today, these challenges still remain and have only slighted been reduced. The most critical challenges are to manage the journey from closed to open innovation internally, and to sustain external relationships with innovation partners.

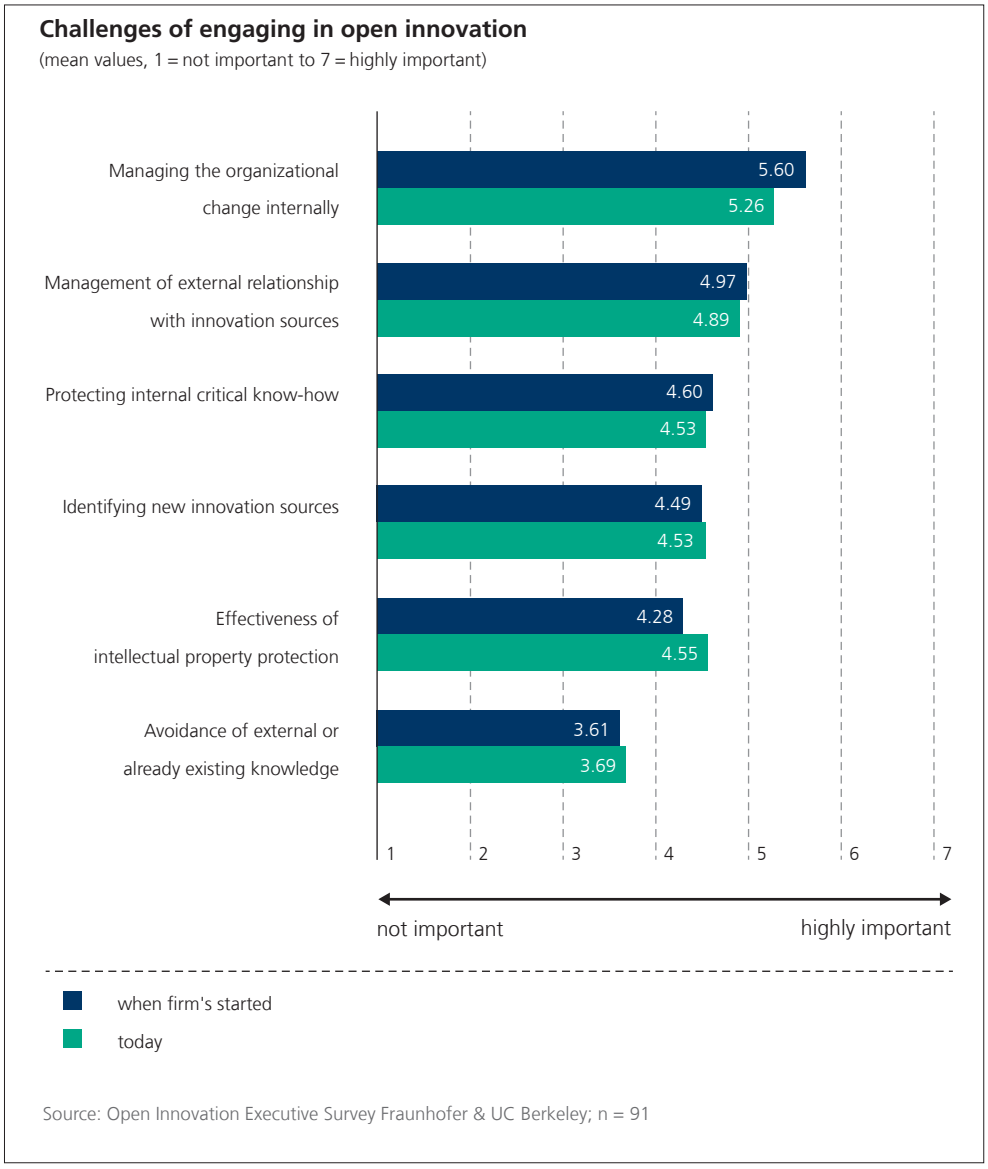


Figure 14: Challenges when engaging in open innovation – At start and today

5.5. Conclusion

There is no dominant mode of how firms organize open innovation internally. While some firms organize it primarily from the bottom up, others prefer top down approach with little financial autonomy of lower ranks. Overall, organizing for open innovation is taken more seriously over time. Organizations that have practiced open innovation longer spend more money on open innovation, relative to organizations who have only recently started to practice open innovation. Open innovation practices are not very formalized at this point, with cultural norms perceived as equal in importance to formally documented procedures. While open innovation poses many new challenges to firms when adopted, it is the internal organizational challenges that are perceived as most difficult to manage. Managing the journey from closed to open innovation implies a range of organizational changes at various levels of the firm. Making these changes happen is really hard.

6 | MEASURING OPEN INNOVATION AND ITS IMPACT

As our study reveals, large firms are increasingly engaging in open innovation and formally dedicate resources towards it. Firms that are intensifying their open innovation activities are also attaching even greater strategic importance to open innovation. Yet, there is an important element in managing open innovation: metrics and impact. In the following we offer a snapshot of companies' current measurement practices, and their satisfaction with open innovation performance.

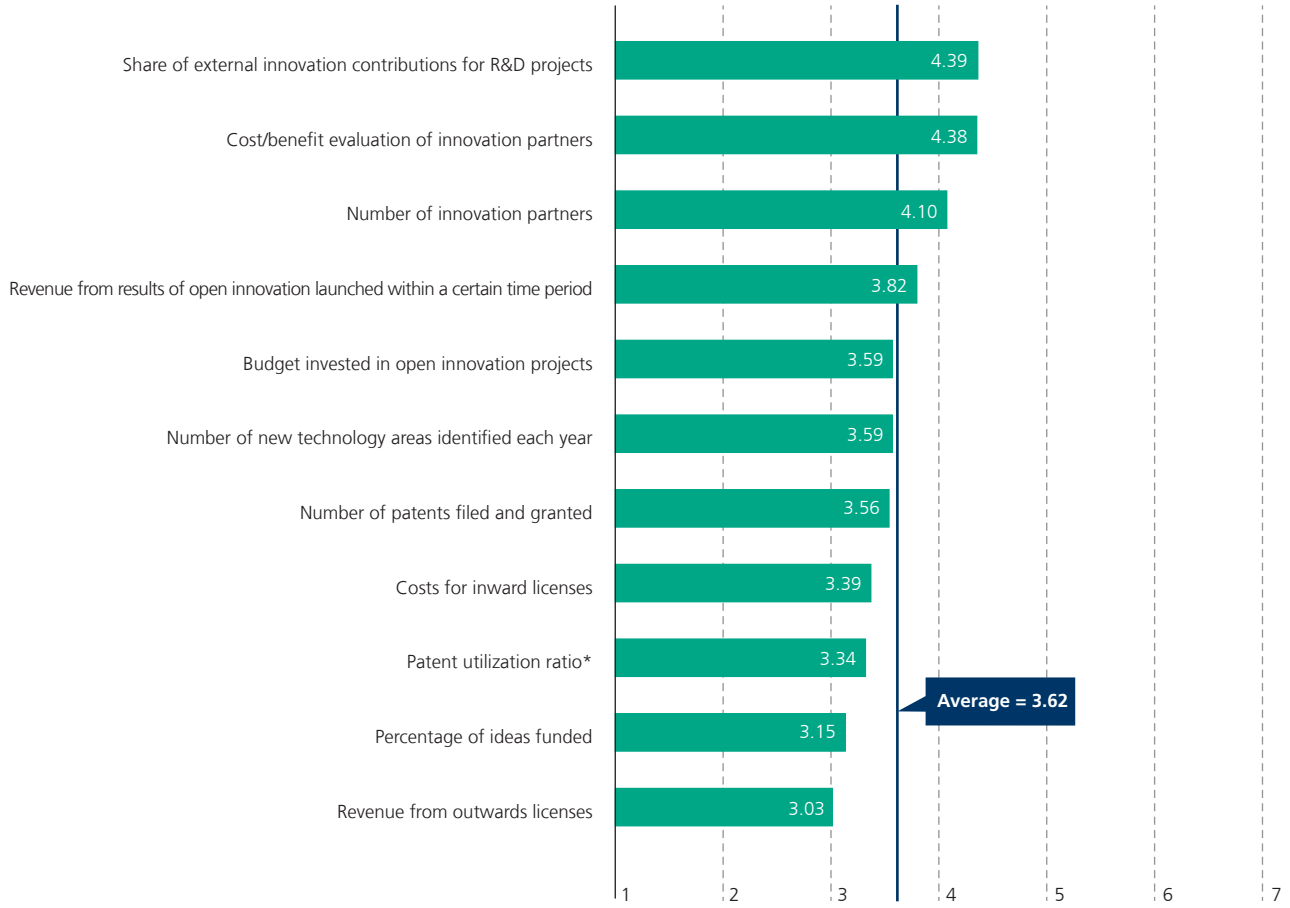
6.1. Measures for open innovation – Are there any suitable measures?

To investigate the usefulness of different metrics for measuring open innovation, we exposed our respondents to list of possible open innovation metrics. We measured their relevance by probing the respondents to assess how satisfied they are with these measure on scale from 1 = highly dissatisfied to 7 = highly satisfied. These measures address the input, the output and also the process of open innovation.

Figure 15 illustrates that generally speaking firms are not satisfied with existing measures for open innovation. The average score of 3.62 indicates that firms are slightly dissatisfied (a score of 4 represents a neutral point view). They are not fully confident that these measures are getting it right and helping firms to improve their open innovation activities. There are three measures where firms, on average, show a slight positive tendency: Share of external innovation contributions for individual R&D products seem to be the most relevant and satisfying measure (score 4.39). Cost/benefit evaluation of innovation partners (score 4.38) ranks second and the number of innovation partners ranks third (score 4.10). Revenue from outwards licensing represents the least satisfactory measure (score 3.03). Firms seem to have a stronger tendency towards measures that relate to inbound open innovation and are non-financial in nature. Interestingly, measures that relate to the innovation partner network seem to be more promising than measures that address the contribution of openness to the bottom-line. In a nutshell, open innovation metrics are not satisfying a firm's needs to measure open innovation. Existing measures are not yet considered as satisfactory.

Satisfaction with open innovation measures

(mean values; 1 = highly dissatisfied to 7 = highly satisfied)



Source: Open Innovation Executive Survey Fraunhofer & UC Berkeley; n = 62

* share of filed patents that generate financial and non-financial benefits

Figure 15:
Measures for open innovation and level of satisfaction

6.2. Satisfaction with open innovation and performance impact

We also investigated the firms' satisfaction with their open innovation performance. Respondents were asked to assess their satisfaction with their open innovation activities from 2008 to 2011 on a scale from 1 = highly dissatisfied 4 = neutral to 7 = satisfied. On average, the satisfaction level was 4.68 which indicate a positive view of firms towards open innovation.

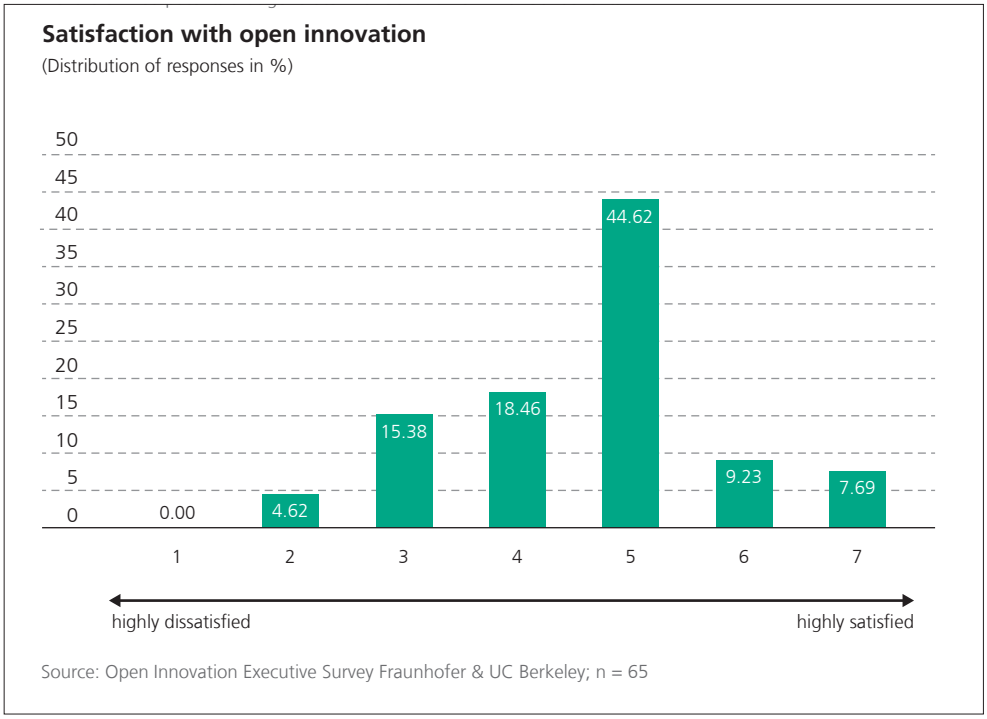


Figure 16: Satisfaction with open innovation activities 2008 to 2011

More than 44 % of the firms assigned a score of 5, and more than 16 % assigned a score of 6 or 7 (see Figure 16). Despite their dissatisfaction with existing open innovation measures, their view on their open innovation experience and performance overall is positive.

We found that the satisfaction of large firms with open innovation performance is positively correlated with the top management support for open innovation. If the top management team has increased its support since they started to engage in open innovation, the satisfaction with the open innovation experience is also higher.

In addition, an increase in the intensity of open innovation activities is also associated with higher satisfaction with open innovation impact. We found a positive and significant correlation. A higher satisfaction with open innovation experience and performance goes hand in hand with an increase of a firm's open innovation activities.
Further, the satisfaction changes with a firm's experience in open innovation. There is a difference between groups with different experience levels (measured as number of years since they have been engaging in open innovation).

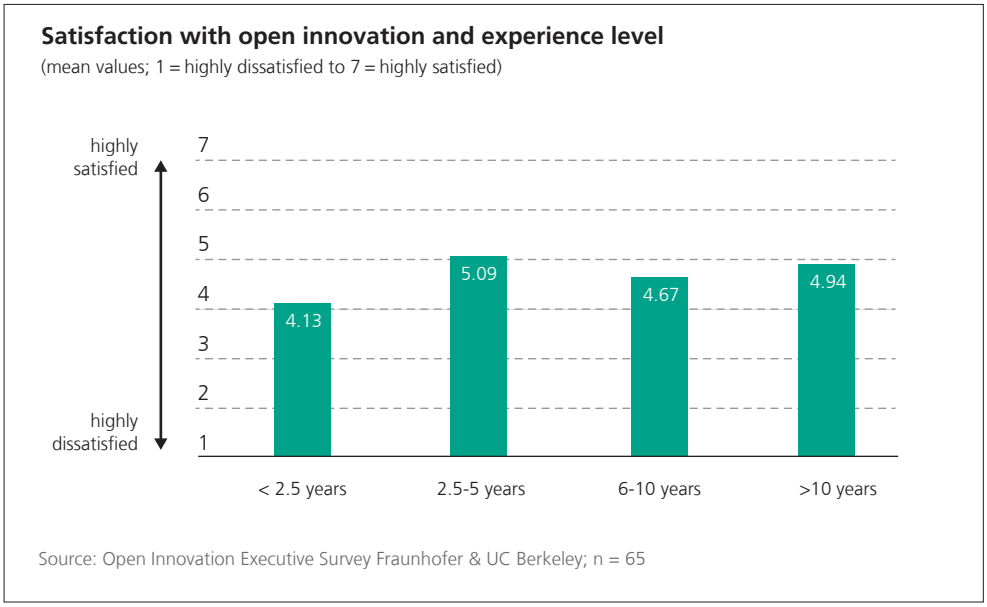


Figure 17: Satisfaction across different experience groups (years of experience in open innovation)

As shown in Figure 17 firms with less than 2.5 years of experience in open innovation show the lowest satisfaction (average score 4.13). Firms that have been experimenting with open innovation for a longer period than 2.5 years show a higher satisfaction. The experimentation has apparently paid off and positively reinforces their open innovation activities.

We also explored the how the role of inbound and outbound open innovation in a firm's innovation portfolio relates to their satisfaction with open innovation. We found that a higher share of projects with an external contribution (e.g. inlicensing, collaboration etc.) is positively correlated with a firm's satisfaction with open innovation performance. A higher outbound open innovation activity is not significantly correlated with a higher satisfaction.

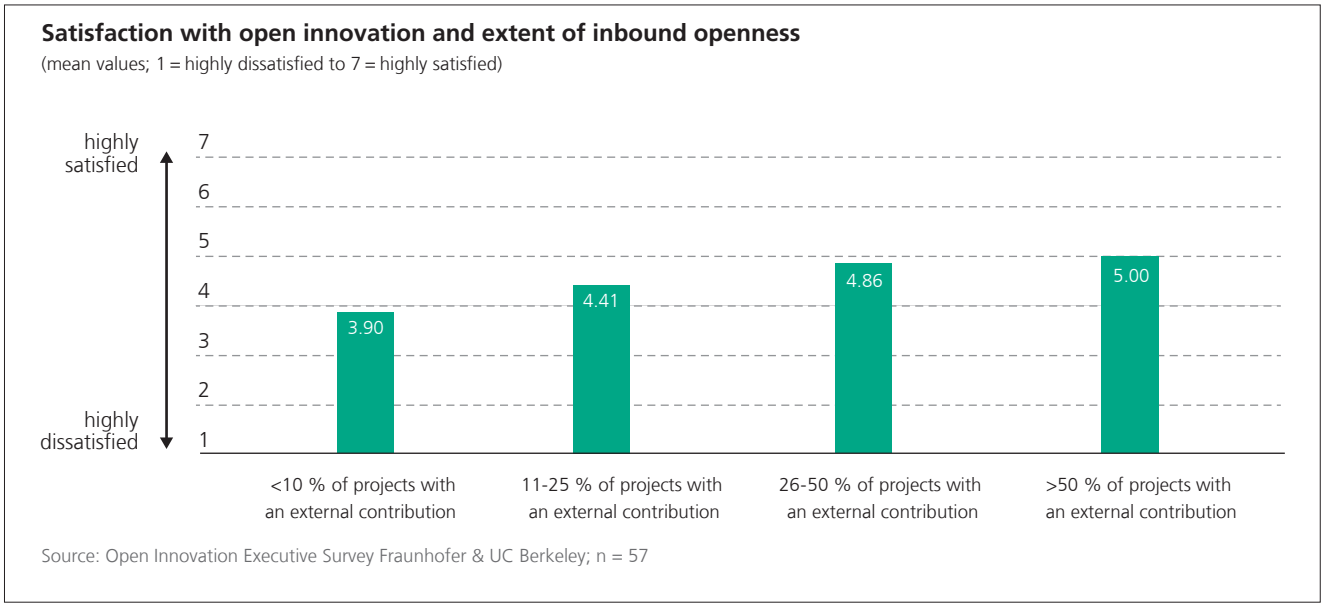


Figure 18 depicts groups of firms with an increasing share of projects with an external contribution. Apparently, a larger amount of inbound open innovation activities and a larger extent of inbound contribution to the innovation portfolio is associated with a higher satisfaction with open innovation activities.

Figure 18: Satisfaction with open innovation and share of projects with external contribution

We also explored whether there is a direct association between open innovation and innovation performance. Sadly, we didn't find a significant initial correlation between different kinds of open innovation measures (e.g. intensity, extent of inbound or outbound) and performance. Future work will examine performance effects from open innovation, using regression models that control for various factors that might influence that performance.

6.3. Conclusion

Respondents to our survey were not satisfied with their metrics for measuring open innovation. However, they are somewhat more satisfied with their results from open innovation. This suggests that the metrics we listed failed to capture at least some of the perceived value from open innovation.

Satisfaction with open innovation does increase with experience, at least after the first few years. And firms who utilize open innovation more extensively in their projects report higher satisfaction with open innovation.

7 | CONCLUSIONS AND IMPLICATIONS

Open innovation is a relatively new concept that emerged about 10 years ago.[16] While it has received a significant amount of attention, with a number of leading companies in the US, Europe, and other regions reporting success with it,[17] there has been a lack of quantitative evidence about the extent to which companies are actually using it. And open innovation is often defined differently by different people. There are even a few observers who wonder if open innovation is a fad that will soon fade away.

Utilizing the definition of "the father of open innovation",[18] we conducted the first large scale survey that probed the extent to which open innovation was being practiced in large firms in Europe and the US. We learned that 78 % of firms with annual sales in excess of US$ 250 million report practicing open innovation. For most firms (71 % in our sample), management support for open innovation is increasing, and no firm yet in our sample reported abandoning open innovation. This evidence strongly suggests that open innovation is not a fad that is about to go away.

On the other hand, our survey shows plenty of dissatisfaction with the practice of open innovation in these large firms. The level of importance assigned to many open innovation practices was reported to be rather low: Inbound open innovation practices were rated at just above 4 (a neutral score on a 7 point scale), while outbound open innovation practices were rated as slightly negative on average (below 4). Even firms that are practicing open innovation more intensively rate their practices only slightly higher than 4 on average. The fact that no firm has abandoned open innovation, in spite of these lukewarm perceptions, suggests that firms are still learning about how to get better results with open innovation. Firms that report practicing open innovation over a longer period do report somewhat higher satisfaction with their practices. But clearly there is room to improve.

Recent academic research on open innovation has highlighted the roles of non-pecuniary or "freely revealed" exchanges of knowledge. At least in large firms, though, our survey finds that these are rated among the very lowest sources in terms of their importance to those firms. And large firms are more willing to receive "free" exchanges of knowledge than they are to provide them. Open and restricted innovation communities and crowdsourcing also attract a lot of coverage, but these too are rated as rather unimportant in the survey. These sources will

[16] See H. Chesbrough, Open Innovation: The new imperative for creating and profiting from technology, Harvard Business School Press, 2003.

[17] See Tesco, AkzoNobel, Lego, P&G, Unilever and Philips, among other firms who have reported success with open innovation.

[18] http://en.wikipedia.org/wiki/Open_innovation

likely grow in importance over time, however, they start from a very low base. And firms are not all that satisfied even with more established open innovation practices, such as working with universities and research institutes, to pick two. The survey results also suggest that open innovation vendors of software tools, intermediaries and other research sources need to work harder to increase the satisfaction of large companies using these resources.

Our survey suggests that it is not easy to implement open innovation. Open innovation is a systemic shift that requires re-thinking many aspects of one's business to utilize it effectively. R&D alone cannot fully implement open innovation. Other parts of the organization, in marketing, in business development, and in supporting functions like human and resource management, must get on board for it to work effectively. Formal documentation of open innovation processes helps, but growing a culture that supports open innovation is at least as important for its effectiveness, according to our survey.

Measuring the performance of open innovation is somewhat elusive in our study. The specific metrics we provided score poorly on satisfaction, while overall satisfaction with the results from open innovation scores higher. This suggests that open innovation's performance impacts have not yet been adequately disaggregated into more discrete metrics. Meanwhile, satisfaction with open innovation appears to increase with experience in using it.

For senior managers, the survey results are sobering. Sadly, there does not appear to be a "silver bullet" in which open innovation directly and immediately leads to substantially better business performance. Yet on closer inspection, it is clear that a large majority of firms are trying it, that management support is growing over time, that satisfaction with open innovation is somewhat positive, and grows with experience using it. This indicates that the general principles of open innovation[19] are likely to remain important for quite some time, while the individual practices that implement open innovation are equally likely to evolve from where they are now.

[19] See the table of closed and open innovation principles at http://www.openinnovation.eu/open-innovation/, which are taken from H. Chesbrough's 2003 book, Open Innovation, op cit.

8 | ANNEX

The following tables (Table 3 to Table 5) show the sample distribution in terms of industry, age and size.

Industry group	Frequency	Percent
Agriculture, forestry and fishing	34	27.2
Mining and construction	5	4
Manufacturing (low-tech)	10	8
Manufacturing (medium-low tech)	11	8.8
Manufacturing (medium-high tech)	23	18.4
Manufacturing (high-tech)	11	8.8
Transportation, communications, electric, gas and sanitary services	13	10.4
Wholesale, trade and retail	7	5.6
Finance, insurance, real estate and services	11	8.8
Total	**125**	**100**

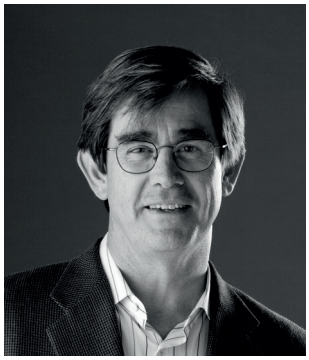
Table 3: Industry distribution

Company age	Frequency	Percent
1-25 years	58	46.4
26-75 years	22	17.6
76-100 years	12	9.6
over 101 years	33	26.4
Total	**125**	**100**

Table 4: Age distribution

Employees	Frequency	Percent
0-4,000	67	53.6
4,001-8,000	16	12.8
8,001-24,000	20	16
24,001-200,000	22	17.6
Total	**125**	**100.0**

Table 5:
Size distribution



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Bibliographic information published by Die Deutsche Bibliothek
Die Deutsche Bibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliografic data is available on the Internet at http://dnb.d-nb.de.

ISBN: 978-3-8396-0574-5

Printing and Bindery:
Mediendienstleistungen des Fraunhofer-Informationszentrum Raum und Bau IRB, Stuttgart

Printed on acid-free and chlorine-free bleached paper.

Fraunhofer Information-Centre for Regional Planning
and Building Construction IRB
P.O. Box 80 04 69, D-70504 Stuttgart
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URL http://verlag.fraunhofer.de

ISBN 978-3-8396-0574-5