Digital Innovation Labs

Developing Digital Innovation to Accelerate Digital Transformation

Digital Innovation Labs Report 2020

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Preface

This report presents the results of a comprehensive series of case studies on the nature and success factors of Digital Innovation Labs (DILs) in German firms. During the last two years, researchers from the ProcessLab at the Frankfurt School of Finance & Management, the University of Bamberg, and the German Graduate School of Management & Law visited 19 DILs and interviewed 86 managers and innovators in those labs about their activities, their success stories, their challenges, and their failures. This report summarizes and illustrates the results and findings of the study.

We are deeply indebted to all persons and institutions who contributed to the success of this work: first of all, the interview partners who spent their valuable time and shared their insights; second, several students who helped gather, transcribe, code, and analyze the collected empirical material, namely

Jannik Diehl, Samira Lauer, Paul Ochs, Jana Riehl, Alexander Schink, Laura Mina, Philip Coupina, Franz Wohlfahrt, and Lennart Offeney; and, third, the financial supporters of this work, namely the donors of the ProcessLab – Commerzbank, UMS, and Loancos – and of the German Graduate School – the Dieter Schwarz Foundation.

We hope that you will find the results and conclusions as valuable and insightful as we do.

The authors of the Digital Innovation Labs Report 2020

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Digital Innovation Labs explore new opportunities to develop digital innovation

01. Digital Innovation Labs (DILs) are separate organizational units of various sizes which bundle a firm's digital innovation capabilities and operate as a one-stop shop for digital innovation.

02. DILs explore the use of digital technologies, generate insights into new products and services, test innovative ideas, convert inventions into market offerings, and exploit existing knowledge.

03. DILs also teach and educate employees in other units of the firm to change the organizational culture and enable others to acquire new skills, knowledge, and methods.

Digital Innovation Labs are the nucleus for change in firms

Key characteristics

DILs are **separate** units. They are outside what we refer to as "the main organization", which is the sum of all other units of the firm. Nonetheless, the DIL is connected to the main organization.

DILs focus on the **innovation process** and do not stop after the first ideas have been proposed. DILs enhance ideas and integrate innovation in the product and service portfolio in the main organization.

DILs share the **vision of developing digital innovation** and accelerating digital transformation, but there is no universal definition of what is included in the development of digital innovation.

Main organization — DIL

1 Setup. DILs are a recent phenomenon found in almost all industries. They all share the vision of developing digital innovation and accelerating digital transformation. Their setup is different in terms of employees, teams, budget, and communication. The majority of DILs are newly founded units with a few employees and a focus on a small number of topics.

2 Strategy. Although all DILs share certain characteristics, they use different approaches. The focus is not limited to converting ideas into products or services but includes further aspects around innovation, such as culture and collaboration. Innovations do not have to be radical, but DILs value improvements and support exploration and exploitation of innovation.

3 Governance. Most DILs are led by senior managers who have been with the firm for many years and have established a broad network. They are staffed with internal employees transferred from the main organization and a few external hires. DILs are not part of the IT or business units and extend their internal network with just a few external partners.

4 Process. DILs aim to address the entire innovation process from scouting to integration, but most of their activities cover only a part of this process. Although there is a strong focus on early stages of innovation, such as idea generation, DILs stress the importance of integration. They invest in workshops and rotate employees between the DIL and the main organization.

5 Outcome. The outcome of DILs is often not quantifiable or tangible. DILs provide new opportunities, collaboration, and awareness that foster digital innovation. Acceptance of change is challenging, and DILs focus on explaining their outcomes. The holistic approach taken by DILs allows changes in organizational learning, culture, and skills development.

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Study design

Insights generated through 19 case studies with 86 interviews

Focus

In this study, we analyze a **new form of organizational design** (Digital Innovation Labs, DILs) for the creation of **digital innovation**. We focus on this new type of organizational units and their activities.

Approach

We gathered insights from **19 DILs** with the aim of understanding the underlying **strategies**, **structures, cultures,** and **processes** that they apply to achieve their respective **results** and **outcomes**.

Findings

The findings provide **deep insights** into what DILs are and what **they focus on**. The findings uncover DILs' **activities** and how they **operate** to develop innovation.

Overview of the Data

Our data include a wide range of implementations of DILs

Data collection
- Data collected between July 2018 and July 2019.
- 19 cases: DILs from 19 firms in different industries.

Case selection based on the following criteria:
- The DIL is a separate organizational unit.
- The DIL focuses clearly on new ideas in the digital context of the firm.
- The DIL tests and applies digital technologies in the field of innovation.

Three to four interviews per case
- First, the head of the DIL, which in some cases is the Chief Digital Officer (CDO), one of the managers directly reporting to the CDO, or, in cases where no CDO was installed, the responsible manager for digitalization.
- Second, a project manager within the DIL. This person usually heads one of the initiatives or projects running in the lab, and she or he is in charge of some budget and personnel resources.
- Third, a manager who is _not_ a member of the DIL but has been working with the DIL to accelerate one of her or his topics or projects. This manager usually belongs to a business unit (any unit that belongs to the main organization) and is often in charge of some customer-relevant products/services.

The figures in the following section illustrate our observations. An analysis of how the different metrics of DILs unfold is provided in the text boxes. Management recommendations allow the derivation of actions to further develop DILs.

Cases

1. Financial service provider with a strong focus on SMEs and retail banking
2. Wholesale financial service provider with a strong international presence
3. Logistics firm providing sourcing, transport, and package handling services
4. Transportation firm specialized in passenger travel and cargo
5. Aviation company with business in passenger travel
6. Provider of specialized financial information services
7. Major insurance firm with life and non-life offerings
8. Leading apparel firm with products in clothing and accessories
9. Umbrella organization of financial service providers in a retail banking network
10. Multinational pharmaceutical, chemical, and life sciences firm
11. Central institution, corporate and investment bank for a network of regional banks
12. Retail bank specialized in home mortgages and standardized retail products
13. Leading transport firm with worldwide air freight and logistics services
14. Multinational aviation corporation focusing on manufacturing and support services
15. Leading regional retail bank and subsidiary of a large commercial bank
16. Global operating firm with land, sea, and air transport, as well as contract logistics
17. Market leader in specialty chemicals with international operations
18. Specialized health insurance firm with a wide product portfolio for retail customers
19. Multinational food and drink processing conglomerate

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Industry and Founding Year

In recent years, DILs have been founded in almost all industries

The DILs under study cover a wide range of industries. The majority (32%) are in the banking industry, followed by other financial institutions (e.g., insurance) and logistics (16% each). In our sample, we find that the service industries are more drawn towards founding a DIL, as their services are intangible and of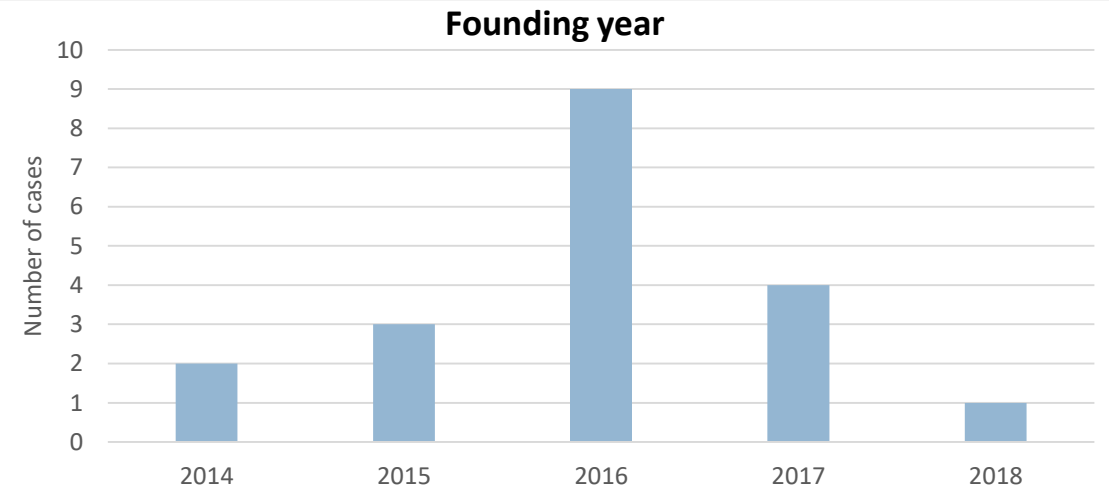ten based on software. Whereas the service industries find a lot of potential in digitalizing existing processes around their products, industries with mainly physical products must add digital components to their existing product offering.

DILs are a recent phenomenon. Most of the DILs (47%) in our study were founded in 2016. The two oldest DILs date back to 2014 and are in the aviation and banking industries. The youngest is in logistics. There is no particular indication of what influence the founding year has, but DILs founded more recently benefit from the success of the older DILs by referencing their accomplishments. Most DILs start as very small units, as the management is often very hesitant. The official communication of the foundation of a DIL often happens significantly after the actual launch and is a strong signal to customers, partners, and employees.

Industry

- Banking
- Other financial services
- Logistics
- Aviation
- Chemical
- Apparel
- Transport
- Food processing

Founding year

See Appendix for details about the metrics.

Management Recommendation

The number of DILs has increased over the past years, and initial skepticism toward them has been refuted. Managers should include DILs in their considerations about how to explore new technologies and react quickly during uncertain times to leverage the lessons of the first generation of DILs.

Employees and Origin

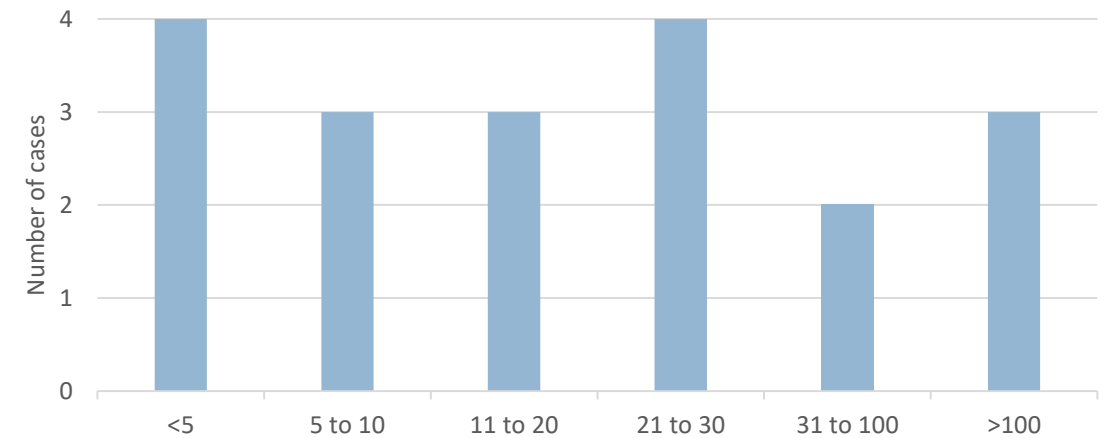## DILs are new units for digital innovation and have few employees

DILs are a new form of organizational unit that stands separate from the main organization. Most of them (58%) are newly founded, i.e., the unit has not existed in any other form before. Some DILs are the result of a restructuring and used to be part of the innovation management or the strategy unit. In restructuring, an existing team is supplemented with new hires and external partners and put under control of a new head. Restructuring an existing unit is associated with less effort but limits the opportunities to design something "new."
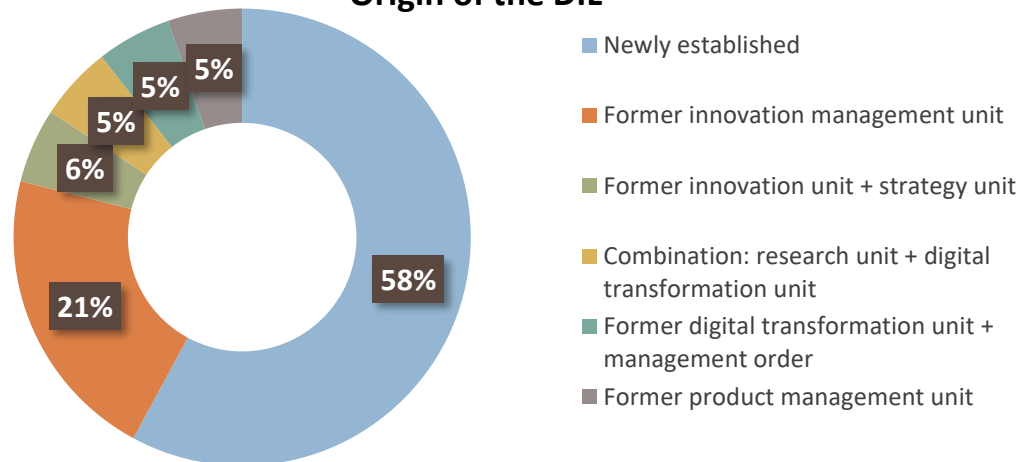
Most DILs are small and focused units. They have only a small number of employees to keep a friendly atmosphere with intensive collaboration, and they try to work as one team for as long as possible. The smallest DILs have fewer than five employees (sometimes as few as two). DILs with few employees leverage their network to attract projects with resources and workforce. The largest DILs have a couple of hundred employees (up to 900 in a firm with about 50,000 employees). These DILs have weak ties to the main organization and are very autonomous.

Origin of the DIL

- 58%
- 21%
- 6%
- 5%
- 5%
- 5%

Legend:
- Newly established
- Former innovation management unit
- Former innovation unit + strategy unit
- Combination: research unit + digital transformation unit
- Former digital transformation unit + management order
- Former product management unit

Number of employees

Number of cases (y-axis: 0 to 4)

Categories: <5, 5 to 10, 11 to 20, 21 to 30, 31 to 100, >100

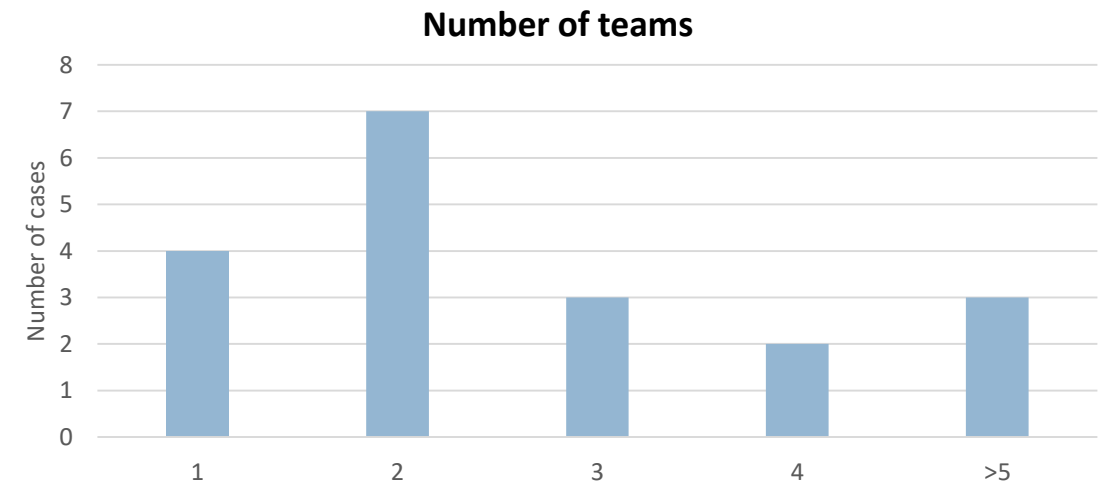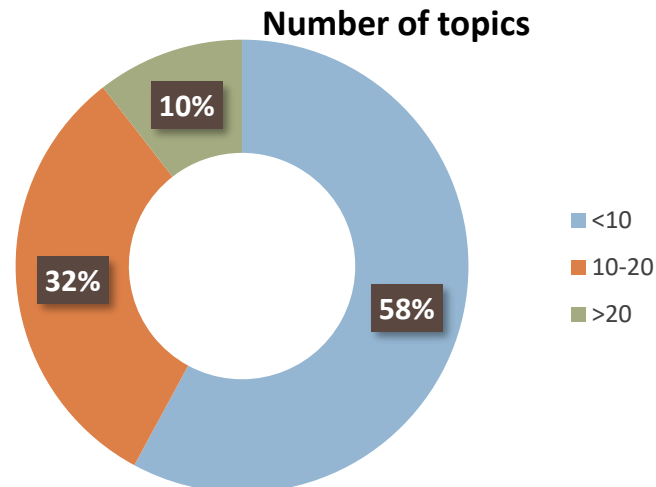See Appendix for details about the metrics.

Management Recommendation

The majority of DILs are new units and have been created following a greenfield approach. When setting up a DIL, managers should diminish old ties to reduce the risk of firm legacy or any unintentional interference. Small units reduce the financial investment at the beginning and ensure flexibility.

DILs work on fewer than 20 topics with fewer than five teams

The size of a DIL corresponds to the number of topics the DIL is working on and to the number of teams. Seven employees per team working on one topic has been reported as the "sweet spot." This allows them to remain small and agile while having enough resources to scale an innovation quickly and to produce tangible outcomes, such as prototypes. Consequently, the vast majority of DILs work on fewer than 20 topics/projects. Handling more than 20 topics is rare and only applies to large DILs (with 30 or more members). A small number of topics allows a DIL to stay focused and to test innovations from the start to the end of the innovation process (see Slide 29). Decisions to integrate or discard the innovation can then be made quickly.

DILs benefit from having a small number of employees, as this reduces overhead and formal processes. The teams are self-organized and can analyze new topics quickly. All the necessary skills are included in the team to reduce external dependencies. The number of teams is low to prevent the DIL from becoming an organization within an organization.

Number of topics

- <10
- 10-20
- >20

58%
32%
10%

Number of teams

See Appendix for details about the metrics.

Management Recommendation

DILs are more successful when they focus on a few topics (perhaps just one) but use the team to develop and test an idea fully rather than experimenting with many ideas. Teams in the DIL should provide all the necessary skills. Working with only a few teams reduces the overhead.
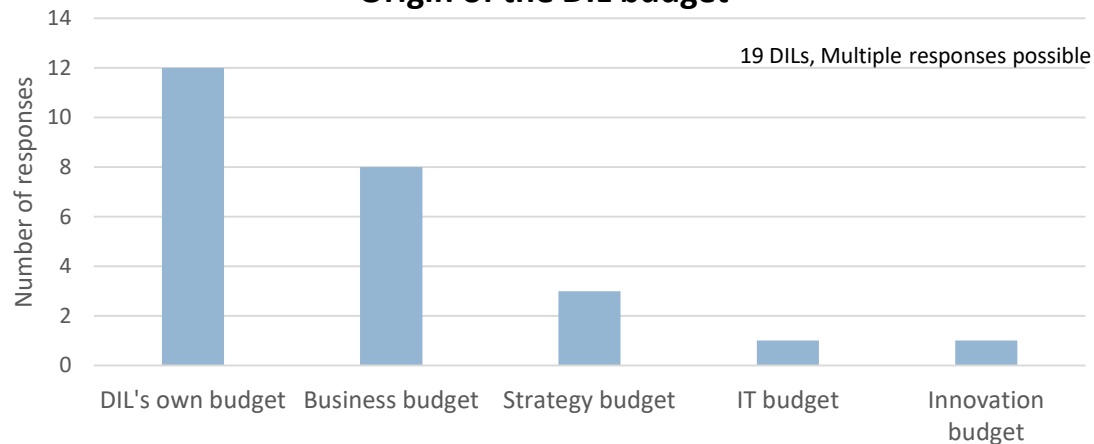
Budget and Communication

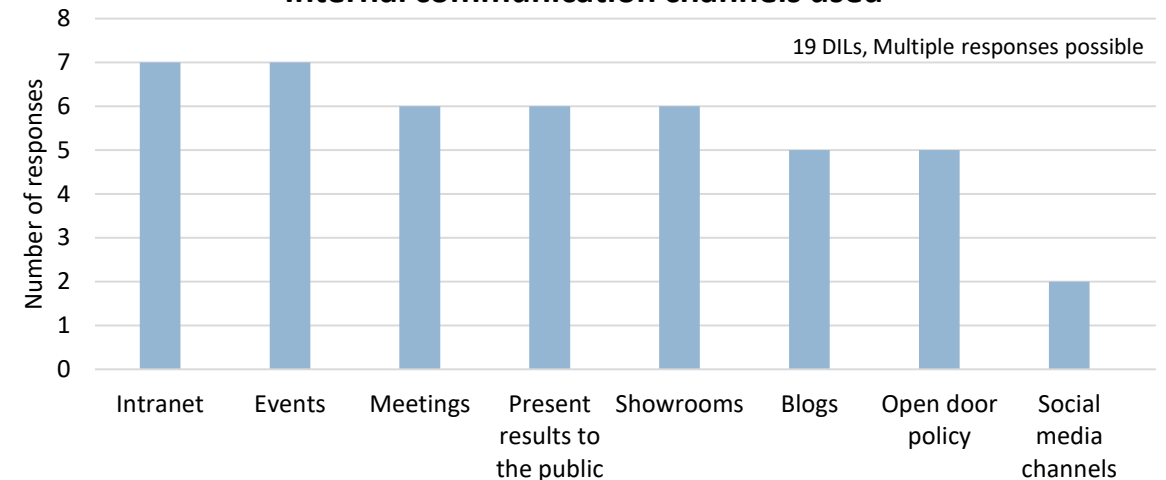## DILs have their own budget and use various communication channels

DILs work with budgets from various sources and leverage their network to acquire additional funding. The budget determines how independently DILs can make decisions about their projects. Naturally, if DILs depend on other units for budget, their activities become dependent on the decisions of those units. We find that DIL budgets come from different sources. Most commonly, the DIL has its own budget, which strengthens its autonomy and allows it to choose projects that fit its strategic goals. In some cases, the business units provide budgets and thereby influence the selection of projects.

Internal communication tools are a vital instrument to navigate through the main organization of the firm, diffusing the results of the exploration activities and even encouraging cultural change. Regular communication is facilitated via communication and collaboration in the intranet, but singular events are also popular mechanisms (e.g., town hall meetings or innovation meetups). Using a variety of channels allows a DIL to address a range of colleagues and cater for the different needs of business and IT units. Communication is important to stay in touch and ensure that all employees stay informed about the activities of the DIL.

Origin of the DIL budget

19 DILs, Multiple responses possible

Internal communication channels used

19 DILs, Multiple responses possible

See Appendix for details about the metrics.

Management Recommendation

Managers should provide a stable and independent budget to the DIL to ensure its autonomy. This budget can be channeled through other units to provide orientation. A DIL should share information intensively to keep employees up to date with its activities and build a positive reputation.

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Although DILs share certain characteristics, their purposes are diverse

Across the different cases, DILs deal with a vast number of topics. Usually their purpose is not entirely fixed but evolves with the innovations created. Interestingly, DILs usually concentrate primarily on one or two purposes (see figure below). Almost half of the DILs in our study address cultural change and focus on redefining values and behaviors. Although there are multiple purposes, it is clear that the main purpose revolves around improving and accelerating. Hence, instead of generating something completely new, DILs focus on bringing firms forward by accelerating innovation creation – the existing internal capabilities of the firms are leveraged. Often the employees in the main organization lack the visionary power to digitalize existing products. In contrast, DILs focus on the existing core and find potential for improvement and digitalization.

Quotes from the case interviews on the purpose of their DIL:

Cultural transformation, prototyping and new business

Central place for digitalization

Innovative projects around existing processes and services

Enabler for innovation

Get ready, make better, make new

Offer *instant services* to customers

Method-as-a-service for the organization

Generate ideas and **innovation culture**

One common point of contact for digitalization topics

Improve *existing* processes and find new business opportunities

Purpose of DILs

19 DILs, Multiple responses possible

See Appendix for details about the metrics.
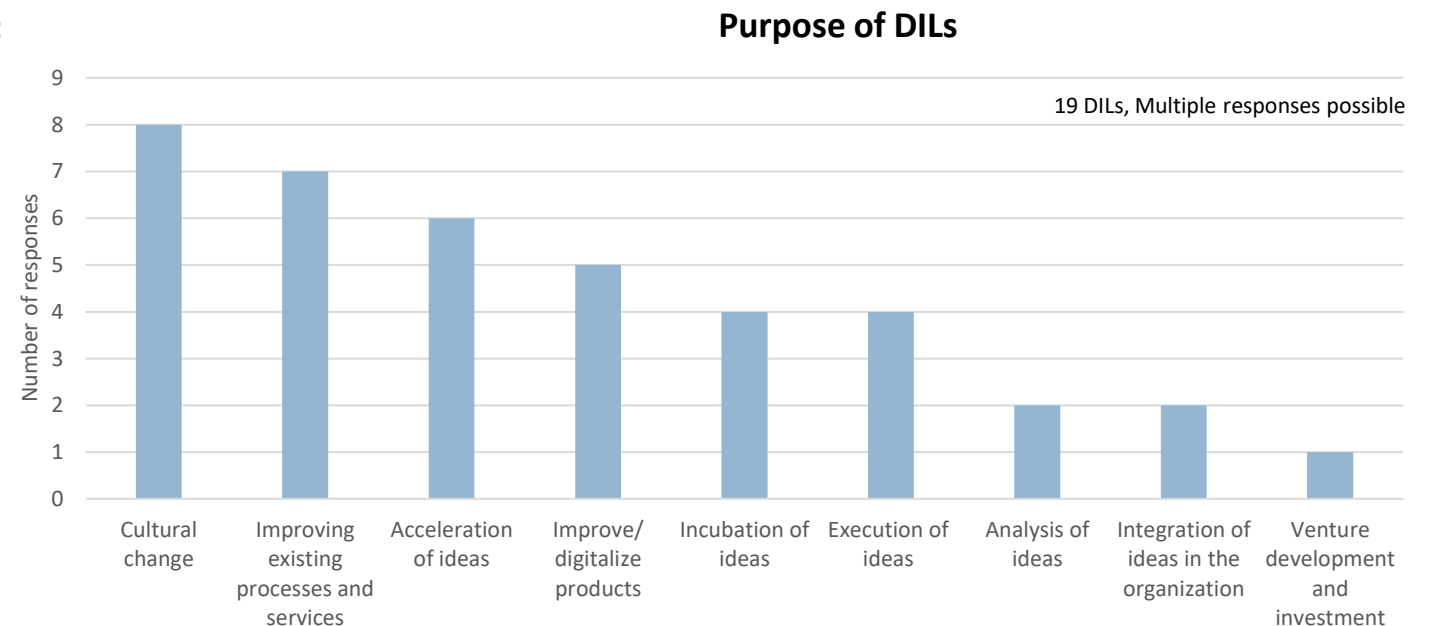
Management Recommendation

The different purposes show that firms have different ideas on how DILs should accelerate digital transformation and how they are expected to support the main organization. Managers should interlock a DIL's purpose with the firm's strategy and vision to ensure alignment.
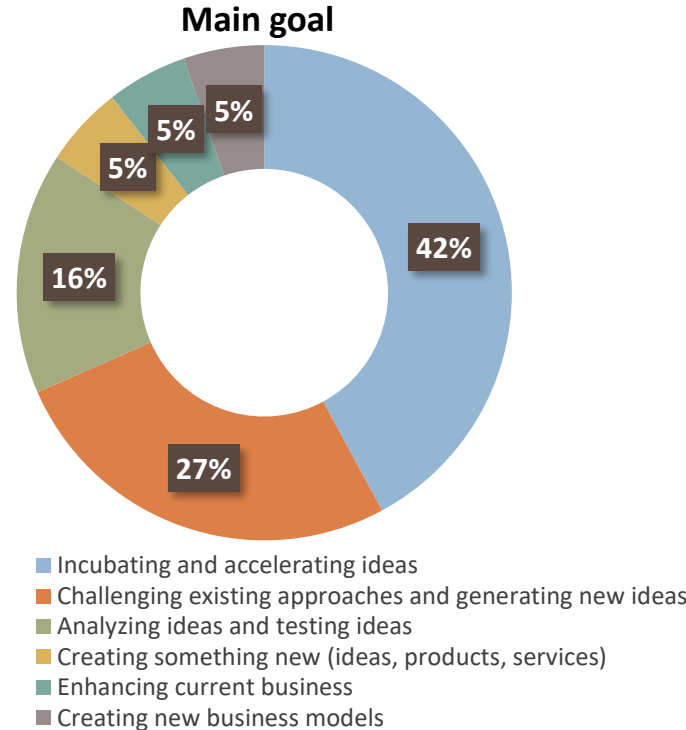
Strategic Goals of DILs

DILs have different goals and the majority have made their goals concrete

Of the DILs investigated, 42% aim to incubate and accelerate ideas, which covers the first stages of the innovation process. Challenging existing approaches and generating new ideas is the goal of 27% of the DILs. Making the goal of the DIL concrete allows all activities to be aligned and makes it easier to achieve goals. Nonetheless, goals are difficult to formulate for innovation activities, as the outcomes are intangible and sometimes even unknown. Thus, only 74% of the DILs have managed to make their goals concrete. They have put their goals in writing or presented them in their intranet, strategy outline, or similar forms of communication. The other DILs have at least developed a common understanding of their goals.

Main goal

42%
27%
16%
5%
5%
5%

■ Incubating and accelerating ideas
■ Challenging existing approaches and generating new ideas
■ Analyzing ideas and testing ideas
■ Creating something new (ideas, products, services)
■ Enhancing current business
■ Creating new business models

Are goals made concrete?

26%
74%
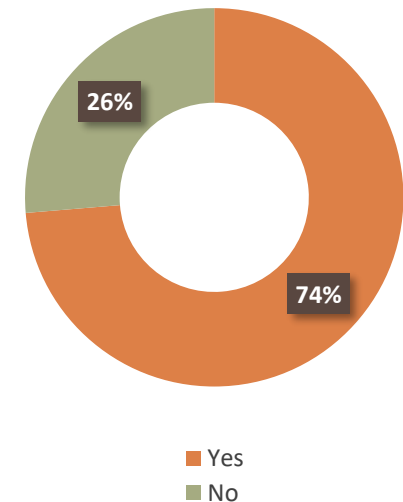
■ Yes
■ No

See Appendix for details about the metrics.

Management Recommendation

Although all DILs have a main goal, it is not easy to make that goal concrete. Goals should be derived from the DIL's purpose, be transparent to all employees, and help attune expectations – making the goals as concrete as possible lets others recognize, understand, and support the DIL's activities.
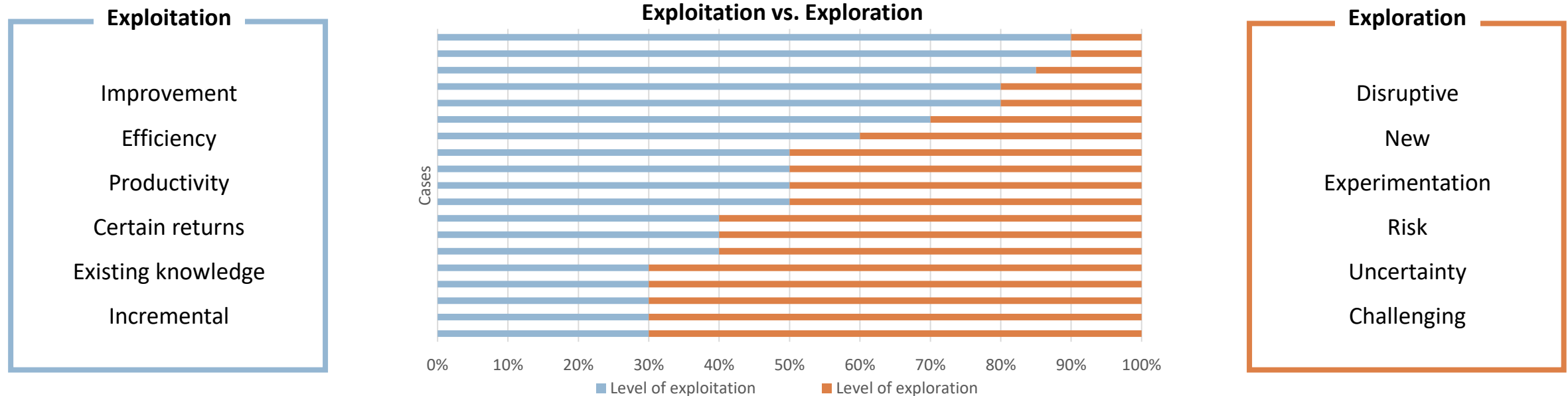
Exploitation vs. Exploration

DILs combine improving existing business and tapping into new business

Exploitation

Improvement

Efficiency

Productivity

Certain returns

Existing knowledge

Incremental

Exploration vs. Exploration

Cases

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

■ Level of exploitation   ■ Level of exploration

Exploration

Disruptive

New

Experimentation

Risk

Uncertainty

Challenging

DILs embody different levels of exploration and exploitation in their objectives. None of the DILs focuses entirely on exploration or on exploitation, i.e., the focus is never purely on generating new ideas nor is it only on leveraging existing products, services, or processes. As the DILs embody exploration and exploitation, they can support a larger part of the innovation process (see Slide 29) and, hence, provide a more holistic approach to innovation. DILs mainly focusing on exploitation work closely with different units of the main organization to leverage existing products and services by combining them with digital technologies. These combinations increase productivity and efficiency. DILs mainly focusing on exploration work on completely new ideas and aim to test new approaches or work with business units to leverage digital innovation by tapping into new opportunities.
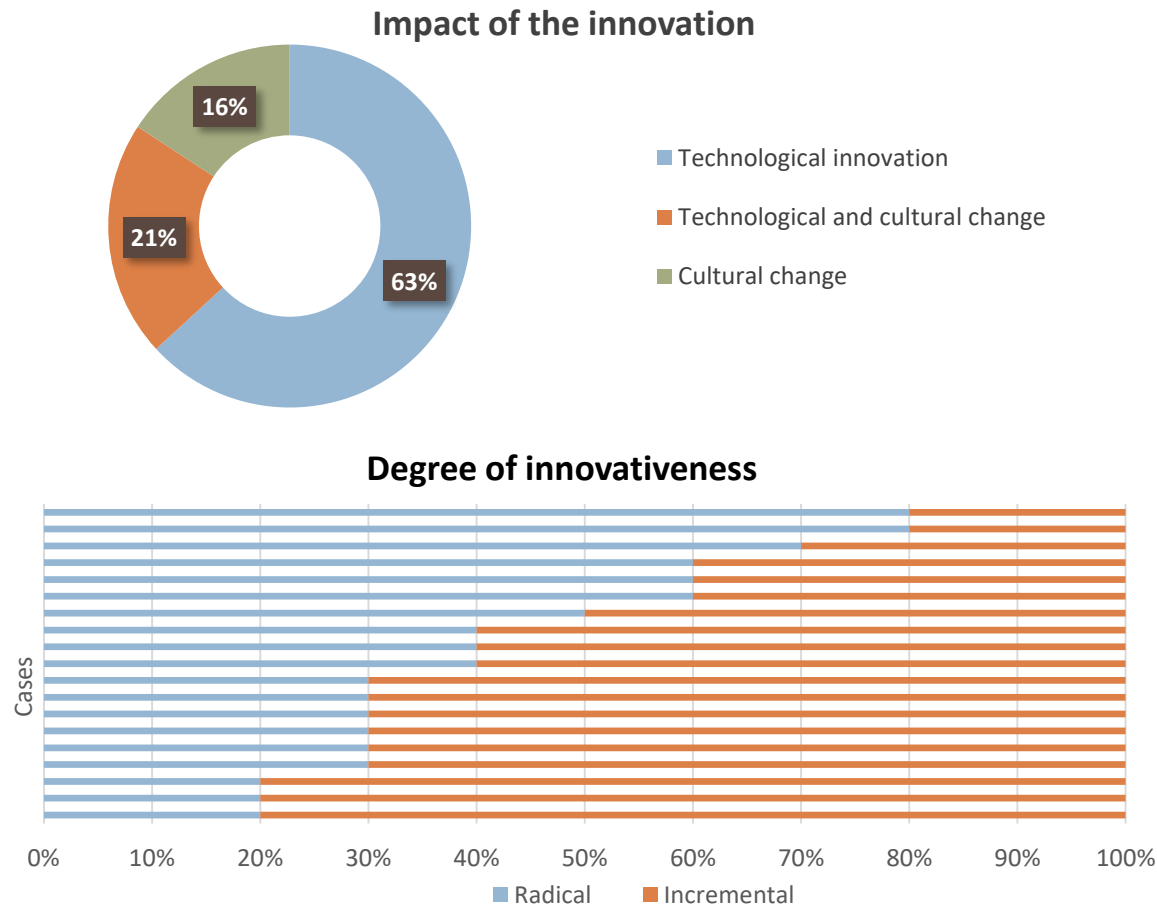
See Appendix for details about the metrics.

Management Recommendation

DILs can, depending on their setup, support a firm's exploration and exploitation. DILs deliver the best results if activities are concentrated – only large DILs can provide the full spectrum of innovation. Managers should focus accordingly on the firm's needs to achieve faster and more meaningful results.

Different Types of Impact

Innovations are mostly incremental technological innovations

Impact of the innovation

- Technological innovation
- Technological and cultural change
- Cultural change

63%
21%
16%

Degree of innovativeness

Cases

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Radical   Incremental

DILs focus on different types of innovation. The majority of DILs (63%) focus on technological advancements and use cases of how to apply digital technologies. Later, these innovations must be tested and analyzed for their potential to create a new market offering. The minority of DILs focus exclusively on cultural aspects such as a new working environment or the involvement of employees in the change process. Some DILs combine the two innovation types and create an impact by innovating with digital technologies combined with the creation of an agile mindset and new methods. For these DILs, innovating with novel technologies is always linked to new approaches.

To develop digital innovations, DILs seek a balance between radical and incremental innovations. Radical innovations are riskier but have more potential. They require more resources than incremental innovations. In contrast, incremental innovations are popular, particularly for DILs, as they produce outcomes quickly and require fewer resources. Developing incremental innovations allows DILs to stay more connected to the operational business units in the main organization by producing meaningful contributions to the business through small improvements (instead of long shots).

See Appendix for details about the metrics.

Management Recommendation

Developing digital innovation should focus on technological innovation, but managers must recognize that the work of DILs is often accompanied by improvements beyond the actual technical aspects. Innovations do not necessarily have to be radical – but they have to fit the firm's requirements.

Location and Decision Power

Most DILs are not located at the HQ but are strongly controlled by the HQ

Location

- On site — 32%
- Close to HQ - same city — 47%
- Far from HQ - different city — 21%
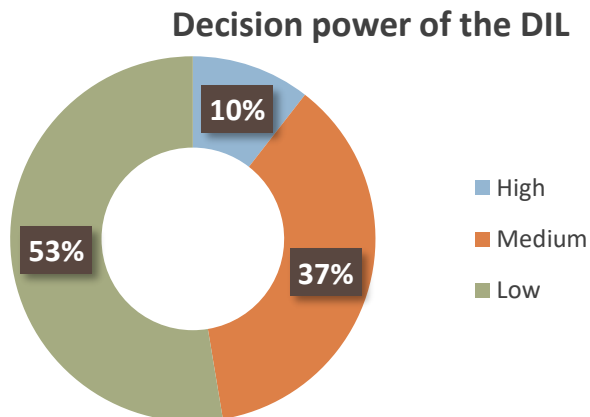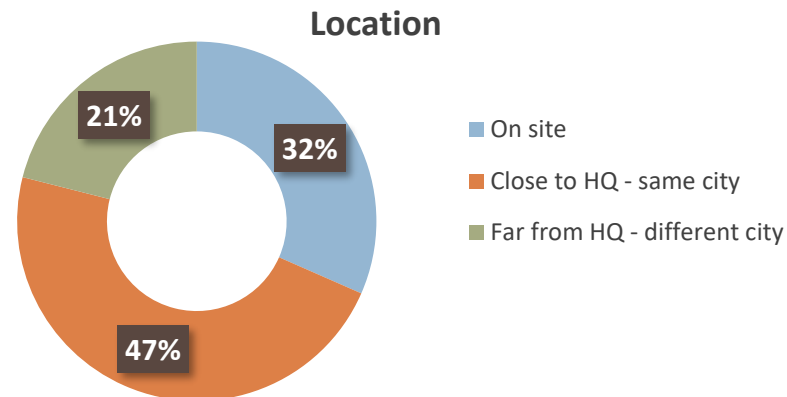
The DILs' locations vary in their closeness to the headquarters (HQ). Some DILs are located in the same building, or at least on the same site. In some cases, they merely have a dedicated office space. Other DILs are set up in a completely separate location, even in a different city. Moving away from the HQ reduces the amount of control over the DIL as well as the opportunity to share the results of the DIL (digital innovation or knowledge in general) with the main organization. Reasons for remote DILs include getting closer to "inspirational" environments (e.g., the Berlin Startup scene), being able to recruit new talents, and gaining access to new technologies (e.g., research clusters).

Decision power of the DIL

- High — 10%
- Medium — 37%
- Low — 53%

The decision power given to the DIL determines how independently it can make decisions and focus on self-determined tasks. High decision power (given to a minority of the DILs – only 10%) involves a shift of decision power from the HQ to the DIL. Members of the DIL can assign tasks and decide on their actions. In contrast, low decision power gives control over the DIL to the main organization at the HQ. The DIL's actions and decisions are made by the HQ. Decision power is often directly linked to financial resources, which are mainly controlled by the HQ. If the HQ is in control, the DILs must report more intensely, and its decisions are influenced. With medium decision power, the decision power is shared between the DIL and the main organization – often strategic decisions remain with the HQ.

See Appendix for details about the metrics.

Management Recommendation

DILs are better positioned close (but not too close) to the HQ to stay in touch and allow outcomes to diffuse from the DIL to the main organization. Although DILs are separate units, they can only be successful if they are properly steered by the HQ while being partly autonomous in their operations.
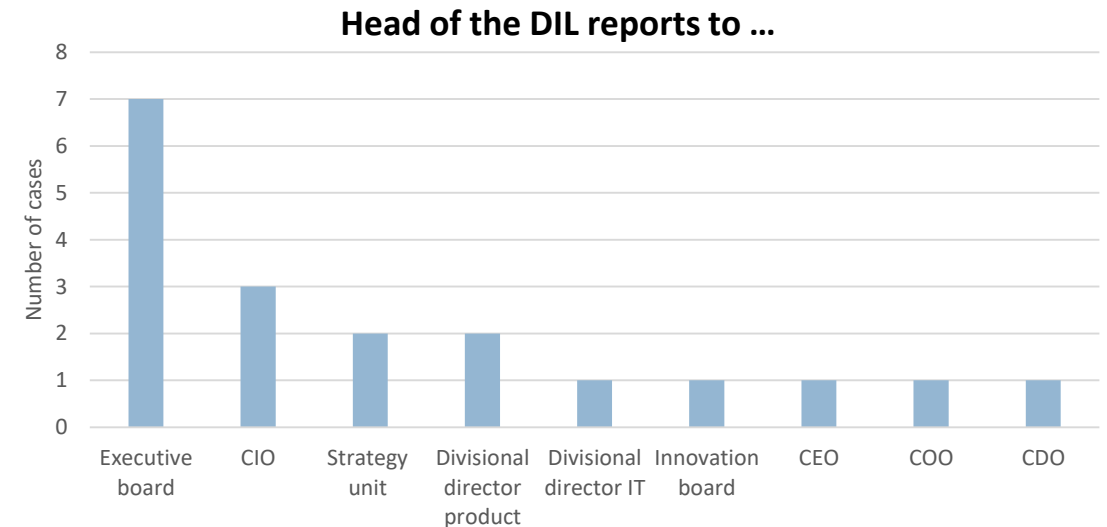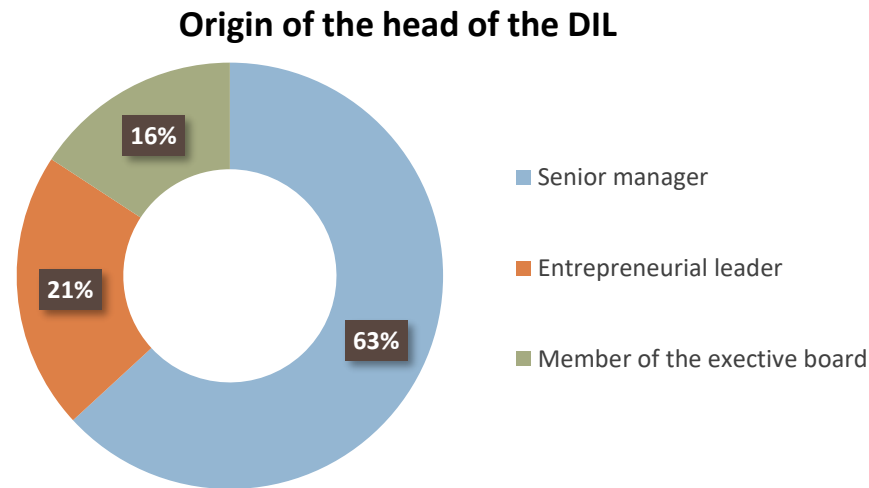
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Management of DILs

Most DILs are led by senior managers who report to the top management

Origin of the head of the DIL

- Senior manager — 63%
- Entrepreneurial leader — 21%
- Member of the exective board — 16%

Head of the DIL reports to …

Number of cases (y-axis, 0 to 8)

- Executive board: 7
- CIO: 3
- Strategy unit: 2
- Divisional director product: 2
- Divisional director IT: 1
- Innovation board: 1
- CEO: 1
- COO: 1
- CDO: 1

In order to execute strategy, most DILs are headed by a senior manager who has been with the firm for a long time, knows its structures very well, and has a strong network within it. Hence, the senior manager can leverage the necessary experience and connections in the best interests of the DIL. Entrepreneurial leaders (21%) are usually hired from outside the firm and have not succumbed to organizational inertia. They bring new ideas from outside and are driven by an innovative spirit, like entrepreneurs. Members of the executive board are uncommon as heads, as they share responsibility for the DIL and the main organization, which can be an impediment. Whereas entrepreneurial leaders are often too detached from the firm's core, members of the executive board might lack a sufficiently independent and open mindset to lead the DIL. To get the best of both worlds (autonomy and alignment), the head of the DIL should report to the executive board. Reporting to the top management underlines the attention the DIL is given and provides the opportunity to address potential improvements from digital innovations at the right level.

See Appendix for details about the metrics.

Management Recommendation

Senior managers act as visionary leaders for the DIL – they keep an open mind to explore digital innovations and are well connected to the main organization. Both aspects are important – hence, some DILs even have two heads. Leaders should use their seniority to guarantee the DIL's autonomy.

Staffing of DILs

DILs are mainly staffed with internal technology experts

Main source of DIL employees

19 DILs, Multiple responses possible

Number of responses

Internal — 16
External — 8

Main background of DIL employees

19 DILs, Multiple responses possible

Number of responses

Technology experts — 13
Coaching/ methodology — 12
Business domain — 8
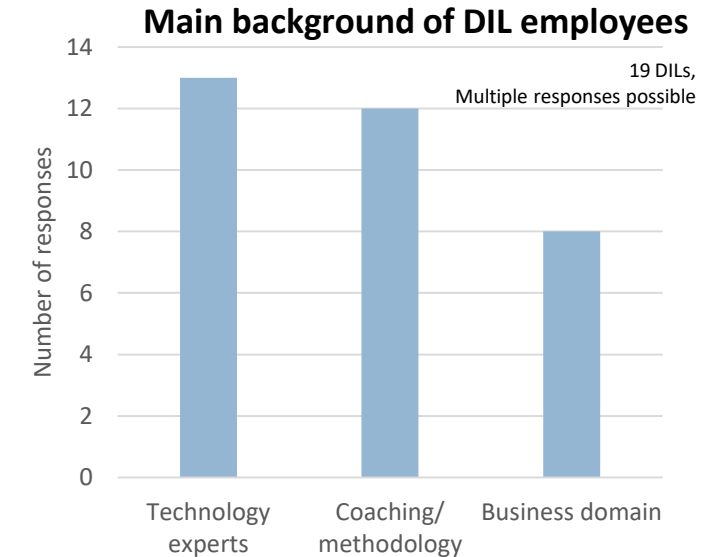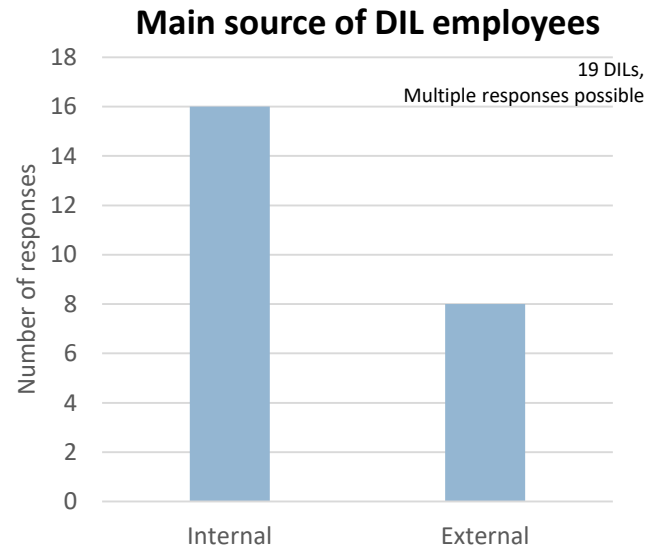
The DILs' employees are hired from internal or external sources. The majority (84% of the DILs) prefer internal to external employees, as they are more familiar with the firm and its customers. Internal employees also have a better understanding of what the firm needs and how digital innovations are most effectively applied. In contrast, hiring new employees provides the opportunity to acquire new skills and bring in fresh ideas.

DILs are looking for a range of skills in their employees – a mix of skills characterizes the majority of DILs. Knowledge of technology is needed to understand and apply the new technological opportunities. Coaching and knowledge of methodology helps convert ideas into tangible innovation and enables others to do the same. Knowledge of the business domain is needed to integrate digital innovations in the product and service portfolio of the firm or create new market offerings.
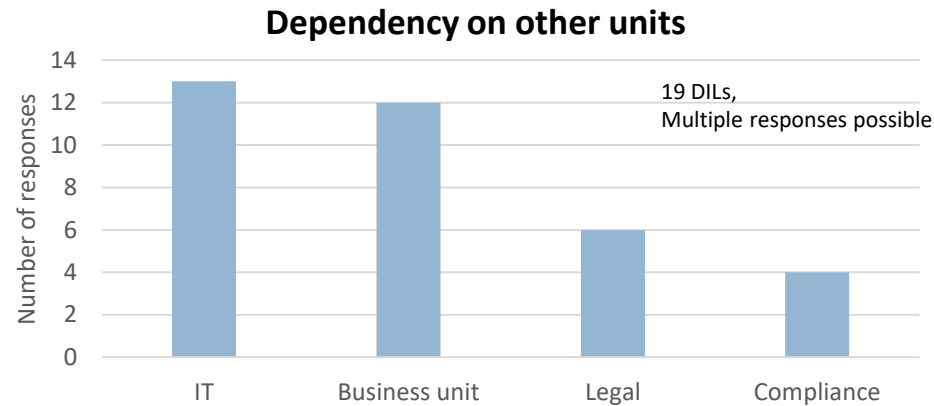
See Appendix for details about the metrics.

Management Recommendation

Different backgrounds and a mix of skills are the cornerstone of DIL staffing. Managers should foster diversity, as it provides a source for innovation. At the same time, it allows innovations to be developed quickly, as the required skills are co-located.
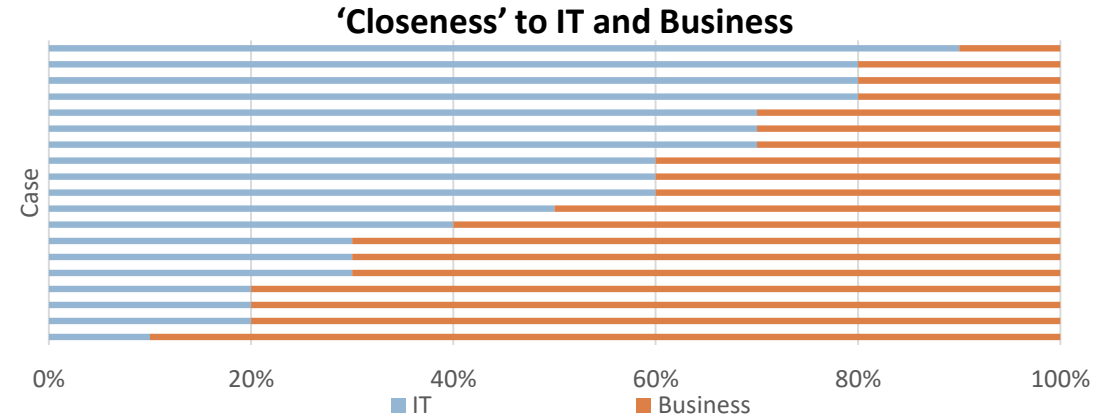
DILs thrive on interconnection with other units

Dependency on other units

19 DILs,
Multiple responses possible

'Closeness' to IT and Business

■ IT ■ Business

The interconnection with other units is important for DILs to make an impact – DILs depend on their ideas or thoughts being adopted by other units. New insights are transferred through collaboration and exchange. Moreover, employees are transferred from other units to the DIL. Hence, certain interdependencies do exist. Some units are more involved in the activities of the DIL, some less so – but to incorporate new ideas and receive feedback, it is important that DILs value and support the involvement of other units. Not all units are permanently involved in the DILs' activities, e.g., feedback on legal and compliance aspects may only be needed from time to time.

DILs are separate units and are not part of the IT or business units of the firms – they claim the ownership of ideas where business ideas are combined with digital technologies or where technological advancements unlock business opportunities. Thus, digital innovations embody digital components which require the support of IT units. At the same time, the integration of innovations into the product and service portfolio of the firms is inevitable. Depending on the situation, DILs are more drawn either to the IT units (for more tech-related innovations) or to the business units (for more applied innovations). These tendencies should, however, not result in an exclusive relationship with either unit, where DILs would *only* work with one side.

See Appendix for details about the metrics.

Management Recommendation

Collaboration and exchange with other units should always be fostered. In particular, DILs depend on other units to make an impact. This dependency should not be misused, and there should be no competition among units for influence – especially not between IT and business units.
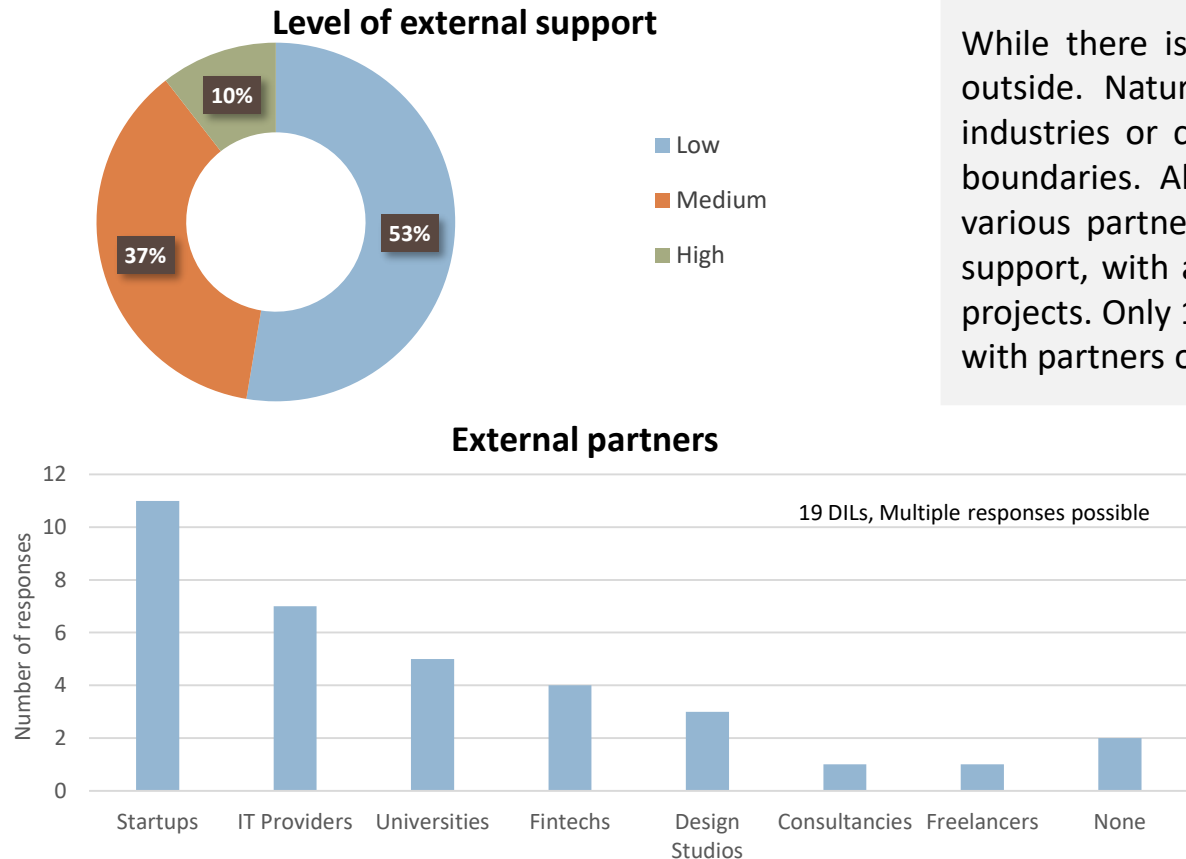
External Support and Partners

DILs rely mainly on their internal resources and receive little help from outside

Level of external support

- Low — 53%
- Medium — 37%
- High — 10%

While there is support for the DILs from within the firms, there is also support from outside. Naturally, all employees of the DILs are well connected in their respective industries or communities. A lot of exchange and collaboration takes place across firm boundaries. All DILs work with external partners and are involved in exchanges with various partners. Nonetheless, the majority of DILs have a rather low level of external support, with a focus on just a few topics. The collaboration is limited to a few selected projects. Only 10% of the DILs have a high level of external support where they collaborate with partners on all projects as part of a permanent and long-lasting relationship.

External partners

19 DILs, Multiple responses possible

Number of responses (y-axis): Startups, IT Providers, Universities, Fintechs, Design Studios, Consultancies, Freelancers, None

DILs work with a wide variety of external partners. Most of the partnerships (32%) are with startups that provide fresh ideas and new input. They can help develop innovation and provide missing skills. Next, IT providers give support in the form of technologies and a profound understanding of how new technologies can be utilized for innovation. Moreover, universities are partners on innovation projects and can provide support with their academic background and their access to new talents.

See Appendix for details about the metrics.

Management Recommendation

External support should extend the scope of DILs and allow for more input. Thus, DILs can overcome the common limitations of firm-internal bias or missing skills. Collaborating with helpful partners accelerates and validates the DILs' ideas and allows them to be tested quickly with further resources.

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DILs are in charge of innovation but with different focus areas

DILs develop innovation, but the firms in our sample have very different understandings of what this means. More than half did not specify this further, and the activities of the DILs lack a clear orientation. Often, DILs help ad hoc and provide support in all stages of the innovation process *upon request*. DILs are good at detecting opportunities for change and reacting to them. Being flexible also allows them to act in ways that are opportunity-driven and accelerate innovation at various stages. Often, opportunities are identified through the longstanding network of the head of the DIL or the various connections of the DIL members to the main organization.

18% of the DILs focus on the **integration** of innovation, as this yields the strongest long-term impact. Integration means handing over the innovation to the main organization and positioning it in the firm's service and product portfolios. Thus, integration ensures that innovations do not remain at the invention stage, so that firms can capture the generated value.

DILs aiming at **idea generation** focus on the very early stage of the innovation process – generating, collecting, and assessing ideas. Firms in profitable situations run the risk of neglecting innovation and therefore need a DIL to generate fresh ideas and to spot new trends that might challenge their existing business models, thus helping them to prepare for the future. DILs focusing on **idea execution** help firms to test innovations and present more concrete examples of how they can digitalize their product and service portfolios.

Focus area of the innovation process

- Nothing specific — 52%
- Integration of innovation — 18%
- Idea generation — 17%
- Idea execution — 13%
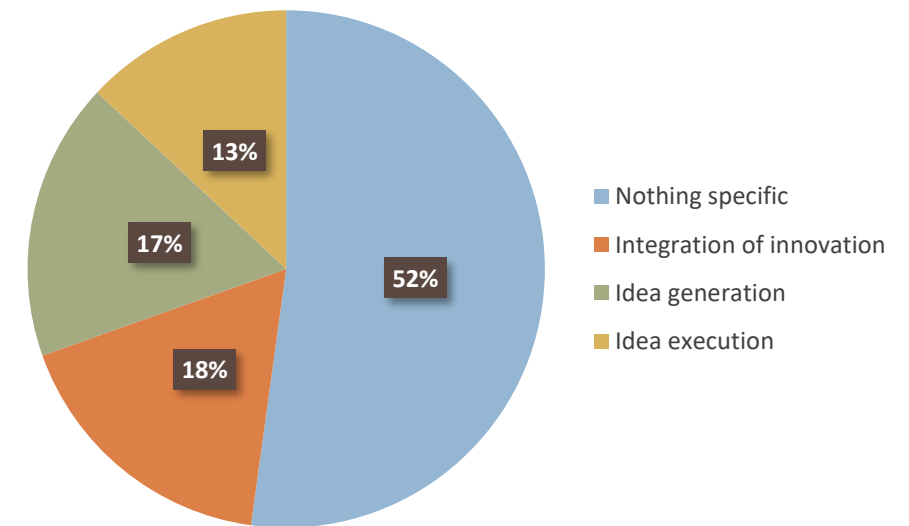
See Appendix for details about the metrics.

Management Recommendation

For the greatest impact, DILs should self-assign their resources to where they are needed most. Leeway in decision making helps to allocate resources effectively. Specifying the goals of the innovation process is feasible if the strategic objectives are clear – otherwise, opportunism is needed.

Activities of DILs stretch over various stages of the innovation process
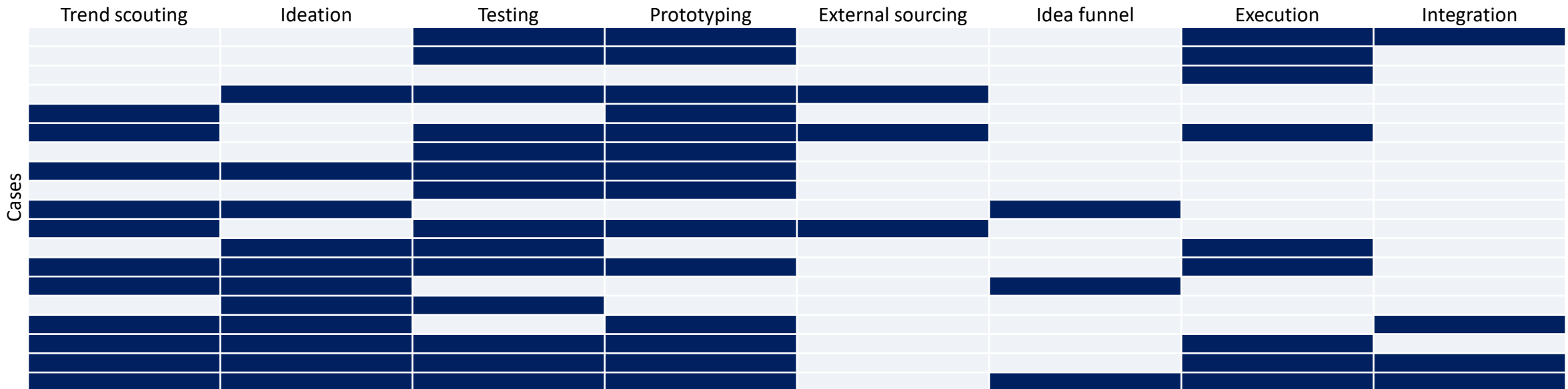
The innovation process stretches from trend scouting to integration. Trend scouting allows firms to scan the business landscape and identify trends. On the basis of these trends, firms develop ideas for a new product or service and aim to understand how the trends can be converted into meaningful business opportunities. Subsequently, DILs test ideas with different tools and methods. Prototyping exemplifies the features of new products or services, tests them with potential customers, and allows feedback to be obtained as fast as possible. External sourcing allows collaboration with partners and quick scaling of innovations for feedback. Using an idea funnel, DILs decide whether firms should proceed to the execution stage. Although most DILs have no specific focus area in their innovation process (see previous slide), we find that their activities are concentrated strongly on the first stages of the innovation process. These activities are more detached from the main organization and give DILs more freedom.

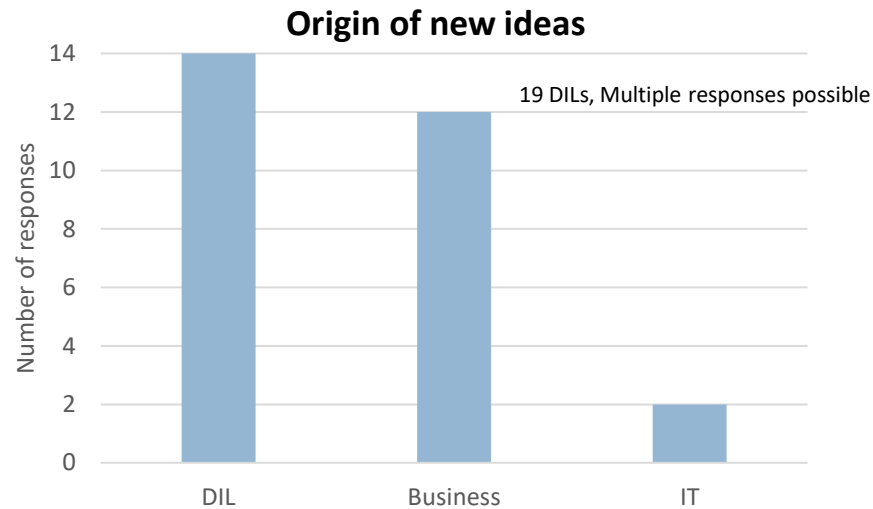See Appendix for details about the metrics.

Management Recommendation

The later stages are less attractive, as embedding the innovation in the main organization can be tedious and DILs have to deal with compliance and regulation. However, managers should emphasize that these stages are of great importance for the long-term impact and success of digital innovations.

DILs and businesses generate ideas through an open-door policy and pitching

Origin of new ideas

19 DILs, Multiple responses possible

Number of responses

| DIL | Business | IT |

Methods for idea generation

19 DILs, Multiple responses possible

Number of responses

| Open door policy | Innovation pitch | Market screening | Management pitch | Hackathons | No method |

DILs leverage several sources for new ideas. The majority of DILs work on ideas they have generated themselves. Those ideas are often highly innovative, build on cutting-edge technology, and leverage the firm's existing technological advantages (e.g., platforms or data of processes). However, the ideas generated are often not well aligned with the firm's needs and require extra work to fit its competitive positioning. Ideas from the business units are more attuned to the firm's needs but do not leverage the potential of new technologies.

DILs are constantly open to new ideas and act as a one-stop shop for innovation. Employees of the main organization can always approach the DIL and present their ideas. Furthermore, a number of DILs organize innovation pitches where employees can submit ideas. If they win, employees join the DIL for a period to work on their ideas. Innovation pitches engage employees and are a great way for the DIL to understand the firm's needs and wishes. DILs use these insights during management pitches to collect new ideas from the managers or when screening the market for suitable ideas.

Management Recommendation

See Appendix for details about the metrics.

A strength of DILs is their ability to collect information from various sources and consolidate this input. DILs should always be open to new ideas to make sure everybody feels understood and that no idea is lost. Consolidating and analyzing all ideas is important to focus the scarce resources DILs have.

Integration mechanisms ensure innovations are embedded in the product unit
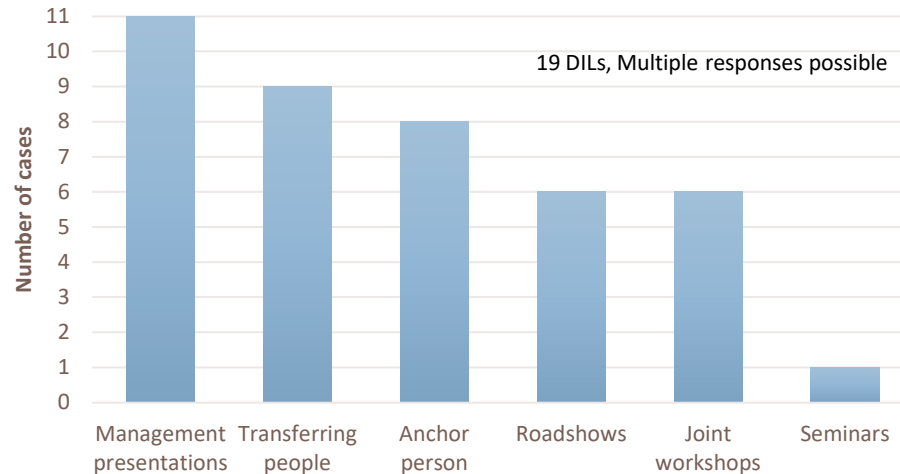
Mechanism for integrating innovations in the main organization

19 DILs, Multiple responses possible

Innovations are integrated in different units in the main organization

- Integration in the product unit
- No structured integration
- Integration in the IT unit
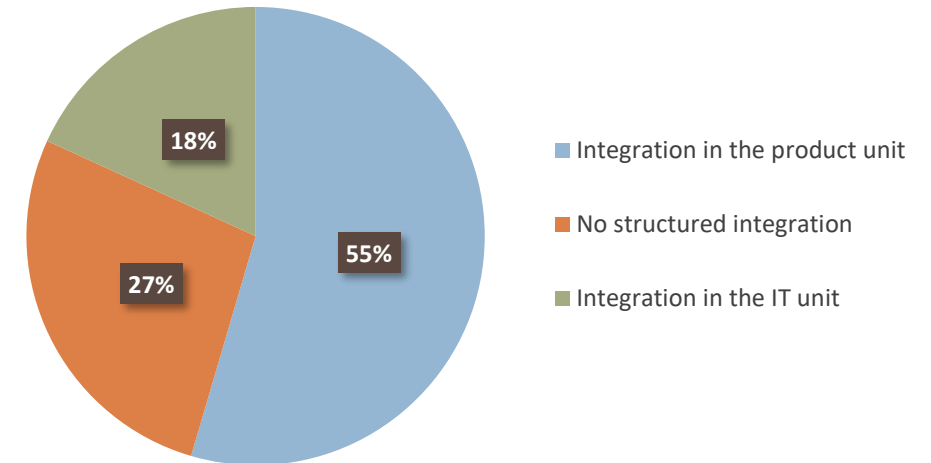
DILs accumulate knowledge. Their success is determined by how they use this knowledge and, most importantly, by how they return it to the main organization. If the knowledge remains in the DILs only, it can hamper the long-term innovativeness of the firm. Thus, DILs acquire knowledge through the innovation process, transfer this knowledge, integrate the innovations, and create profitable market offerings; in fact, 55% chose to integrate their innovations in the product unit of the main organization as the best market, product, and sales experience. New innovations can more easily flow into the firm's offerings if they are integrated by the product unit and not by the IT unit. Often IT units are still considered to be cost centers only. Presentations to the management help to address innovations to the right people and gain support. The transfer of people between the DIL and the main organization allows innovations to move with their "owners" when they are handed over to the main organization. Anchor persons are drawn from the main organizations to be involved in the early stages of an innovation, and they later adopt this innovation in their unit for exploitation.

See Appendix for details about the metrics.

Management Recommendation

Managers should support DILs in their effort to integrate innovations, thereby using various mechanisms to integrate innovations in the main organization and focusing on integration into one of the product units to fast-track the innovation into the service and product portfolio.

Knowledge of methodology can be reused independently of the technology

Content of the DILs' workshops for the main organization

- 42%
- 37%
- 21%

■ No workshops used
■ Knowledge of methodology
■ Knowledge of technology
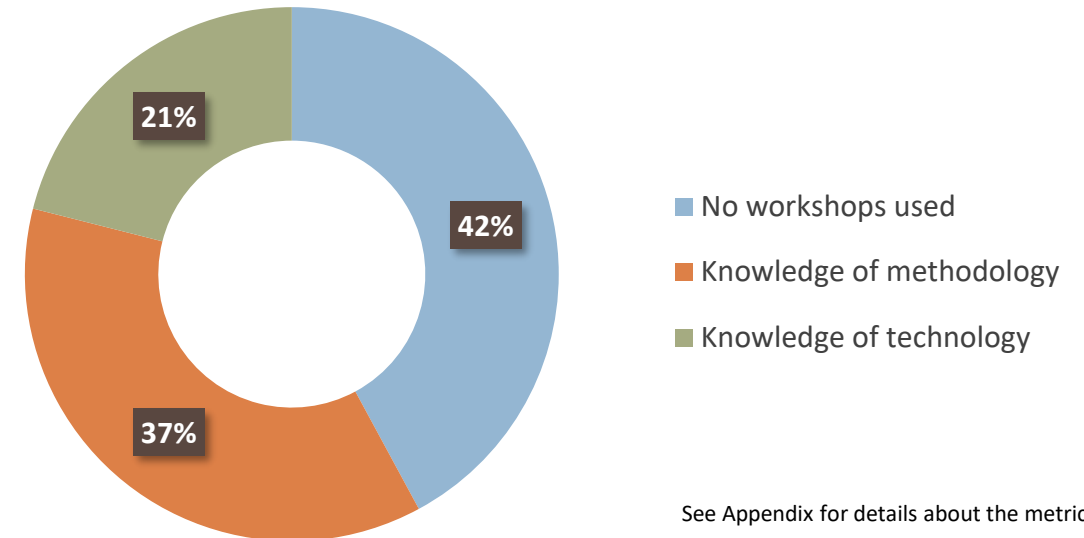
See Appendix for details about the metrics.

Joint workshops of the DIL and the main organization are used to transfer knowledge. They can be applied at various stages of the innovation process. Whereas workshops at an early stage of the innovation process are mainly intended to transfer knowledge from the main organization to the DIL, workshops at a later stage are organized by the DIL to diffuse new insights in the main organization. New insights are mainly generated during scouting, testing of new ideas, and prototyping. Joint workshops are then used to determine the usefulness of the innovations for the firm as a whole. Methodological workshops share insights independently of the underlying technology. These insights can be used to improve the next cycle of the innovation process or daily operations in the main organization.

Management Recommendation

Workshops are an interactive way for DILs to transfer knowledge. DILs should focus on methodological insights, as these can easily be reused in the DIL during exploration or in the main organization to trigger new work methods and cultural change.

Instead of transferring ideas or innovation … employees are transferred

Intensity of employee transfer

- Very low — 23%
- Low — 15%
- Medium — 31%
- High — 8%
- Very high — 23%

Structured program for employee transfer

Yes — 68% No — 32%
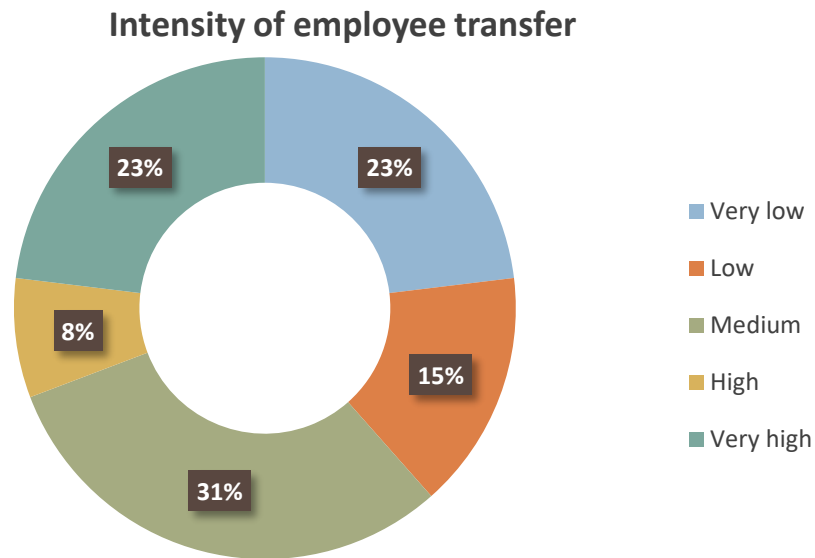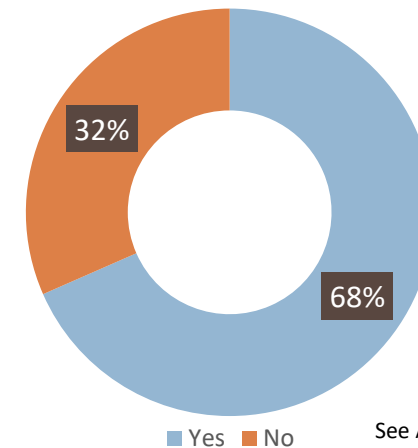
See Appendix for details about the metrics.

The transfer of employees takes place between the main organization and the DIL in both directions. The transfer aims to intertwine the activities of the DIL with the activities of the main organization. Although we observed many forms of transfer, the most common form is a structured program (or a similar organizational mechanism). Transferring employees to the DIL is difficult, as it creates an opportunity cost and the transferred employee is away from the "home base." At the same time, if employees temporarily join the DIL to explore ideas and create innovations, and are then transferred back to the main organization to exploit innovations, it reduces the risks associated with handing over innovations from one unit to another. Transfers enable transparent exchange and high commitment among colleagues. Structured transfer programs can mitigate the negative effects of transfers and are common in DILs with very intense transfers. Overall, 68% of DILs implemented a program to transfer people. The intensity of these programs varied from several months of dedicated project work (high intensity) to a few days of co-working on small projects (low intensity).

Management Recommendation

Employees should be transferred via a structured program so that transfers are effective and all employees are involved. Employees share expert knowledge about the firm's products and services during exploration and, later, advocate new innovations from the DIL in the main organization.

Non-monetary incentives trigger employees to join the DIL

Main direction of employee transfer

Incentives for employee transfer

19 DILs, Multiple responses possible
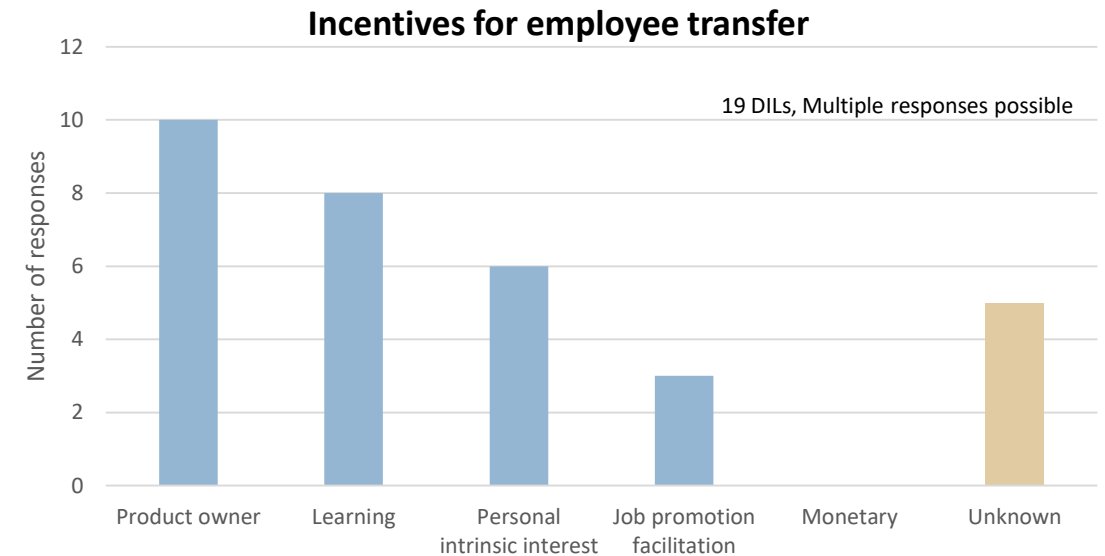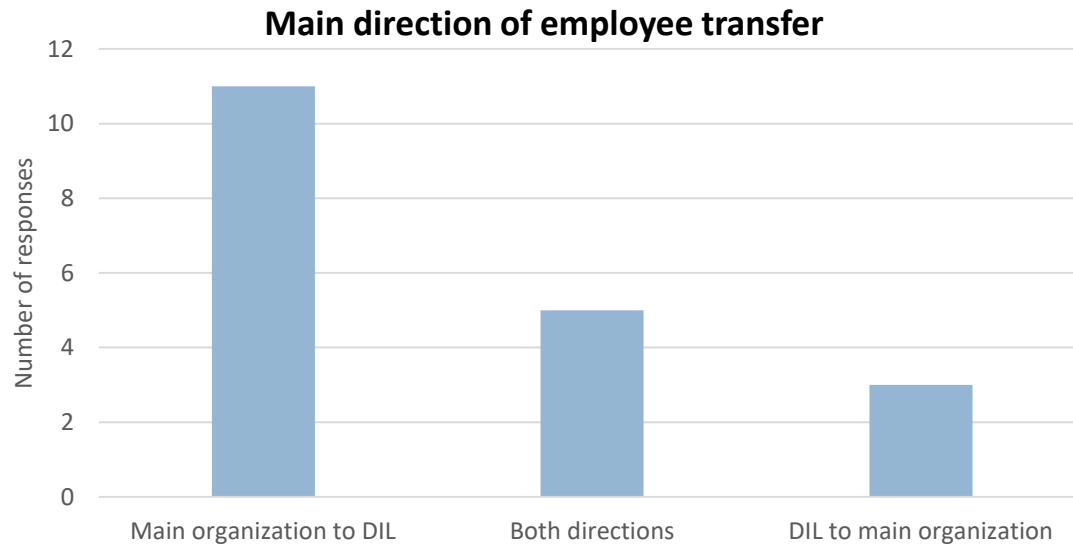
Although there are two possible directions of transfer, most DILs (13 out of 19) focus on employee transfers towards the DIL. Employees leave their home base in the main organization and join the DIL for a period. If proper transfer programs are implemented, employees rejoin their original unit afterwards. The transfer programs ensure a continuous rotation of people in and out of the DIL. No DIL uses monetary incentives to motivate people, but some use non-monetary incentives such as greater independence, higher flexibility, and more self-determined work to attract talents from the main organization. In addition, employees are motivated by their curiosity and aim to become a "product owner" of the specific innovation. They see the transfer as an opportunity to shape the innovation and to keep ownership when the innovation transits from exploration (in the DIL) to exploitation (in the main organization). Employees value the steep learning curve in the DIL and use the transfer to ramp up their skills.

See Appendix for details about the metrics.

Management Recommendation

Managers should appeal to the intrinsic motivation of employees to get the best out of the main organization. Employees need to take on responsibility and be given the opportunity to decide how the new product or service is developed – active involvement builds up commitment to the ideas of the DIL.

The direction of the transfer is associated with different levels of intensity

⬤ = individual case

Intensity (axis): high, low

Direction (axis): DIL to main organization → Main organization to DIL
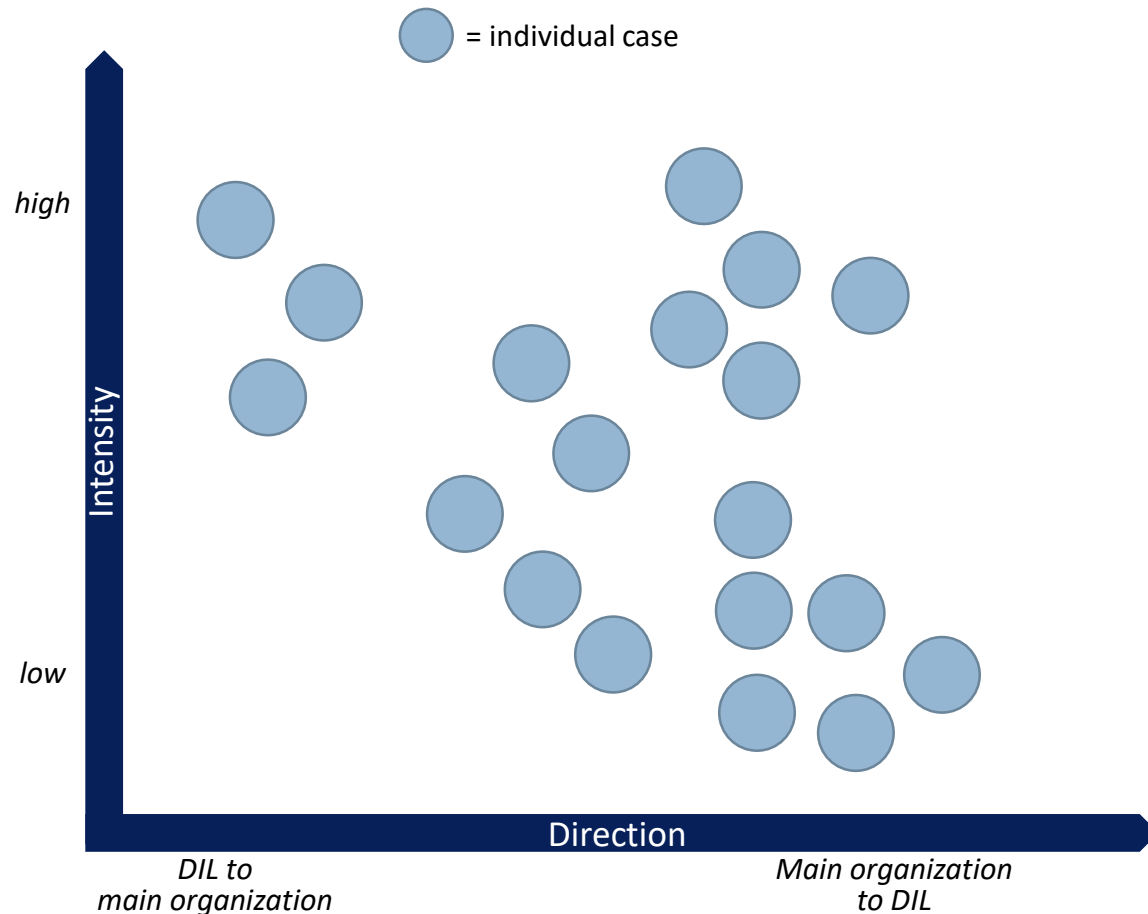
When DIL members temporarily join projects outside the DIL in other units of the firm to accelerate them, the **direction of transfer** is from the DIL to the main organization. When employees leave their home base and temporarily join the DIL, the direction of transfer is from the main organization to the DIL. Most DILs receive transfers from the main organization, but some fail to support transfers in the opposite direction. There is no structured program for returning to the main organization, which causes employees to stay in the DIL and hinders the integration of innovations.

Transfers also take place with varying degrees of **intensity**, in terms of length of membership in the DIL, percentage of working time dedicated to the DIL, and how connected employees stay after the transfer. A typical low-intensity transfer involves transferring employees for only a few days for a workshop; medium intensity is when they are transferred for one or two weeks to collaborate on projects or assignments; and high intensity is when they are transferred for two months or longer on a full-time basis, with exemption from all other tasks.

Firms in the top right corner have a well-implemented transfer program with limited time periods and a good balance between the two directions. Firms in the top left have intense transfers but tend only to transfer DIL members to the main organization.

Management Recommendation

DILs should have a structured transfer program that allows managers to steer the direction of transfers and adjust their intensity according to the firm's needs. Transfer programs must also ensure that employees can transfer in either direction and carry over their insights.

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Outcomes

DILs deliver various outcomes, with the majority focusing on soft facts

Digital opportunities

- Very high — 37%
- High — 53%
- Medium — 10%
- Low
- Very low
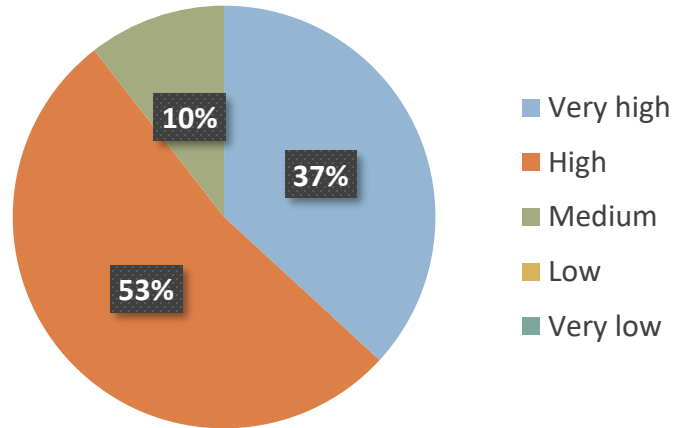
Products, tested ideas, solutions to problems, application of new technology, new business

Digital collaboration

- Very high — 26%
- High — 16%
- Medium — 37%
- Low — 16%
- Very low — 5%
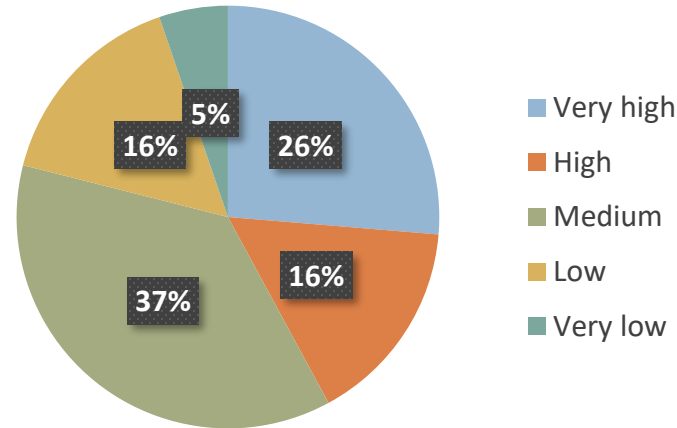
Culture, partnerships, thinking outside the box, methods and tools

Digital awareness

- Very high — 11%
- High — 32%
- Medium — 26%
- Low — 26%
- Very low — 5%
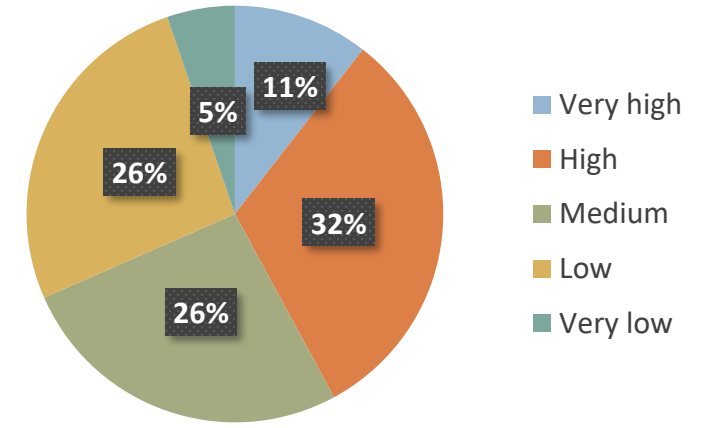
Education, alertness, know-how about technologies and innovations, knowledge base

Firms benefit in various ways from implementing a DIL. Discussion of outcomes often centers on tangible outcomes, such as new products or services, to the neglect of intangible outcomes. Firms assess their DILs as having a very strong impact on new opportunities created for the firms in the digital business environment, with 90% of the DILs regarded as having a high impact on the firms' technological know-how and prototyping capabilities. DILs invest heavily in formal and informal ties with partners, and they connect employees inside the organization. Together, they create new standards of work routines, idea exchange, and teamwork which enable cross-functional and intense collaboration. DILs open the eyes of their firm to innovations stemming from digital technologies and outline possible applications for business impact. They help employees leverage their knowledge to meet the challenges of digitalization, create the proper responsiveness, and understand the long-term implications.

Management Recommendation

See Appendix for details about the metrics.

Managers should not insist on quantifiable or tangible outcomes of DILs only, because intangible outcomes are of long-term value. They should support the change of the entire firm. Spreading and leveraging the outcomes of DILs enables a digital transformation in all units of the main organization.

Acceptance

Innovation needs explanation – acceptance should not be taken for granted

Acceptance of DIL

- Very high — 16%
- High — 31%
- Medium — 32%
- Low — 16%
- Very low — 5%
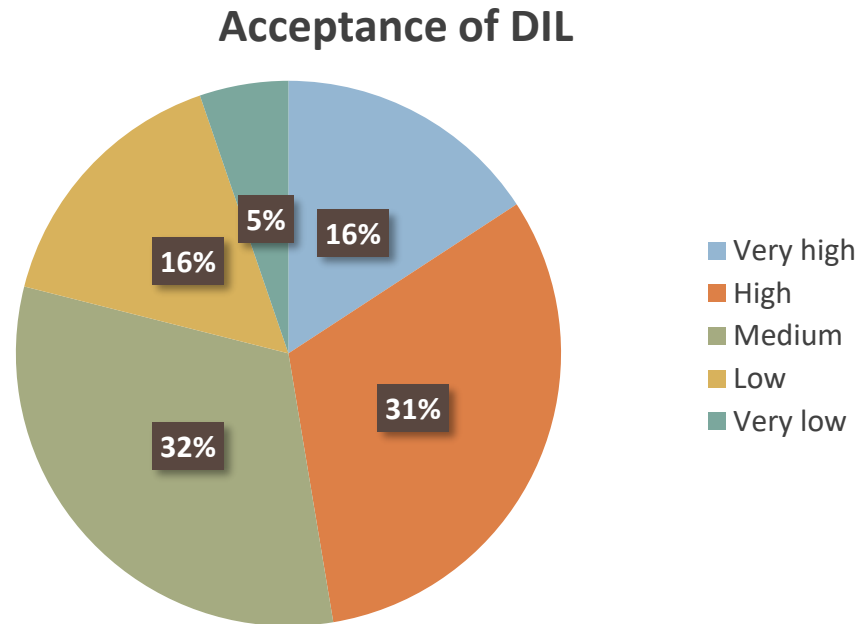
Acceptance captures to what extent the main organization absorbs the work of the DIL. Only if the innovations and activities of the DIL are accepted in the main organization, a DIL can be a success. This outside acceptance varies, with about half of the DILs struggling with low acceptance. Acceptance often results from the perceived value and the cost/benefit relation of innovations. Although there are quantitative measures of acceptance, DILs operate in an environment where acceptance tends to be measured qualitatively. Thus, opinion about the DIL is driven by people and may change quickly. DILs can increase acceptance by investing in transparency, communication, and active engagement. Often the power of catchy explanations is underestimated – a few clear innovations, even if they are only "quick wins," are more helpful than research projects that are big, but vague.

Management Recommendation   See Appendix for details about the metrics.

Acceptance in the main organization needs intensive explanation, and it depends on how well DILs communicate about their work. Investing in communication increases acceptance, and engaging colleagues builds trust in the digital innovation. To gain acceptance, DILs should be proactive.

Multilevel Outcomes

Outcomes are complex and visible on multiple levels

Firm level - Organizational learning -	With the help of DILs, firms learn about new technologies, new business models, and the digital transformation of their industry. With DILs, firms change their culture and open up to bottom-up innovation and cross-functional work. Innovation plays a new role in firms with DILs; in particular, organizational learning about digital innovation is triggered. New ideas generated and tested by the DIL provide a fresh source for ideas and bring the firm up to speed. On the basis of these ideas, DILs develop innovation, focus on customer-centricity, and provide new revenue streams and new growth potentials for the firm.
Unit level - Organizational culture -	The different business units use the DIL as a partner to co-develop digital innovation and collaborate on solutions for their problems. Some firms make it mandatory for any innovation project to involve the DIL in order to receive feedback and test ideas quickly. DILs trigger cultural innovation awareness and provide outside-the-box thinking about longstanding problems. The units learn from the DIL how to deal with failure and embrace errors. To intensify the collaboration, permanent job rotations link the units of the main organization to the DIL – ideas and innovations are transferred with the employees to minimize problems during handovers.
Employee level - Skill development -	Employees working in the main organization can be transferred to the DIL to experience new working methods, learn about digital technologies, and provide expert knowledge of the firm's products and services. Hence, the outcomes of the transfer are always two-sided: employees contribute their expertise and ideas to the DIL's innovation activities, and the DIL engages the employees in digital innovation projects. The transfers enable DILs to recruit multiplicators and sometimes even product owners from the main organization. The employees of the DIL are typically intrinsically motivated and find their purpose in innovation – the impact of their innovation activities is the main impetus.

Management Recommendation

Outcomes of the DIL should not be reduced to one level or the physical or digital products/services of the DIL. In all cases, we observed multi-level outcomes – these are the drivers for the success of the DILs. Thus, the management should take care to exploit the full potential on all levels.

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Digital Innovation Labs Research Projects

Our academic research inserts DILs into the Information Systems literature

Academic research

Theoretical concepts

- Rather conceptual and causal questions
- Theoretical models as basis
- Aim to extend existing theories

Systematic investigation

- Structured data collection and analysis
- Causal connections of insights
- Generation of generalizable findings

Generation of new knowledge

- Findings generally made public
- Assessed through peer review
- Journals or conference publications

The following pages give an overview about the initial academic insights that we generated from the DIL case study series. Each of the following pages gives a short summary of a research paper, some of which have already been published. The papers focus on the topics of knowledge management, knowledge recombination, organizational ambidexterity, and translocational transfer of people. If you are interested in any of these papers or in further details about our research, please do not hesitate to contact us.

How DILs facilitate knowledge recombination

Knowledge is widely regarded as a crucial organizational resource. In the pursuit of novel solutions to problems, firms recombine knowledge and resources in different ways. The digitalization of entire industries creates new challenges, requiring firms to engage with different and new areas of knowledge. To do this, numerous firms set up DILs, which are viewed as a promising approach to the current challenges of transformation in a digital environment. To uncover how DILs facilitate knowledge management and recombination, we conducted several case studies in different industries. Our results show how knowledge enters the DIL, how it is applied and recombined, and how it is exchanged between units. We identified **six key mechanisms** that DILs use to meet the challenge of knowledge management and innovation in a digital era.

Knowledge management helps to overcome typical hurdles such as miscommunication and a general misunderstanding of the objectives of the DIL.

Mechanism	Level of influence: How is knowledge …		
	… brought into the DIL?	… integrated and recombined?	… exchanged between units?
Liaison employee	Can share cross-functional knowledge. Is able to identify necessary knowledge elsewhere.	Translates between different knowledge domains. Is able to understand/identify customer pain points.	Has an overview and can connect the right units. Understands the big picture and the potential of successful realizations.
Workshops	Cross-functional knowledge is communicated to other unit members.	The process of preparing knowledge for workshops requires making it explicit and accessible for cross-boundary communication.	Knowledge is communicated across unit boundaries. Insight is provided into work of the unit.
Knowledge aggregation	Empowers employees to acquire knowledge from other areas of expertise.	Creates an incentive to combine available knowledge with new and different knowledge.	Creates an incentive for units to cooperate with units from outside their own area of expertise.
Small teams	Employees are hand-picked for the DIL and bring in their diverse knowledge.	Everyone sits at "one" table to allow efficient sharing of knowledge.	Agile working practices enable the sharing of knowledge beyond the boundaries of the team.
Rotation	Employees bring their knowledge and experiences from their current position into the DIL.	People are encouraged to connect, network, and collaborate with other people.	People go back to their actual position and can report about the DIL's project.
Exploration	Diverse knowledge is leveraged to explore the opportunities created by digital technologies.	Knowledge of digital techno-logies is advanced by being integrated and recombined.	Frontier knowledge is transferred across domains.

Management Recommendation

To successfully produce digital innovation, firms must acquire and combine knowledge from different areas of expertise. DILs can use six key mechanisms to acquire knowledge, integrate and recombine it, and exchange it between different units within the firm.

Research Project II: Knowledge Recombination

How DILs acquire and recombine knowledge

In this paper, we investigate how DILs acquire different types of knowledge and how these types of knowledge are recombined during the course of a project. Our results highlight the need to distinguish between different types of knowledge, and we identify 44 mechanisms used to acquire certain types of knowledge. Most importantly, we uncover **five paths of knowledge recombination**, which allow us to develop seven propositions that address the specific roles and effects of each type of knowledge involved in recombination. Thereby, we take a first step towards untangling the paths of knowledge recombination, and we identify new avenues for future research on knowledge recombination and digital innovation.

We show how different knowledge types are acquired and recombined for digital innovation.

There are five paths to recombining knowledge, depending on the type of knowledge involved (see right).

Conditional knowledge
provides contextual insights about *when* to apply something (such as technologies, strategies)

Recombination of declarative, procedural, and causal knowledge

Digital Innovation Outcome

Path 1: Declarative → Causal → Procedural → Implementation of 3D printers and augmented reality to increase efficiency

Path 2: Causal → Declarative → Procedural → Development of an app to automate check-ins and increase satisfaction

Recombination of causal and procedural knowledge

Path 5: Causal → Procedural → Development of new machine learning algorithms with higher success rate

Recombination of declarative and causal knowledge

Use Case Identification without Implementation

Path 3: Declarative → Causal → Introduction of virtual reality solutions to counteract processual dangers

Path 4: Causal → Declarative → Identification of problems and potential solutions. No outcome yet.

Relational Knowledge
provides contextual insights about how things interact *with* each other (such as objects, processes and/or people)

Management Recommendation

Depending on the goal, a firm can use different mechanisms strategically to acquire specific types of knowledge (declarative, procedural, causal, conditional, relational). These types of knowledge enable distinct paths of recombination, which can result in digital innovation.

Research Project III: Enabling Ambidexterity

How DILs enable ambidexterity to develop digital innovation

There is limited knowledge of how DILs develop digital innovation. To understand how they enable ambidexterity and, thus, develop digital innovation, we conducted an analysis at firm level as well as at unit level with 20 interviews to provide deep insights into the organizational design of a DIL. We uncover the design features of DILs and show how they enable ambidexterity. These findings allow us to explain how DILs develop digital innovation. Furthermore, we find that DILs provide a **new way to achieve ambidexterity**. We discuss our findings in light of the ambidexterity and digital innovation literature.

The research project uses six dimensions to show how ambidexterity is achieved through DILs and how each dimension leads to different ambidexterity outcomes.

Success of the outcomes of DILs builds on three pillars: Acceptance is built through the added value of the innovation; Technical functionality builds trust and people start to adopt the innovation; Reintegration into the main organization ensures the long-term ownership of the developed innovations.

	DIL features	Ambidexterity outcome
Motivation and vision	• Exploration of the digital business landscape • Using insights to develop new digital innovation	• Exploration focuses on digital innovation and leveraging the potential of digitalization
Setup and alignment	• A separate and dedicated unit without interference • Temporarily moved, internal people are co-located in the DIL	• A separate team for exploration that is also linked to the main organization (exploitation)
Governance	• Close link to the strategy unit to be aligned to the top management • DIL committee aligns and orientates the projects	• Exploration is linked to the strategic needs of the firm and complements the exploitation efforts
Employees and staffing	• People work in agile, autonomous, and cross-functional teams • Teams are small and organized on SCRUM principles	• Exploration benefits from various backgrounds, experiences, and knowledge
Operations	• Work is organized based on daily meetings, and feedback is utilized • Trends are directly transferred into prototypes and tested	• New insights of the exploration are iteratively developed and tested early
Culture	• Changes are valued and seen as new opportunities • An informal, direct, and innovation-open culture is propagated	• Exploration is not only valued in the form of innovation but also as a new culture

Management Recommendation

Firms can use DILs to achieve ambidexterity – implementing DIL features unlocks different ambidexterity outcomes. To make ambidexterity successful, firms have to focus on the acceptance of the innovation, its technical functionality, and its smooth reintegration into the main organization.

How DILs are used to achieve translocational ambidexterity

This paper analyzes data collected from DILs to determine how they contribute to organizational ambidexterity. We find that DILs consist of people temporarily transferred from the main organization to the DIL to ensure synchronization between exploration and exploitation. Our analysis reveals that existing forms of ambidexterity do not adequately address typical issues and tensions stemming from the introduction of digital innovation activities. To better address these concerns, we recombine elements of existing forms of ambidexterity and propose **translocational ambidexterity** as a new, contextualized form of ambidexterity.

Translocational ambidexterity manages the trade-off between exploration and exploitation by connecting the two through the translocational transfer of people between a unit of exploration and units of exploitation. Thus, translocational ambidexterity has specific organizational requirements which build on a dedicated organizational unit for exploration and a main organization which deals with exploitation.

Translocational ambidexterity enables full-time dedication to exploration, so that employees can leverage the potential of digital innovation and acquire the necessary knowledge quickly.

	DIL	Transfer	Main organization
Firm	Explore novel ideas and make digital technologies tangible and usable	Intertwine exploration and exploitation activities by transferring people	Provide the foundation for the DIL and incorporate ideas from the DIL
Unit	Dedicated unit for exploration and organizationally separated	Mix of people creates a unique unit and vibrant collaboration with units in the main organization	The business units dispatch to the DIL and receive help in innovating
People	People are staffed internally and bring various experiences, expertise, and skills	People are temporarily transferred between the DIL and the main organization	People have their home base in the main organization and are selected for the DIL

Ambidexterity

Exploration
- Exploring new technologies with a mixed team
- Digital technologies selected based on business needs and adapted to the demands of the business
- Time lag between exploration and subsequent exploitation is reduced by incorporating exploitation expertise into the innovating and

Exploitation
- High fit between innovation and business need increases success of the innovation
- Reduced integration costs and efforts by infusing groundwork on innovations in the exploitation
- Widespread infusion of innovations for firm-wide adoption to maximize benefits

Management Recommendation

The temporary transfer of people offers great potential for firms aiming to overcome current concerns in innovating as well as to balance exploration and exploitation. Translocational ambidexterity can integrate and thus outdistance existing forms of ambidexterity in the context of digital innovation.
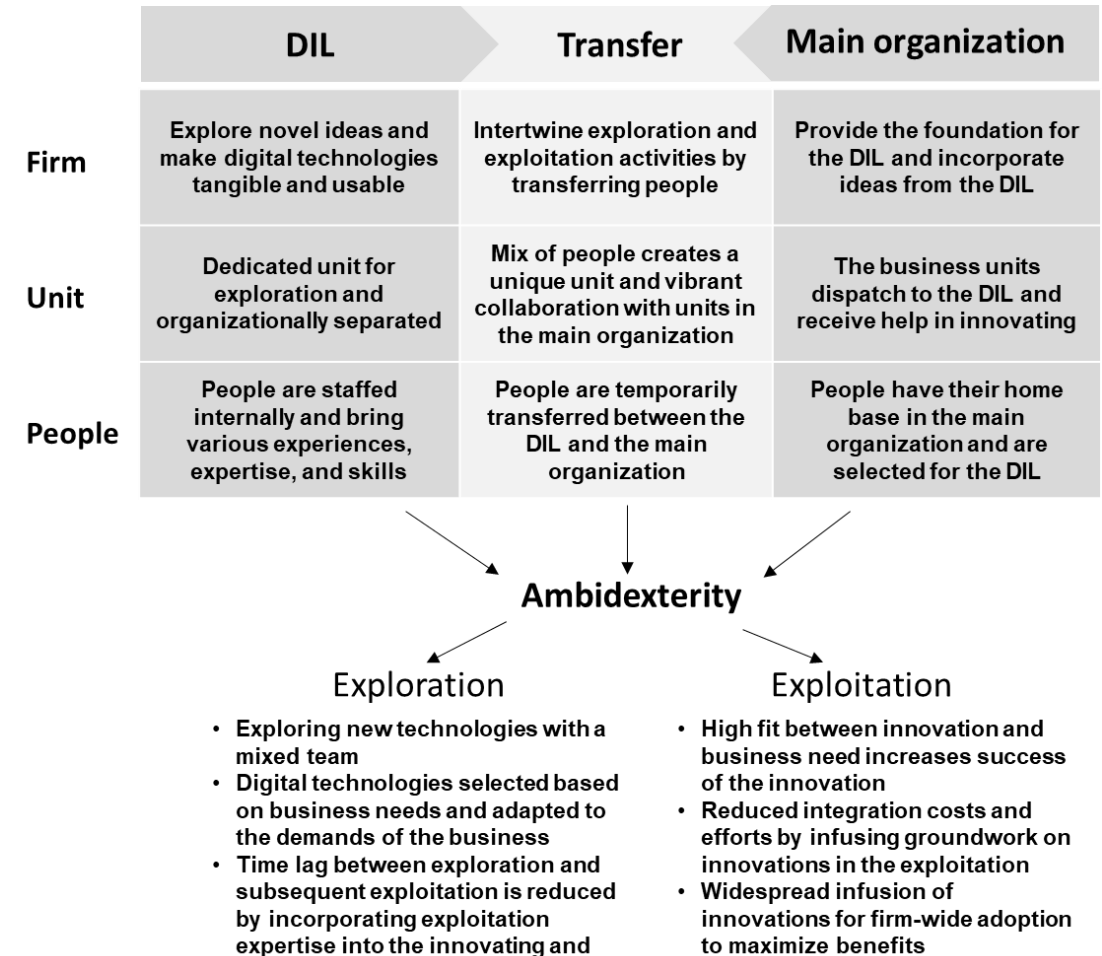
Digital Innovation Labs Report 2020

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Conclusion

DILs can accelerate digital transformation – but *it ain't no sure-fire success*

Our recommendations

Setup
Reduce old ties to minimize the risk of firm legacy. Set up small units to reduce the financial investments and ensure flexibility. Focus on few topics for faster results. Create autonomy by providing a dedicated budget.

Outcome
Value all forms of outcomes of the DIL. Make intangible or qualitative outcomes visible and market them. Gain acceptance though workshops and communication. Highlight the positive impact on different levels of the firm.

Strategy
Define a strategic focus to provide guidance and derive concrete goals to align actions. Always look at the innovation from start to end and incorporate all types of innovation. Stay in sync with the HQ for support.

Process
Cover the entire innovation process from first idea to successful market offering. Incorporate ideas from all employees and then integrate innovations into the main organization. Rotate employees in and out of the DIL.

Governance
Select somebody with long experience in the firm and with a broad network as head of the DIL. Select staff based on expertise and motivation, not availability. Mix different skills and backgrounds. Let the DIL be independent and connect it with external partners.
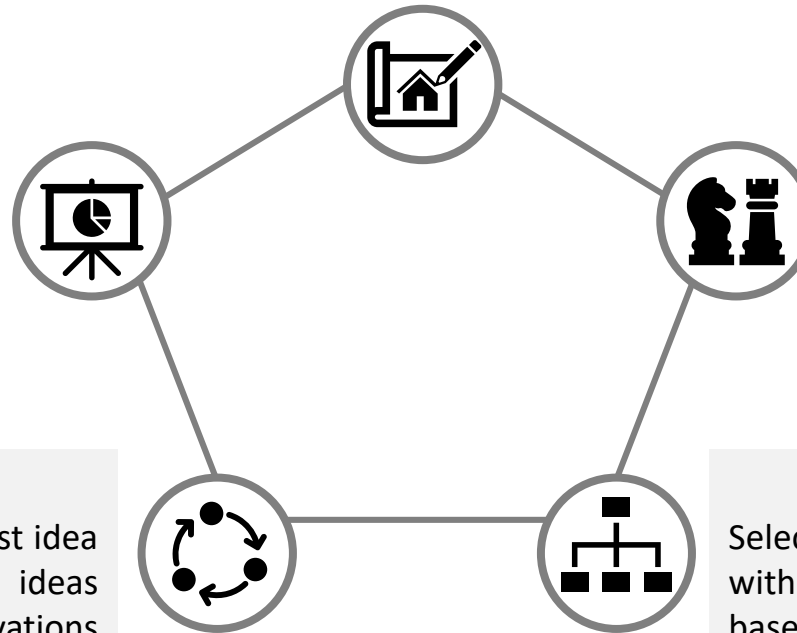
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Appendix – Measurements of the metrics

The following slides provide an overview about how we measured each metric. The majority of the metrics represent qualitative measurements. For all metrics, a simple and transparent evaluation scheme was used: We interviewed all interviewees of each DIL and transcribed all interviews. We applied 'in vivo' coding to find the appropriate categories for the metrics in our data or we applied 'a priori' coding where categories have been available either through previous rounds of coding or extant theoretical frameworks. In some cases, we combined both coding methods to make use of iterative validations. Subsequently, we were able to categorize each case according to the measurements of the metrics and created graphs accordingly. The process has been done by at least two of the authors to ensure high quality of data analysis and consistency of our findings.

Metrics I

Setup

Section	Slide	Metric	Explanation
Setup	12	Industry	Covers the industry in which the firms are active.
Setup	12	Founding year	The founding year of the DIL was directly reported by the interviewees.
Setup	13	Origin	States the origin of the DIL as a new unit by highlighting the unit from which the DIL emerged. The history of each DIL was explained by the interviewees and allowed us to identify the origin of the DIL. The DIL is either a new unit or has emerged from a different unit or sub-unit.
Setup	13	Number of employees	The number of employees is measured as the number of FTEs actively working in the DIL as reported by the interviewees. The number excludes short-term temporary employees, employees interacting with the DIL, and any external people.
Setup	14	Number of topics	The topics of the DILs describe the main areas of their activities such as actual projects or day-to-day activities such as marketing, communication, and trainings. The number of topics was counted according to the different activities of the DILs which the interviewees were asked to enumerate and explain.
Setup	14	Number of teams	The number of teams was determined from the interviewees' description of the inner-organizational structure of the DIL. Teams usually cover three to 20 employees.
Setup	15	Origin of DIL budget	The budget indicates the main financing resource the DIL relies on. The origin of the budget was determined by analyzing the financing of the DILs' projects and cost centers of the DILs' employees. We coded all relevant statements for each case, analyzed all coded statements regarding their impact on the overall budget of a DIL, and identified one major or if applicable the two major origins for each DIL – multiple responses were possible.
Setup	15	Internal communication channels used	The communication channels describe different channels the DILs use to communicate with the main organization or associated external partners. The channels were reported by the interviewees and have been coded during the analysis. We summarized the codes to eight categories and identified the relevant categories for each case – multiple responses were possible.

Metrics II

Strategy

Section	Slide	Metric	Explanation
Strategy	17	Purpose of the DIL	The purpose of the DIL represents the main motivation of the firm to found the DIL. Importantly, the purpose was set by the firm (and not by the DIL itself). The evaluation is based on the motivations of the firms as reported by the interviews and was coded during our analysis based on emerging codes from the interview data, triangulated among all three interviewees belonging to the same case.
Strategy	18	Main goal	To determine the main goal of each DIL we collected all statements of the interviewees regarding the key objective of all activities of the DIL. We summarized the statements for each DIL to derive one *main* goal and developed six categories across all cases that emerged from our data.
Strategy	18	Are goals made concrete?	Binary metric that states if the DIL has managed to put the goal in written form or presented them in the intranet, strategy outline, or any similar form of communication. If one of these measures was mentioned by the interviewees of the DIL we considered the goals of the DIL to be concrete.
Strategy	19	Exploration vs. Exploitation	This area of tension states in percent how much the DIL focuses on exploration or exploitation. We coded the activities of the DILs regarding exploration or exploitation and subsequently analyzed the distribution of codings regarding the two dimensions.
Strategy	20	Impact of the innovation	During our analysis, we found that DILs create an impact through the technological innovation they produce or by how they change the culture of the firm. Technological innovation is characterized by innovation in products and services based on the usage of digital technologies including prototypes or tested ideas, whereas cultural change is about mindset change or new routines and methods. We coded whether the impact of the DIL is recognized by the main organization through one of the two forms or through a mix of them.
Strategy	20	Degree of innovativeness	The degree of innovativeness is represented by radical and incremental innovation. Radical innovation is about revolutionary, new outcomes which lead to big changes. Incremental innovation is less risky and rather evolutionary which lead to small changes. We assigned the planned and current activities of the DILs along with the resulting outcomes to the two forms of innovation.
Strategy	21	Location	The location states how close or distant the DIL is geographically located from the main organization (or: headquarters (HQ)). If the DIL is in the same building or onsite, it falls into the category "on site"; if the DIL is in the same city, it is "close to HQ", and "far from HQ", otherwise. The location of the DIL was documented by the physical visit of the researcher team.
Strategy	21	Decision power of the DIL	The decision power represents how much freedom the DIL has in its decision-making. High decision power is characterized by full control over its actions, the budget, allocation of resources, and projects. Low decision power is characterized by a lot of interferences by the main organization, decisions have to be approved by the management of the firm, or any formal approval process. Statements of the interviewees were coded accordingly and DILs are categorized based on the category (high, medium, low) with the most statements.

Metrics III

Governance

Section	Slide	Metric	Explanation
Governance	23	Origin of the head of the DIL	States the previous position of the head of DIL before joining the DIL, which was reported by the interviewee him/herself.
Governance	23	Head of the DIL reports to	We analyzed the reporting lines of the head of the DIL and the head's counterpart in the main organization. We collected all positions or boards the heads in our sample report to. We summarized all the evidence we collected from the different interviews per case to one reporting counterpart.
Governance	24	Main source of DIL employees	DILs start as very small units and new employees join either from internal (inside the firm) or external (outside the firm). We analyzed the background of most of the employees for each DIL and categorized the DIL accordingly. Additionally, DIL can recruit new employees from internal and external sources – multiple responses were possible.
Governance	24	DIL employees' skills	DILs work with a diverse set of employees and the employees bring along bring different skills. Technology experts provide skills concerning the usage of digital technologies, coaching/methodology covers skills about how to develop innovation and apply technologies during the innovation process, and business domain covers the skills regarding the firm's product and service portfolio. We analyzed the skills of most of the employees for each DIL and categorized the DIL accordingly – multiple responses were possible.
Governance	25	Dependency on other units	DILs collaborate with different units. Often a dependency is created due to needed coordination or due to the provision of resources, employees, or technology. Sometimes the dependency can also be due to political reasons or to ensure quality standards (e.g., legal, compliance, IT). We aggregated all major dependencies as reported by the interviewees – multiple responses were possible.
Governance	25	Closeness to IT and Business	Closeness reflects an aggregated measure that combines the following factors: (1) the share of employees in the DIL originating from IT or business units, (2) the share of DIL employees having an IT background/education vs having a business background/education, and (3) organizational reporting line (head of the DIL reports to the head of the IT division or to the head of the business division). We scored each DIL on a scale between 0 and 100 for IT and business based on the listed factors.
Governance	26	Level of external support	How much support is coming from outside of the firm compared to the overall support from in- and outside the firm? The metric is measured by the number of external employees in a project, the number of working hours provided by external partners to the DIL, the level of support projects needed from external partners, and how dependent the DIL is on resources or skills of the external partners. We coded the interviews with regard to the a priori categories (high, medium, low) and categorized each DIL accordingly.
Governance	26	External support	DILs collaborate with different external partners. The partners can provide new or additional expertise. Often a DIL collaborates with more than one external partner. We aggregated all major collaborations with external partners as reported by the interviewees – multiple responses were possible.

Process (1/2)

Section	Slide	Metric	Explanation
Process	28	Focus areas of the innovation process	All DILs work on innovation. However, the focus areas differ, and we coded all relevant focus areas for each DIL. We summarized the statements for each DIL to derive one main focus and developed four categories across all cases that emerged from our data. If there is 'nothing specific' the DIL usually failed to determine any particular focus.
Process	29	Innovation process	The metric states in which stages of the innovation process the DIL is involved. The innovation process is explained on slide 29. We coded all activities of each DIL along the process and registered if the activities fall within the different stages.
Process	30	Origin of new ideas	This measure ranks early-stage innovations by their source of origin and reflects the source of origin with the highest number of these early-stage innovations. There are three categories: ideas originate from inside the DIL or from outside – if the ideas are from outside, they are either from the business or IT unit. Based on coded segments we determined the one or two most mentioned origins.
Process	30	Methods for idea generation	The methods for idea generation state the different techniques the DIL applies to generate new ideas. We analyzed the DILs behavior during the first stages of innovation process around ideation. We coded all different methods and aggregated all major methods applied as reported by the interviewees – multiple responses were possible.
Process	31	Mechanism for integrating innovations in the main organization	The last stage of the innovation process ensures that innovations do not remain in the DIL (the innovation unit) but actually make their way back into the main organization. In the main organization the innovations are adopted, and employees start to focus on the exploitation. The metric states which mechanisms are used to achieve the transfer of innovations from the DIL to the main organization. Two out of six responses focus on the transfer of employees as a vehicle to integrate innovations (transferring people and anchor person). Roadshows and joint workshops involve employees from both side and aim to integrate innovations through collaboration. We coded all different mechanisms and aggregated all major mechanisms applied as reported by the interviewees – multiple responses were possible.
Process	31	Innovations are integrated in different units in the main organization	Integration of innovation refers to transferring responsibility and to anchor the further development in the main organization. The metric states to where the innovation is transferred once the DIL has completed its part of the innovation process. Comparing the cases, we identified three categories: no structured integration, integration in the product unit, or integration in the IT unit. The statements of the interviewees are coded according to the three categories and DILs are categorized based on the category with the highest number of statements.

Process (2/2)

Section	Slide	Metric	Explanation
Process	32	Content of the DILs' workshops for the main organization	Workshops are a common way to transfer innovation. They are often organized by the DIL and involve creative workshop formats. The content of the workshop can categorize in two areas: First, knowhow of methodology covers new work methods and can often be applied to further innovation or even to improve existing products (such as design thinking or rapid prototyping). Second, the DIL focuses on presenting new technologies behind the innovation and explain further applications of these technologies. We coded the content of the offered workshop to the two categories and DILs are categorized based on the category with the highest number of statements. In cases where no workshops are offered, we assigned the category "no workshops used".
Process	33	Intensity of employee transfer	The intensity of employee transfer states to which extent employees that are entering the DIL are involved in DIL activities relative to their involvement in their actual job and also how involved DIL employees in the activities in the main organization. High intensity is characterized by longer transfer periods (up to three month) and a structured transfer program where employees can apply or employees can be nominated for the program. Low intensity is characterized by very few exchange and employees only transfer for one or two days. Statements of the interviewees were coded accordingly and DILs are categorized based on the category (very high, high, medium, low, very low) with the most dominant transfer activity as reported by the interviewees. Interviewees were asked which activities are most important for them to enable employee transfer.
Process	33	Structured program for employee transfer	Structured program are designed either by the DIL or the main organization happens regularly. Often a dedicated budget is reserved for the program and no cost are occurred for the different units. The structured program also allows employees to be exempted from all other tasks and employees can focus fulltime on their "new" task and responsibilities. The metric states whether the DIL or the main organization has or has not implemented a program as described above.
Process	34	Main direction of employee transfer	The main direction of employee transfer states in which direction regularly established employee transfer takes place. We coded all transfers as stated by the interviews regarding the two directions: main organization to DIL or DIL to main organization. DILs are categorized based on the direction with the highest number of statements. If we found that both directions of the transfer are actively used by the DIL and main organization and the number of statements was close to even, we categorized the DIL as "both directions".
Process	34	Incentives for employee transfer to DIL	The incentives for employee transfer to DIL states which incentives exist for employees outside of the DIL to engage with the DIL and take part in an employee transfer program. We coded all different incentives and aggregated all major incentives used as reported by the interviewees – multiple responses were possible.

Metrics VI

Outcome

Section	Slide	Metric	Explanation
Outcome	37		Digital opportunities, digital collaboration, and digital awareness are measured in relative numbers. To determine the score for each DIL, we counted the coded segments and created a relative measure with five levels (very high, high, medium, low, very low). The applied coding criteria for digital opportunities, digital collaboration, and digital awareness are listed below.
		Digital Opportunities	For digital opportunities we coded based on the following criteria: new products based on digital technologies, tested ideas, ideas at early stages of the innovation process, newly acquired knowledge about technologies, new solutions to problems, and application of digital technologies. Digital collaboration captures outcomes that improve the product or service portfolio.
		Digital Collaboration	For digital collaboration we coded based on the following criteria: work behavior and routines, partnerships, out-of-the-box thinking, methods and tools, and collaboration tools. Digital collaboration captures how and to what extend DILs apply innovative work methods and techniques between different teams and units.
		Digital Awareness	For digital awareness we coded based on the following criteria: business impact, technology, innovations, knowledge base. Digital awareness captures how good the DIL is able to attract attention and channel the attention to the importance of digital innovation.
Outcome	38	Acceptance of DIL	Acceptance of the DIL captures how the DIL is perceived in the main organization. If the perception is predominantly positive the DIL is accepted. Thus, acceptance often goes hand in hand with the perceived value or the cost-benefit ratio the DIL has. Furthermore acceptance depends on whether expectations are met and if promises are kept. We coded all statements that present a positive association of the DIL – the more statements we found the higher we rated its acceptance. Again, we used relative measures with five stages (very high, high, medium, low, very low).