Innovation patterns of Innosuisse applicants

«Evaluation of the Innosuisse survey 2021»
Study commissoned by Innosuisse

Hulfeld F., Spescha A., Wörter, M.

Zurich, 22.02.2023

Introduction

Initial Position

- Second implementation of the survey after pilot project in 2019
  - Adapted questionnaire since last implementation
    - New questions (labeled new below)
    - More extensive questions in other areas (labeled ext below)
    - Dropped questions in other areas (support mechanisms and motives for public innovation support)
- Present study focuses on innovation patterns of Innosuisse firms and does not assess the impact of Innosuisse funding
  - Comparison of Innosuisse clientele with other R&D active Swiss companies follows in the next survey wave 2023
- Topics of the survey
  - Innovation activities
    - Development of innovation activities
    - Risk of innovation activities (ext)
    - Utility of innovation support
  - Innovation promotion instruments (new)
  - International innovation collaboration (new)
  - Novelty and disruption of innovations (new)
  - Impact of the COVID-19 pandemic on innovation activities (new)
  - Sustainable Development Goals (SDG) (new)
  - Innovation and turnover shares of funded firms (new)
- Unless stated otherwise, the results refer to the 2021 survey

Goals of the Study

- **Monitoring** of applicants to Innosuisse's primary funding tools ("Innovation projects" / "Innovation cheques") to track the evolution of their innovation patterns: characteristics, activities, risks and needs
- **Gain a more fundamental understanding** of the reach, effectiveness and evolution of Innosuisse's innovation support and gather more insight into topics of special interest for Innosuisse
- **Input to evidence-based strategic optimization** of funding instruments

Takeaways

Takeaways

(1) Innovation activities keep increasing

- Slightly slower growth in period 2018 to 2020 (55.5%) compared to 2016 to 2018 (62.9%)
- Expected increase in future innovation activities despite COVID-19 pandemic:
  Higher positive expectations for next three years (60.7%), but expectations are lower than three years ago (69.1%)
- **Startups** have the strongest increase

(2) Innovation risks are more pronounced for market implementation than feasibility

- 42% have high or very high market implementation risks
- 32% have high or very high feasibility risks
- **Startups** and **SMEs** have higher market implementation risks
- **Rejected applicants seeking international funding** struggle significantly **more** with **both innovation risks**
- Innovation cheques and projects have identical innovation risks

(3) The innovation support from Innosuisse is highly useful

- **71%** indicate a **high** or **very high** utility in 2021; 78% indicate a high or very high utility in 2019
- **Rejected applicants** drive the slight **reduction** since 2019
- Innovation cheques and projects are equally useful
- Even rejected proposals see the innovation support as useful

Takeaways

(4) Other innovation funding instruments are also well known

- Over 60% are aware of Mentoring and Start-up Coaching
- Around 50% are aware of Swiss Innovation Power (COVID-19), EUREKA and Eurostars

(5) International innovation collaboration is important

- **51% see international companies** as highly or very highly relevant collaboration partners
- 40% see **international research organizations** as highly or very highly relevant collaboration partners
- Key reasons for international innovation collaboration are **product innovations for the international market**, entry to foreign markets, and strategic business relations
- **Startups** have the highest appreciation for international collaboration partners and especially for international companies
- **Startups** mostly seek financing of innovation activities, research partnerships, entry to foreign markets, strategic business relations
- Europe (93%) and especially border countries (Germany 75%, France 25%, Austria 17%) as well as the US (38%) and China (13%) are relevant

(6) Innovations are more often radical than incremental

- **37% say their innovations are radical** while only 25% say they are incremental
- Startups have tendency towards more radical innovations
- SMEs have more radical innovations opposed to large companies
- Companies funded by **innovation cheques** and **projects** have **equal degree of radicality**

Takeaways

(7) Most innovations show some disruption, but to a limited degree

- 58% see their innovations as middle or weakly disruptive, **29% as strongly or very strongly disruptive**
- Radical innovations are more disruptive than incremental innovations but no one-to-one relationship
- **SMEs** are **more disruptive** than large companies
- **Startups** are **more disruptive** than established companies
- The creation of world market novelties is the most common disruptive effect

(8) COVID-19 pandemic (first two waves) influenced innovation activities

- **27% were strongly or very strongly** influenced by the pandemic however 49% felt only a weak or no impact
- Startups and companies with international innovation funding felt the strongest impact
- **Digitization and social innovations** became more important
- The strategic importance of innovations increased and business models were re-invented
- **Collaborations** with companies and research institutions **decreased**
- **Innovation investments** were **negatively affected** by the pandemic

Takeaways

(9) Innovation activities of Innosuisse clientele contribute frequently to the UN's Sustainable Development Goals

- Biggest contributions are within “Industry, Innovation and Infrastructure”, “Good Health and Well-Being” and “Climate Action“
- **51% have a high contribution to at least one SDG** and 20% have only a minor or no contribution to all SDGs
- Most contributions are linked to developed countries
- Startups and large companies contribute the most
- Multiple contributions are common

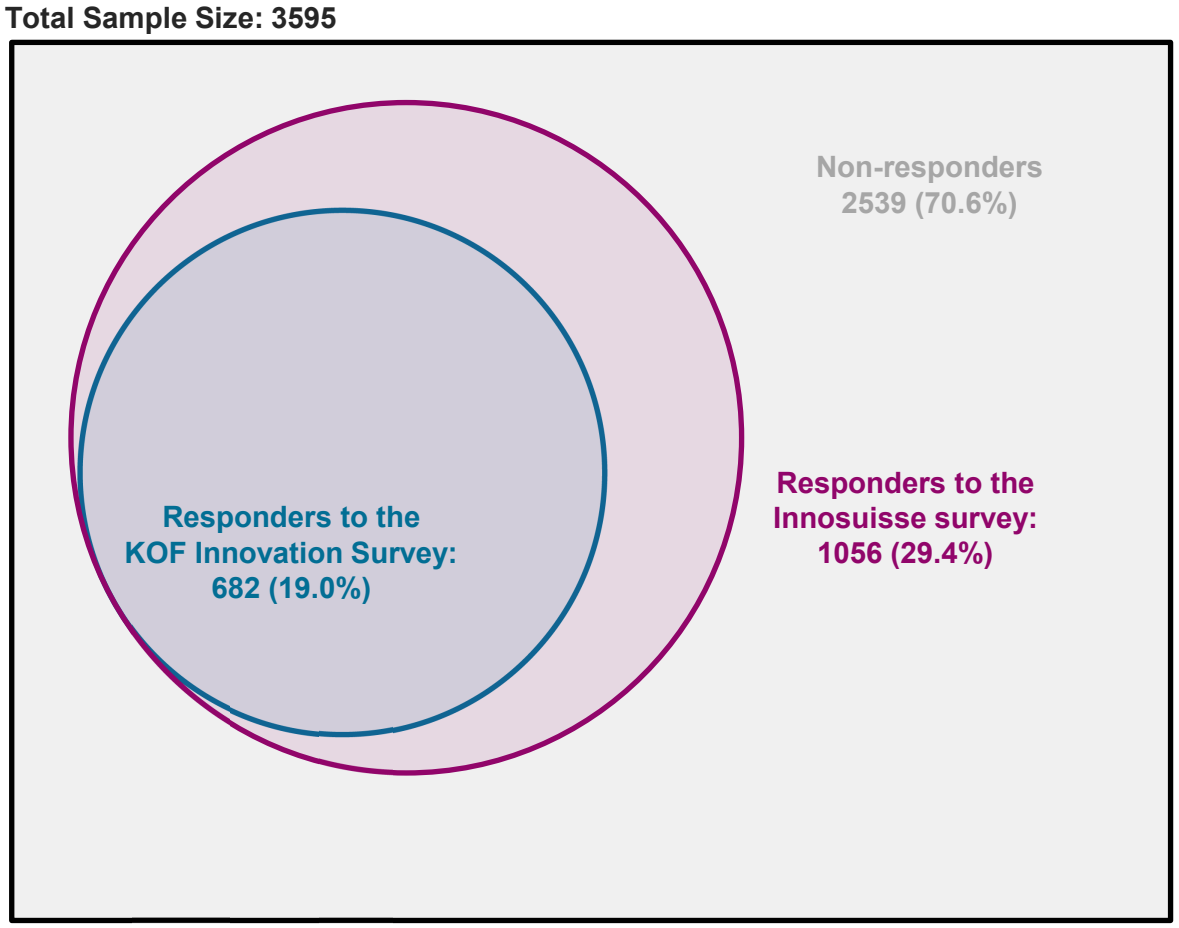
(10) In 2020, the Innosuisse clientele had a higher turnover share from product innovations and especially market novelties

- Companies with approved projects report an average turnover share from product innovations of 51.7%
  - 29.9% from firm novelties, 21.8% from market novelties
- Companies that never applied for Innosuisse funding since 2016 but are R&D-active, report an average turnover share from product innovations of 30.4%
  - 24.7% from firm novelties, 5.7% from market novelties
- Differences do **not** allow any **causal** interpretation (reflect both selection effects and impact of funding)

Sample and Response

Sample composition and response rates

- The total sample size is 3595 and comprises applicants to the two primary Innosuisse funding instruments (“Innovation projects” and “Innovation cheques”) since 2016
  - 2106 observations have an application after the last implementation of the Innosuisse survey in 2019
  - 1489 observations only have applications prior to that
- **Response rates** are substantially **higher** than in pilot project
  - 29.4% (vs. 23.4% in 2019) answer Innosuisse survey
  - 19.0% (vs 11.4% in 2019) answer both Innosuisse survey and KOF Innovation Survey
- Everyone that answered the KOF Innovation Survey also answered the Innosuisse survey
  - explained by the merger of the surveys and precedence of Innosuisse survey

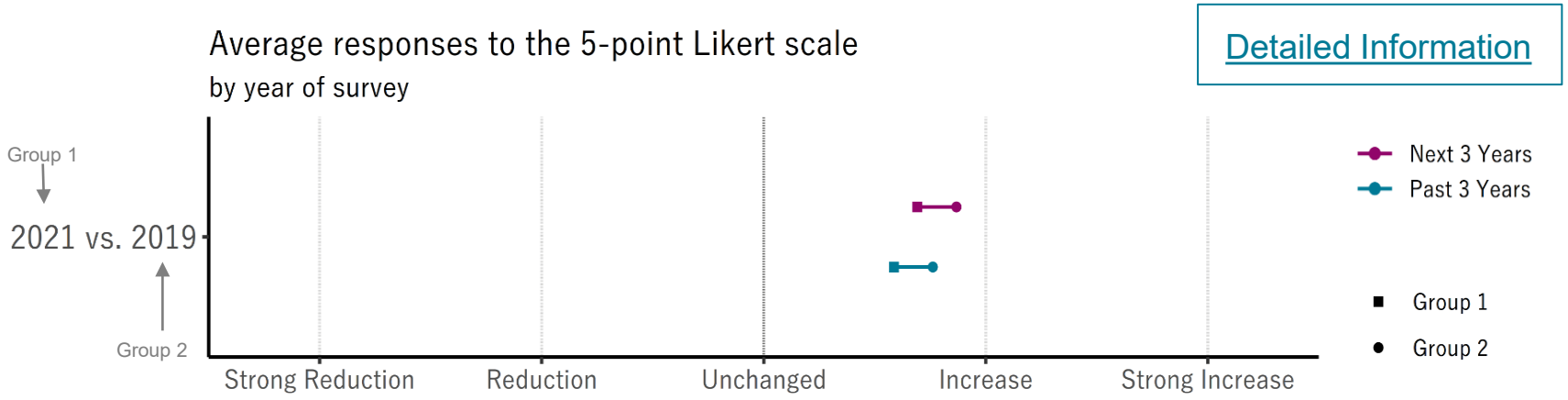


# of cases response rate

Development of innovation activities

Development of innovation activities

Questions: How did the innovation activities in your company develop in the last 3 years?
How will the innovation activities in your company develop in the next 3 years?



Detailed Information

Key findings:

1) Past and expected future developments of innovation activities are **positive**

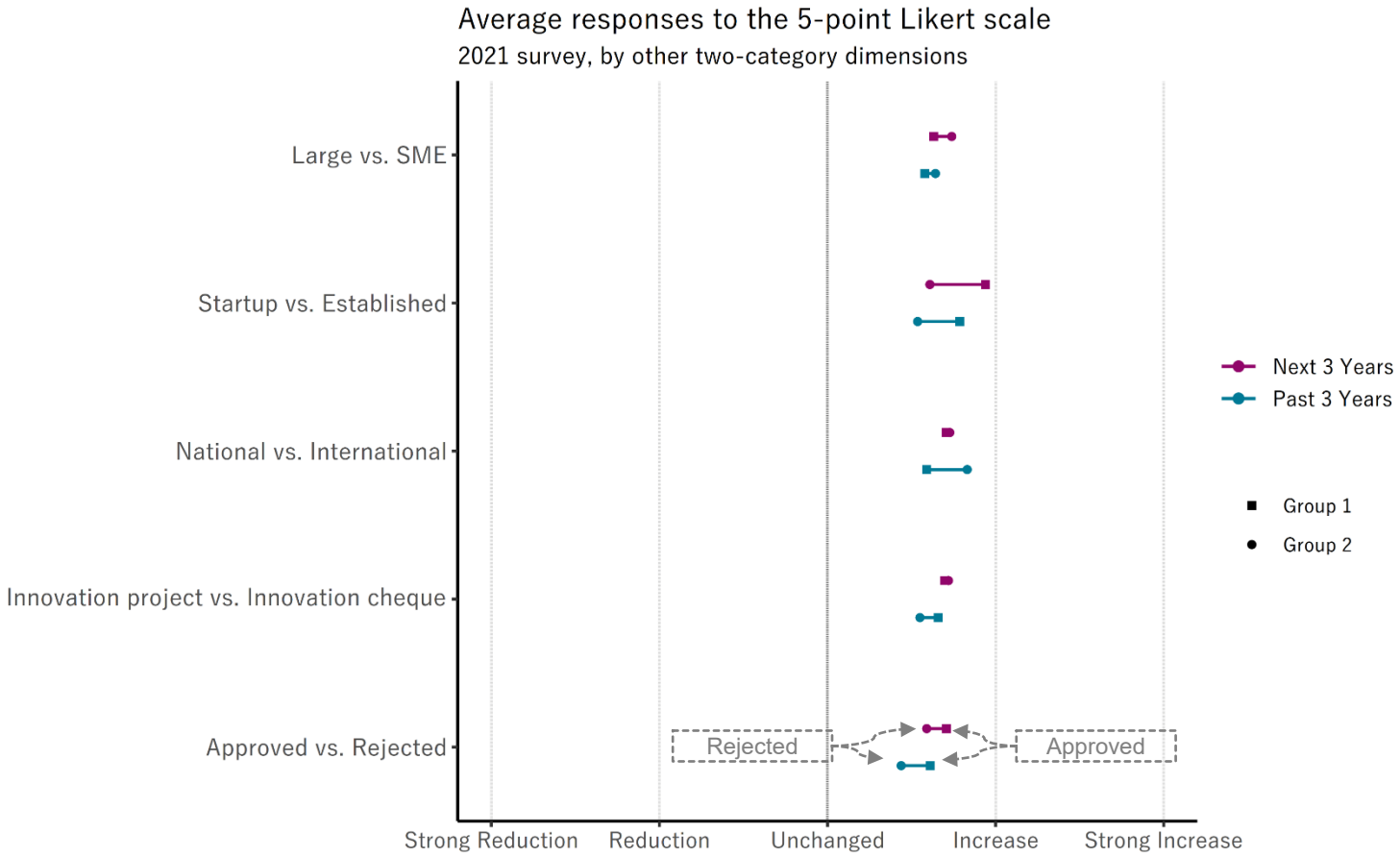
2) Expectations exceed past developments

3) Reduction in past and expected future innovation activities **for 2021**

4) Large **discrepancy** between **2019 expected** future and **2021 realized** past developments

Development of innovation activities

Questions: How did the innovation activities in your company develop in the last 3 years?
How will the innovation activities in your company develop in the next 3 years?



Key findings:

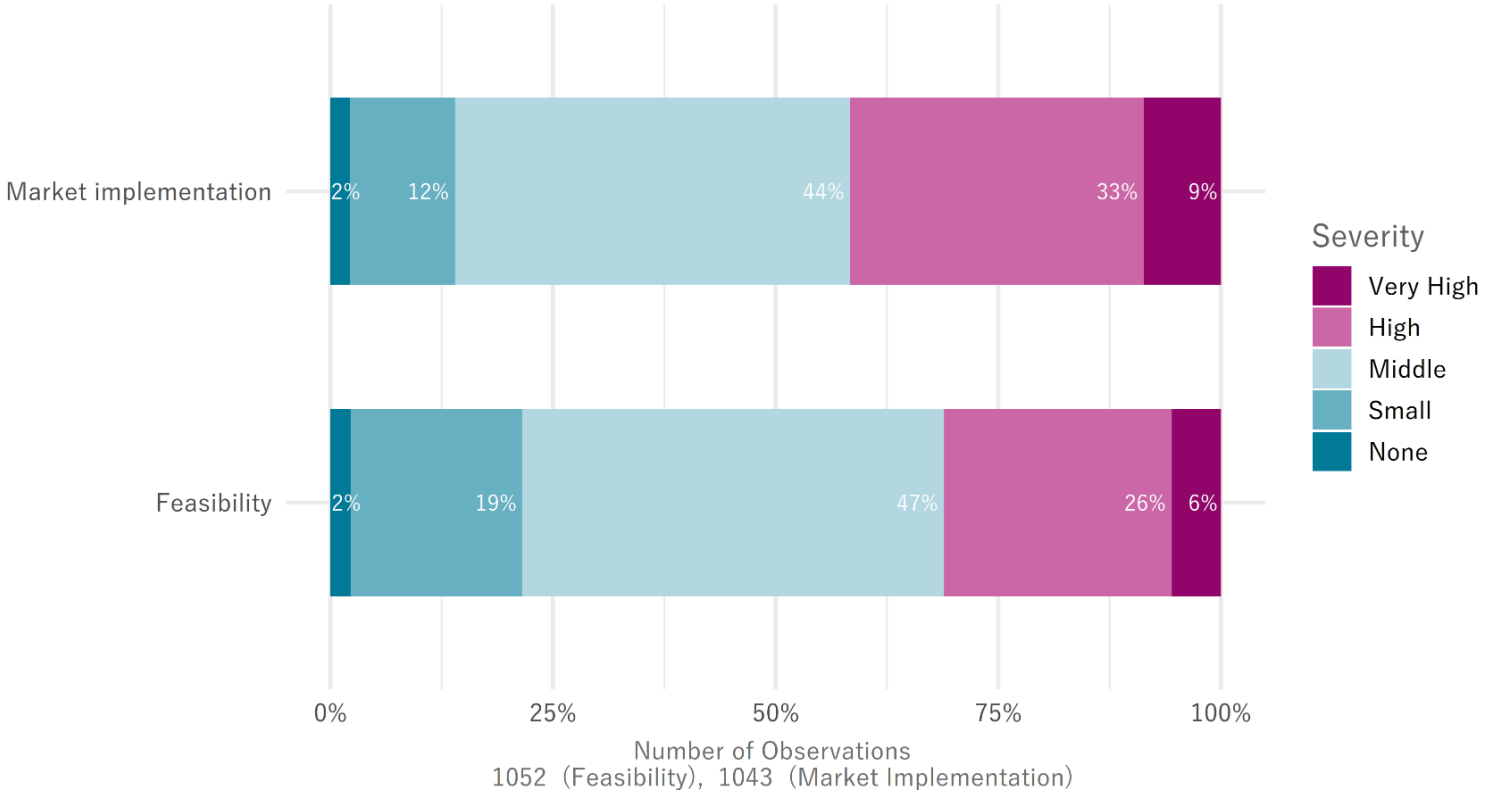
1) The average response is **always positive** irrespective of the subgroup
2) **Most** groups are **not significantly different** in their assessment of the past and expected future developments
3) Companies with **approved proposals** had **better** developments in the last 3 years opposed to those with **rejected proposals**
4) Companies with **international** funding had a **better past** development than those with national funding
5) **Startups** have both **better past and** expected **future** developments than established companies

Risk of innovation activities

Risk of innovation activities

Questions: How high are the R&D and innovation risks of your company related to **feasibility?**

How high are the R&D and innovation risks of your company related to **market implementation?**



1) Innovation **risks exist** for almost everyone
   - Only 2% see no risks in the feasibility or market implementation of innovations

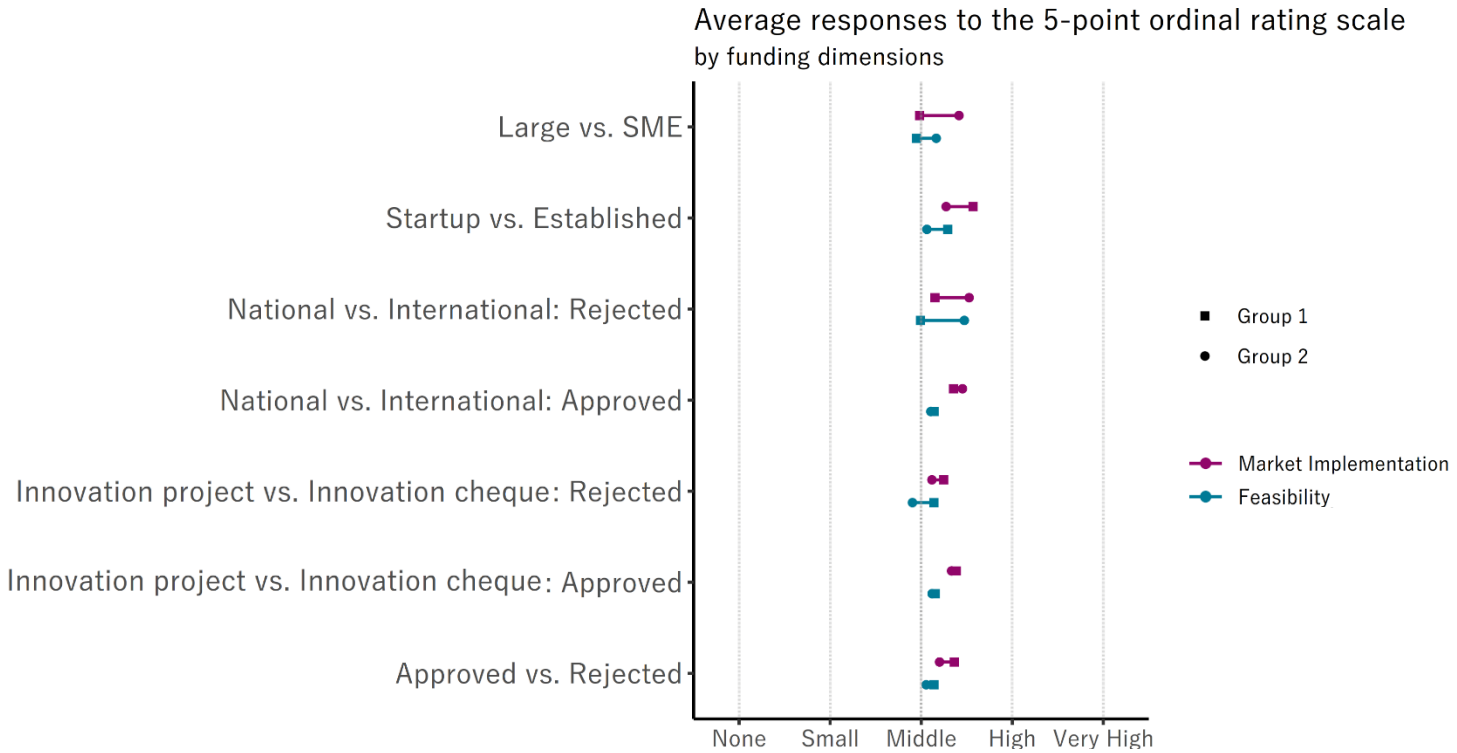
2) Market implementation is a **more prevalent** risk
   - 42% of respondents have high or very high market implementation risks
   - 32% of respondents indicate high or very high feasibility risks

3) Most companies assess both innovation risks as **middle**
   - 44% of respondents indicate that for market implementation risks
   - 47% of respondents indicate that for feasibility risks

Risk of innovation activities

Questions: How high are the R&D and innovation risks of your company related to **feasibility?**

How high are the R&D and innovation risks of your company related to **market implementation?**

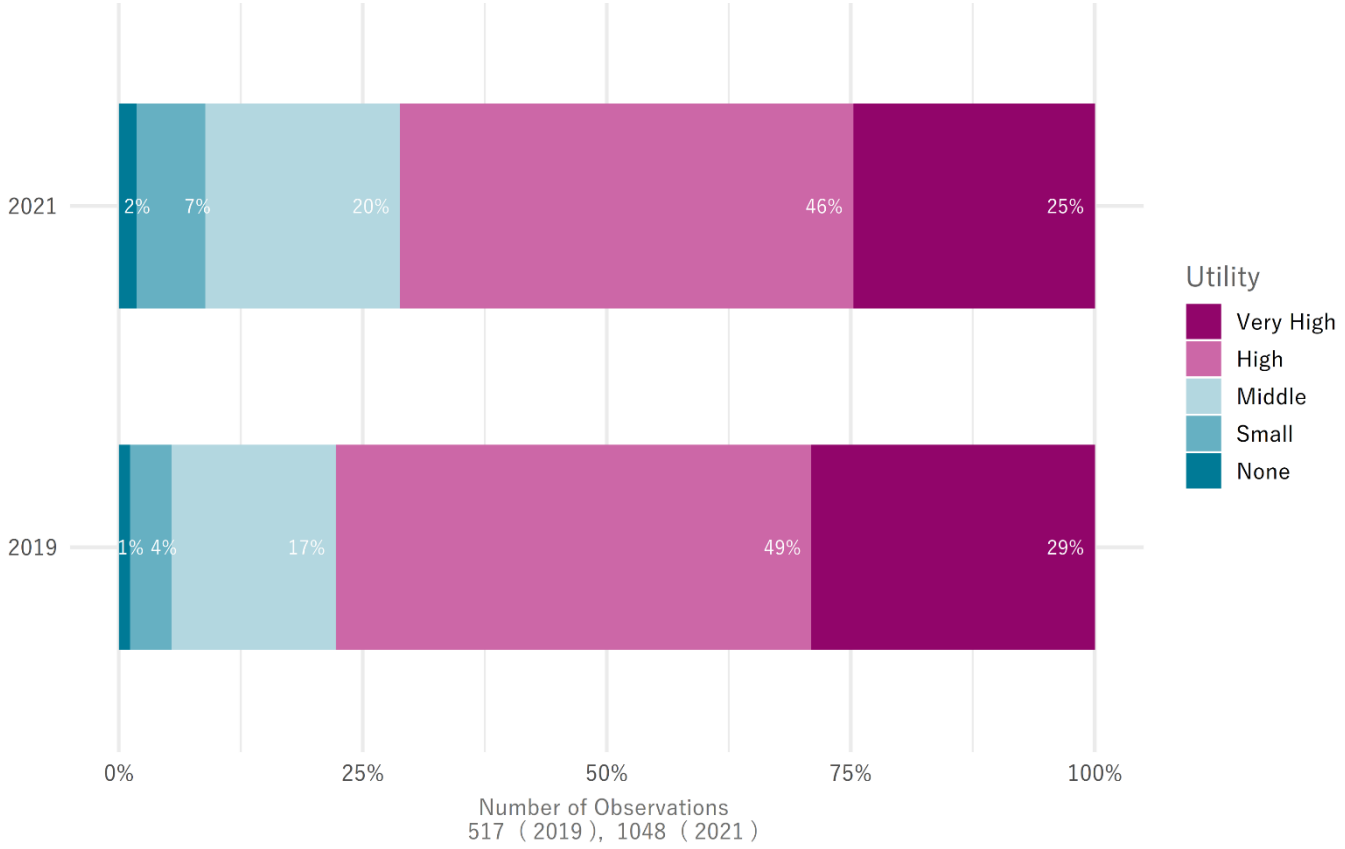


1) Innovation **risks** are **similar** across all **funding** dimensions
   - Those that are **funded** (“Approved”) have **similar risks** irrespective of whether that funding came from projects or cheques or from national or international collaborations
   - Companies that **don’t get any funding** (“Rejected”) have **different risks** depending on what they applied for
2) Innovation **risks** are **different** across **firm characteristics**
   - **Startups** have **higher** innovation **risks** than established companies
   - **SMEs** have **higher** innovation **risks** than large companies

Utility of innovation support

Utility of innovation support

Question: How would you rate the overall utility of Innosuisse's innovation funding?

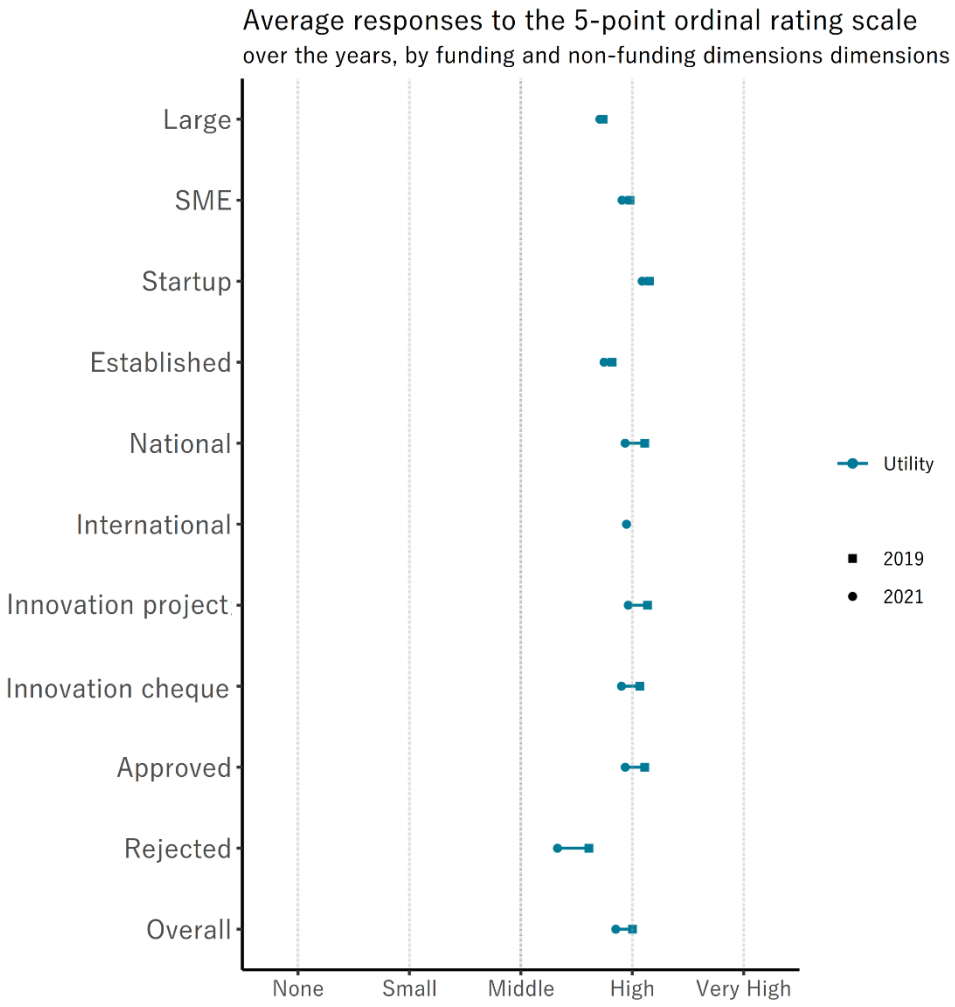


Key findings:

1) Innosuisse's innovation support has a **high utility**
   - In both surveys, over 70% of all applicants assess the utility as high or very high
2) The perceived utility has **slightly decreased** between 2019 and 2021
   - In 2019, the share of companies that indicate a high or very high utility was 7 percentage points higher than in 2021
   - In 2021, those 7 percentage points spread evenly to higher percentages in middle and small utility, but not to no utility
   - The difference is statistically significant at a 5% level

Utility of innovation support

Question: How would you rate the overall utility of Innosuisse's innovation funding?



Key findings:

1) The **overall decrease** in utility between 2021 and 2019 is **small** but statistically significant
   - The average utility is still high for more than 70% of companies
   - **Rejected** applicants are **mainly responsible** for the decrease in utility
   - Approved applicants also show a very small reduction
   - For the other funding dimensions, we also see a small reduction
   - Within groups based on **firm characteristics** the utility assessment is **stable** over time

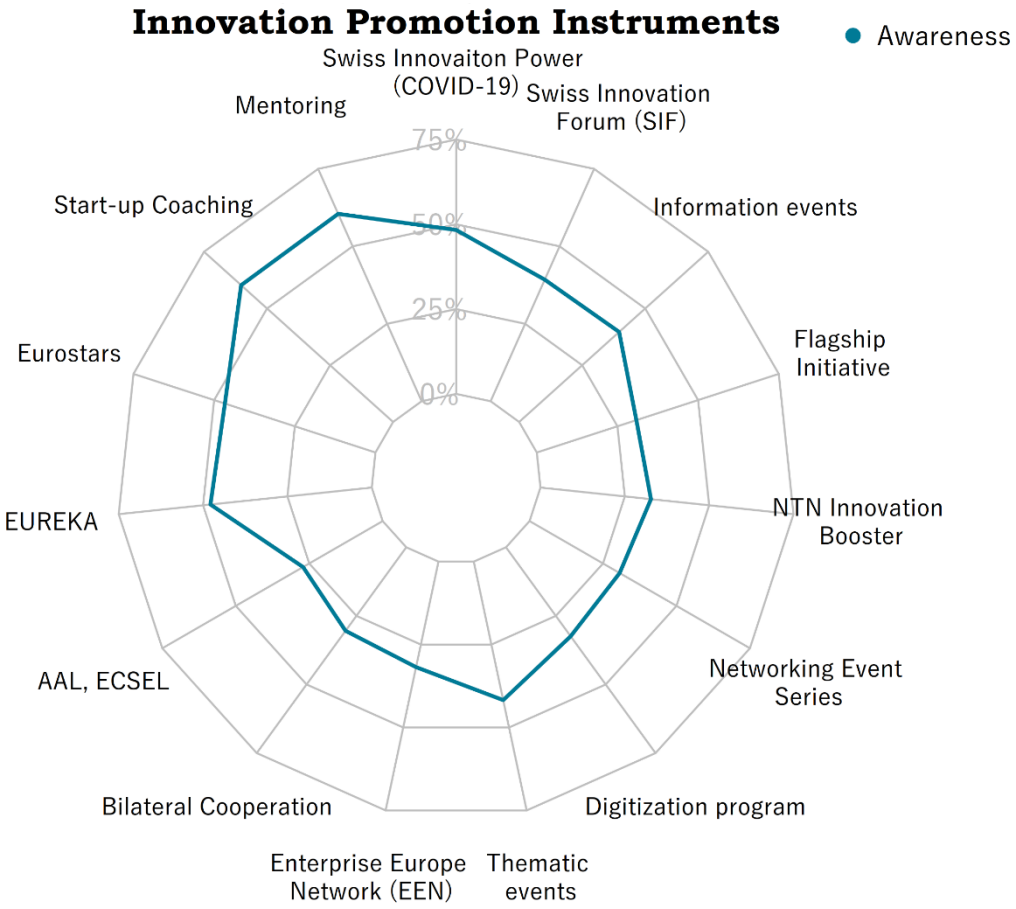
2) Some groups assess a **different utility** to the innovation support
   - **Approved** applicants have a **higher** utility than rejected applicants
   - **Startups** have a **higher** utility than established companies
   - **SMEs** have a **slightly higher** utility than large companies

3) Some groups assess a **similar utility** to the innovation support
   - Companies funded by **cheques** and funded **projects**
   - Companies with **national** funding and those with **international** funding

Innovation Promotion Instruments

Innovation Promotion Instruments

Questions: Is your company aware of the following Innosuisse instruments or events?



Number of observations 896

Key findings:

1) Mentoring and Start-up Coaching are best known promotion instruments
   - Over 60% of the survey participants are aware of those instruments
   - The sample only contains firms that specifically applied for one of the Innosuisse's two main funding mechanism ("Innovation cheques" and "Innovation projects")

2) Swiss Innovation Power (COVID-19), EUREKA and Eurostars are also well known
   - Around 50% are aware of these funding instruments

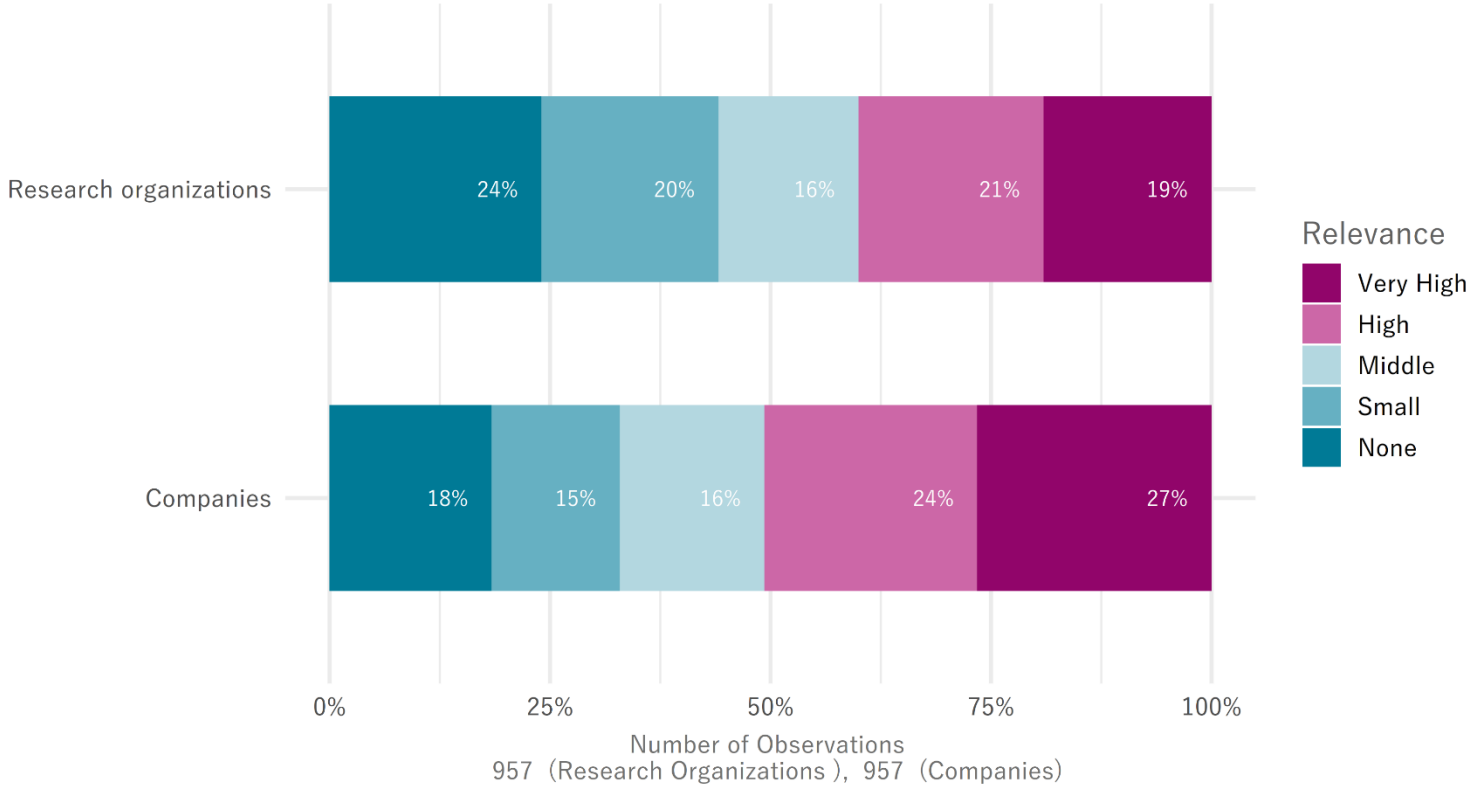
The utility assessment was answered so poorly that we only show evidence in the appendix that we refrain from interpreting since the uncertainty of the results is simply too big

International innovation collaboration

International innovation collaboration

Questions: How relevant is innovation collaboration with foreign companies for your company?

How relevant is innovation collaboration with foreign research organizations for your company?



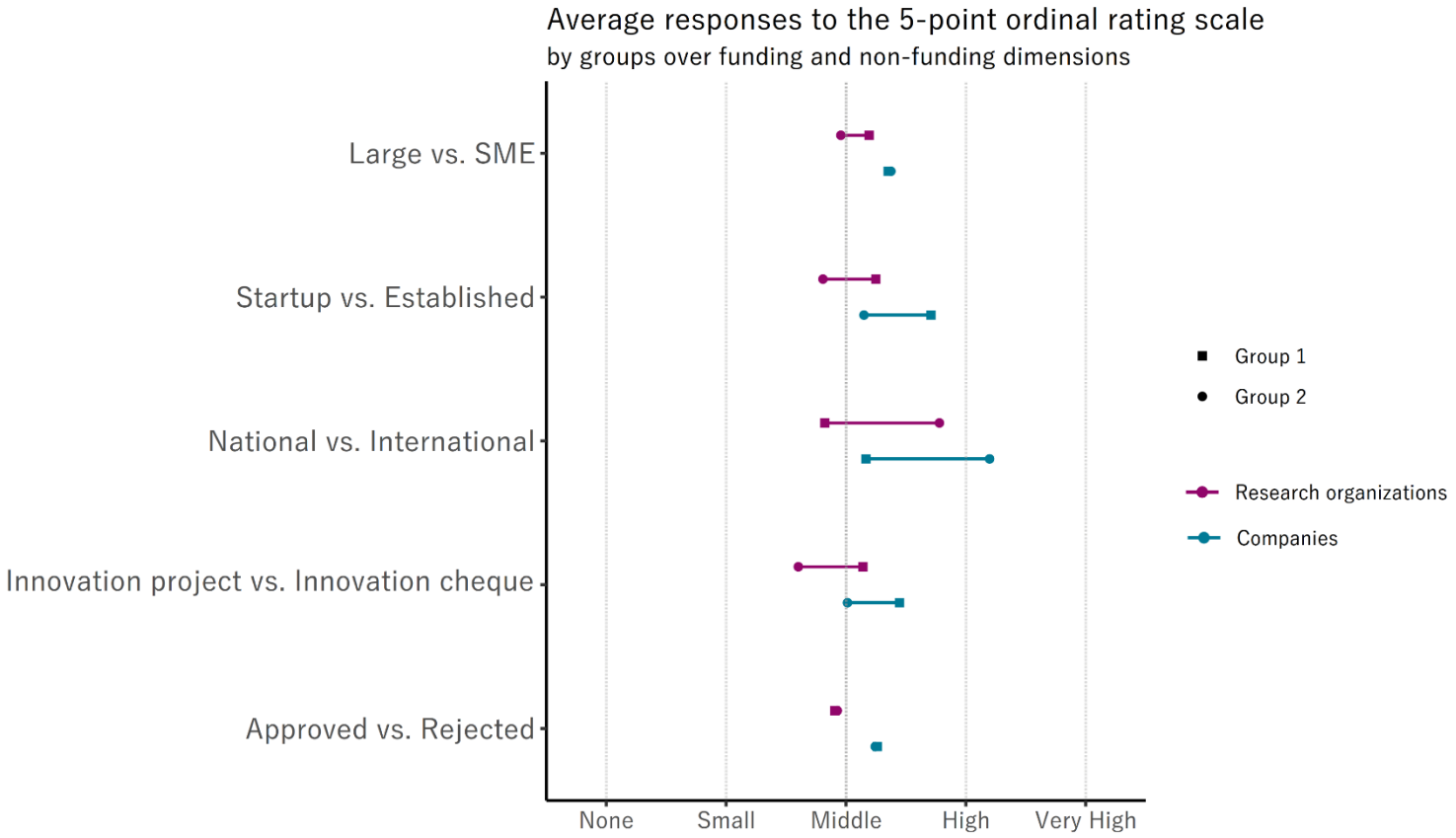
Key findings:

1) **International collaboration** is **very relevant** to Swiss firms
   - More than $^1/_2$ of firms see international research organizations as relevant collaboration partners (*middle* relevance *or higher)*
   - More than $^2/_3$ of firms see international companies as relevant collaboration partner
2) Companies are more relevant collaboration partners than research organizations
   - 51% see companies as highly or very highly relevant
   - 40% see research organizations as highly or very highly relevant
3) Only a minor fraction sees international collaboration as irrelevant
   - 18% for companies
   - 24% for research organizations

International innovation collaboration

Questions: How relevant is innovation collaboration with foreign companies for your company?

How relevant is innovation collaboration with foreign research organizations for your company?



Key findings:

1) **Companies** are **more relevant** international collaboration partner, irrespective of the dimension or group
2) **Approval** and **firm size** have **no statistically significant influence** on the perceived relevance of international partners
3) Project applicants see international partners as more relevant than cheque applicants
4) Applicants for international collaborations see international partners as more relevant
5) Startups see international collaborations as more relevant than established firms

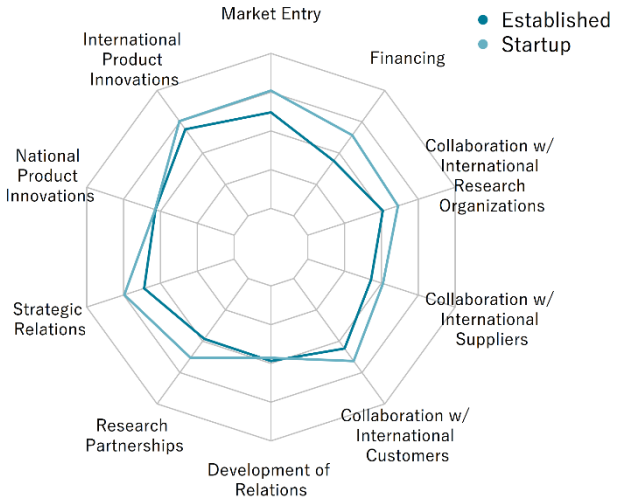
International innovation collaboration

Questions: If international innovation collaboration is relevant for your company, for what reasons?

Percentage of responses indicating a high relevance of the reason values >= 4 on a 5-point ordinal scale

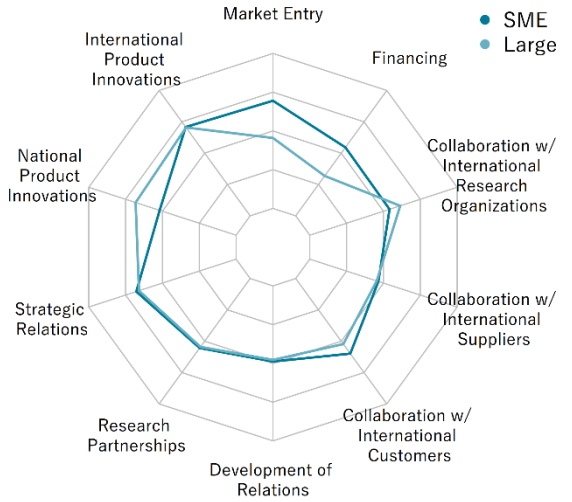
Number of observations 683

Percentage of responses indicating a high relevance of the reason values >= 4 on a 5-point ordinal scale



Number of observations 326 (Established), 196 (Startup)

Percentage of responses indicating a high relevance of the reason values >= 4 on a 5-point ordinal scale



Number of observations 449 (SME), 44 (Large)

Key findings:

1) Overall, high relevance of all motives
   - For all reasons, between 46% and 71% of all companies that see international collaborations as important see the specific reason as relevant
2) '**Product** innovations for the **international market**', '**Entry** to foreign **markets**', and '**Strategic** business **relations**' are the most relevant motives
3) **Startups** generally see a higher relevance behind most reasons
   - Especially true for '**Strategic** business **relations**', 'New research **partnerships**', and especially '**Financing** of innovation activities'
4) SMEs and large companies see the relevance of reasons similarly
   - **SMEs** assign a higher relevance to '**Entry** to foreign **markets**' and '**Financing** of innovation activities'
   - **Large** companies assign a higher relevance to '**Product** innovations for the **national** market'

International innovation collaboration

Questions: Which countries are particularly interesting for international innovation activities of your company?

Companies that mention the region/country

EUROPE	**707**	**92.5%**
Germany	576	75.4%
France	192	25.1%
Austria	133	17.4%
United Kingdom	128	16.8%
Italy	100	13.1%
Netherlands	54	7.1%
Spain	22	2.9%
Sweden	21	2.7%
Belgium	20	2.6%
Norway	15	2.0%
Poland	13	1.7%
Portugal	12	1.6%
Denmark	10	1.3%
Liechtenstein	9	1.2%

NORTH AMERICA	**304**	**39.8%**
United States	292	38.2%
Canada	18	2.4%
ASIA	**204**	**26.7%**
China	101	13.2%
Japan	41	5.4%
India	21	2.7%
South Korea	19	2.5%
United Arab Emirates	10	1.3%
Singapore	8	1.0%
SOUTH AMERICA	**24**	**3.1%**
Brazil	17	2.2%
AFRICA	**20**	**2.6%**
South Africa	7	0.9%
OCEANIA	**11**	**1.4%**
Australia	7	0.9%

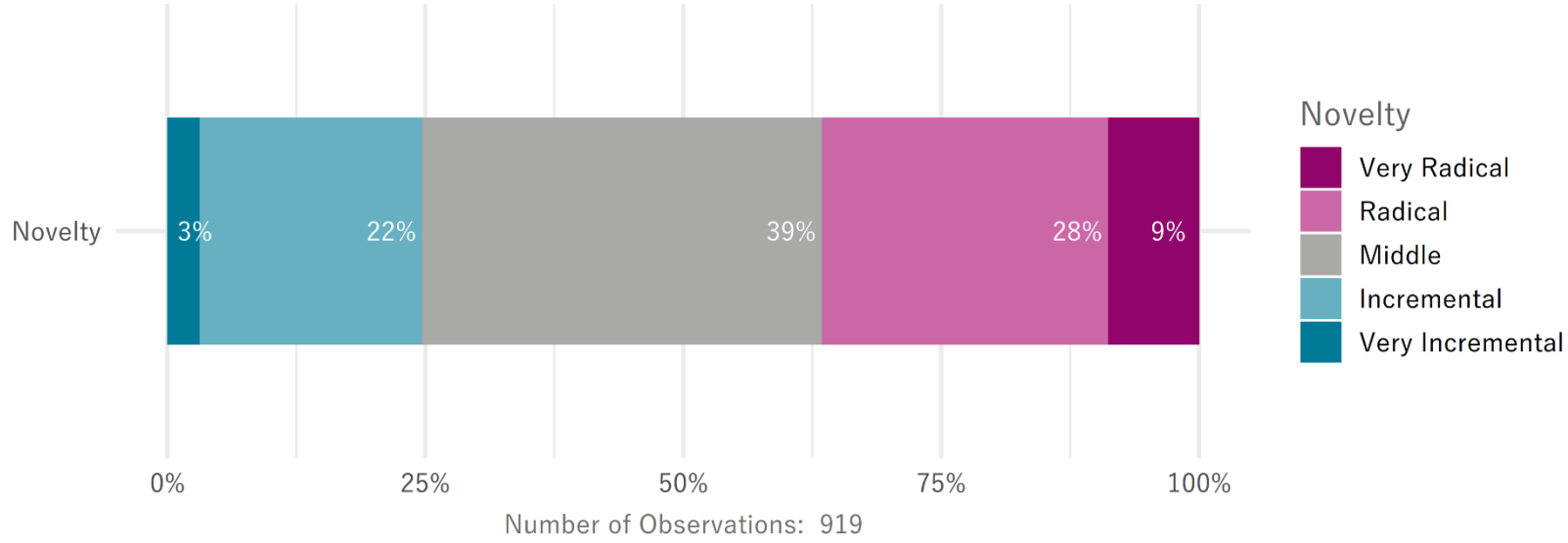
Key findings:

1) **Europe**, **North America**, and **Asia** are the most important continents for innovation collaboration
   - Almost all companies that answered this question see at least one country in Europe as an important collaboration country
2) South America, Africa, and Oceania are not important for international innovation collaboration
3) The most important countries for international collaboration are border countries
   - **Border countries** and especially Germany
   - The **United States** and the **United Kingdom**
   - China

Novelty and disruption of innovations

Novelty of innovations

Question: How would you rate the degree of novelty of the innovations of your company in the last two years?



Key findings:

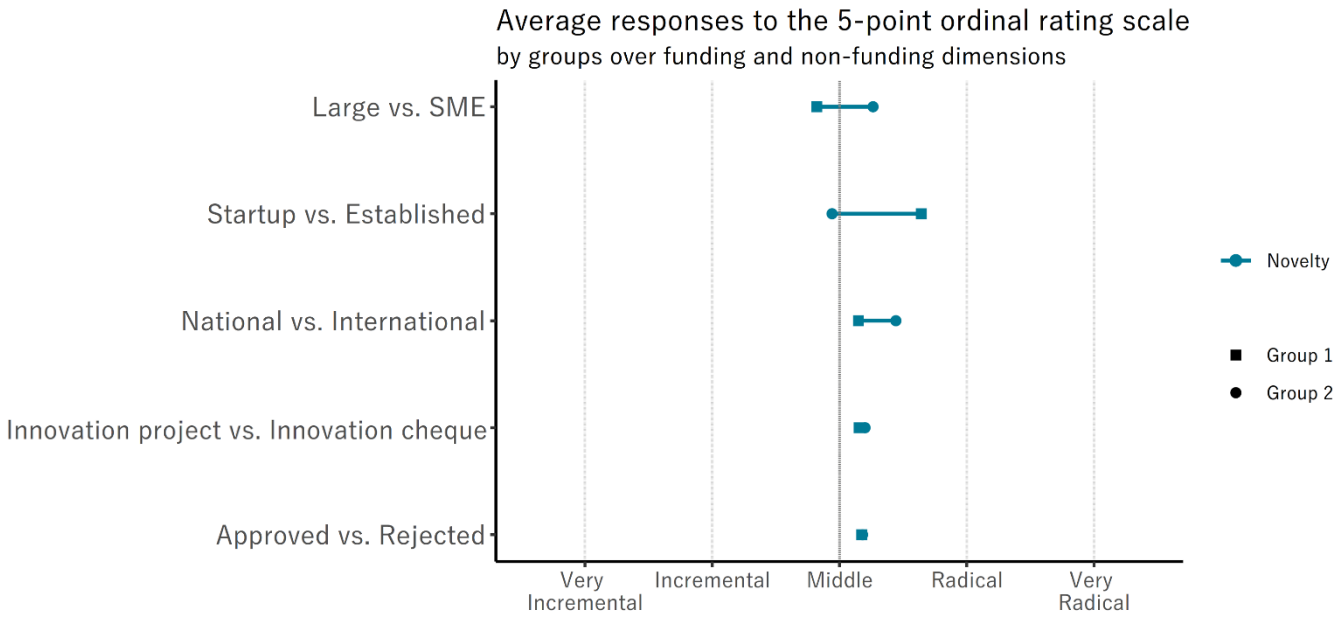
1) Respondents see their innovation activities **more frequently** as **radical than incremental**
   - 37% of respondents indicate radical innovations; 25% indicate purely incremental innovations

2) Extremes are **rare**
   - Only 9% see their innovations as very radical; only 3% see their innovations as very incremental

3) Mixture is **most common**
   - About 39% of all respondents see their innovation activity as something between incremental and radical

Novelty of innovations

Question: How would you rate the degree of novelty of the innovations of your company in the last two years?



Key findings:

(1) On average, **most groups** see their innovations somewhere **between incremental** and **radical**

(2) **No differences** in the novelty of their innovations

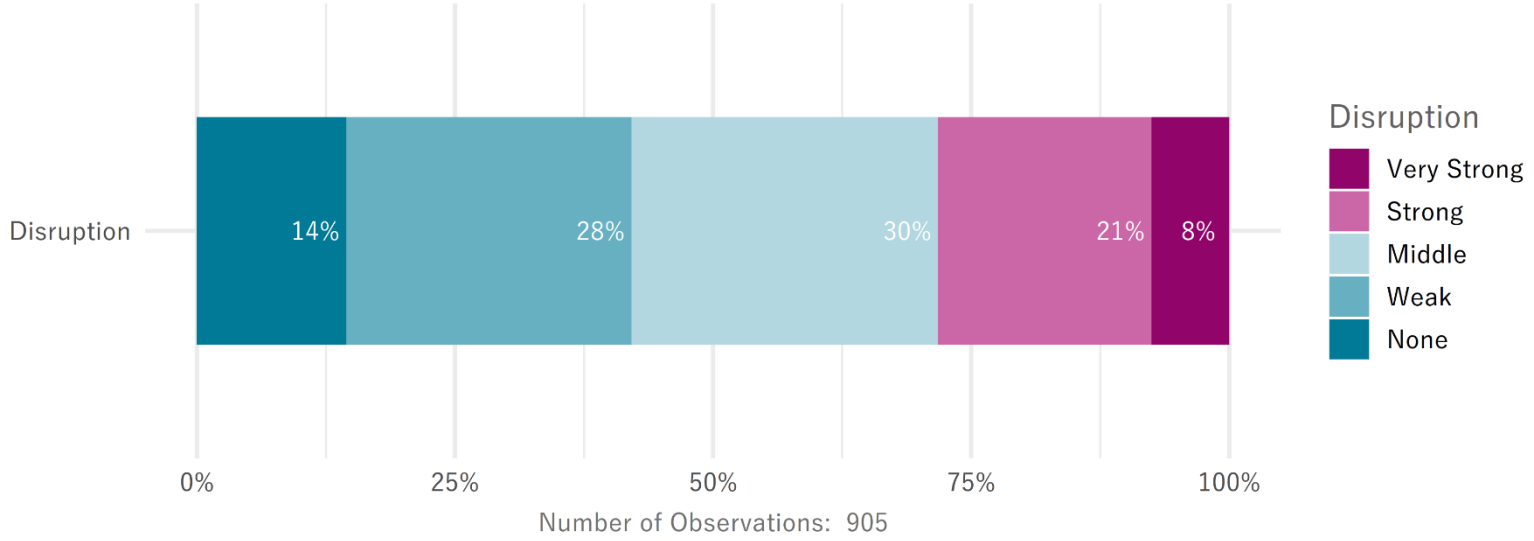
- **Approved or rejected** applicants assess the novelty of their innovations the same
- There are no differences between **approved projects and cheques** either

(3) Some groups show a clear **tendency** towards more **radical** innovations

- **International** collaborators see their innovations as more radical than national collaborators
- **SMEs and Startups** with more radical innovations than large enterprises and established companies

Disruption of innovations

Question: Do the product and process innovations of the last five years of your company show disruptive effects?



Key findings:

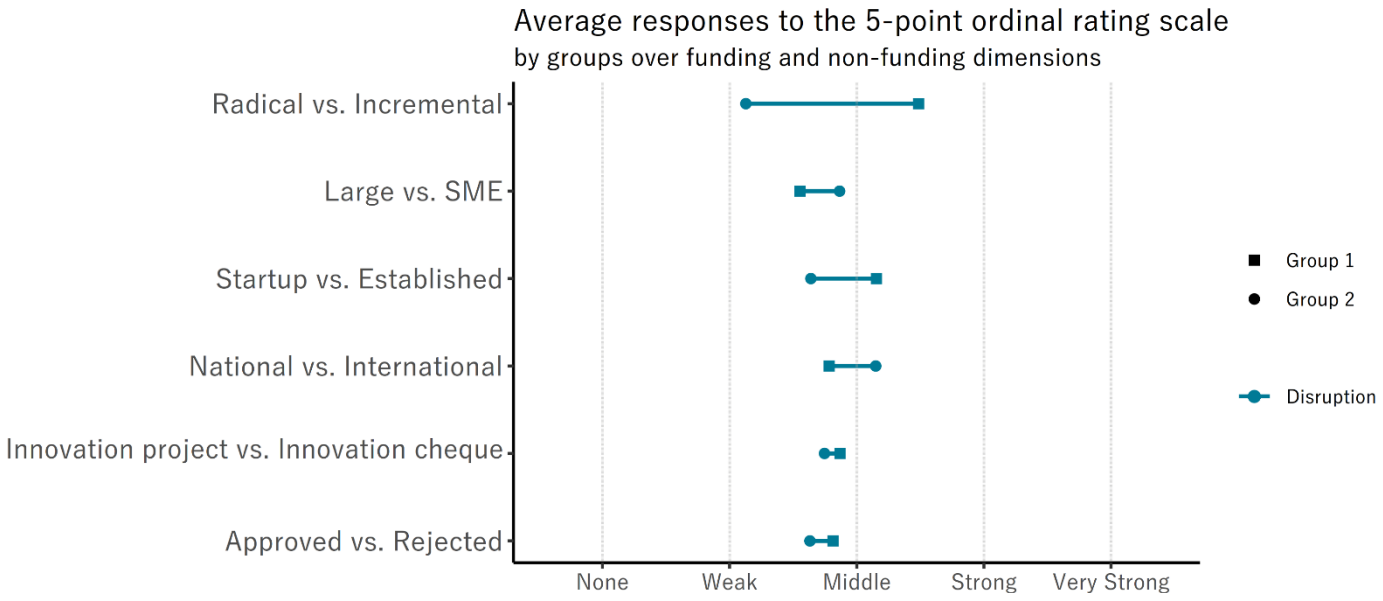
1) A strong **disruptiveness** is **not uncommon**
   - 29% of all respondents see their innovations as strongly or very strongly disruptive

2) Most firms see **some disruption** behind their innovations
   - Only 14% see no disruptiveness

3) Most firms see a **limited disruptiveness** of their innovations

Disruption of innovations

Question: Do the product and process innovations of the last five years of your company show disruptive effects?

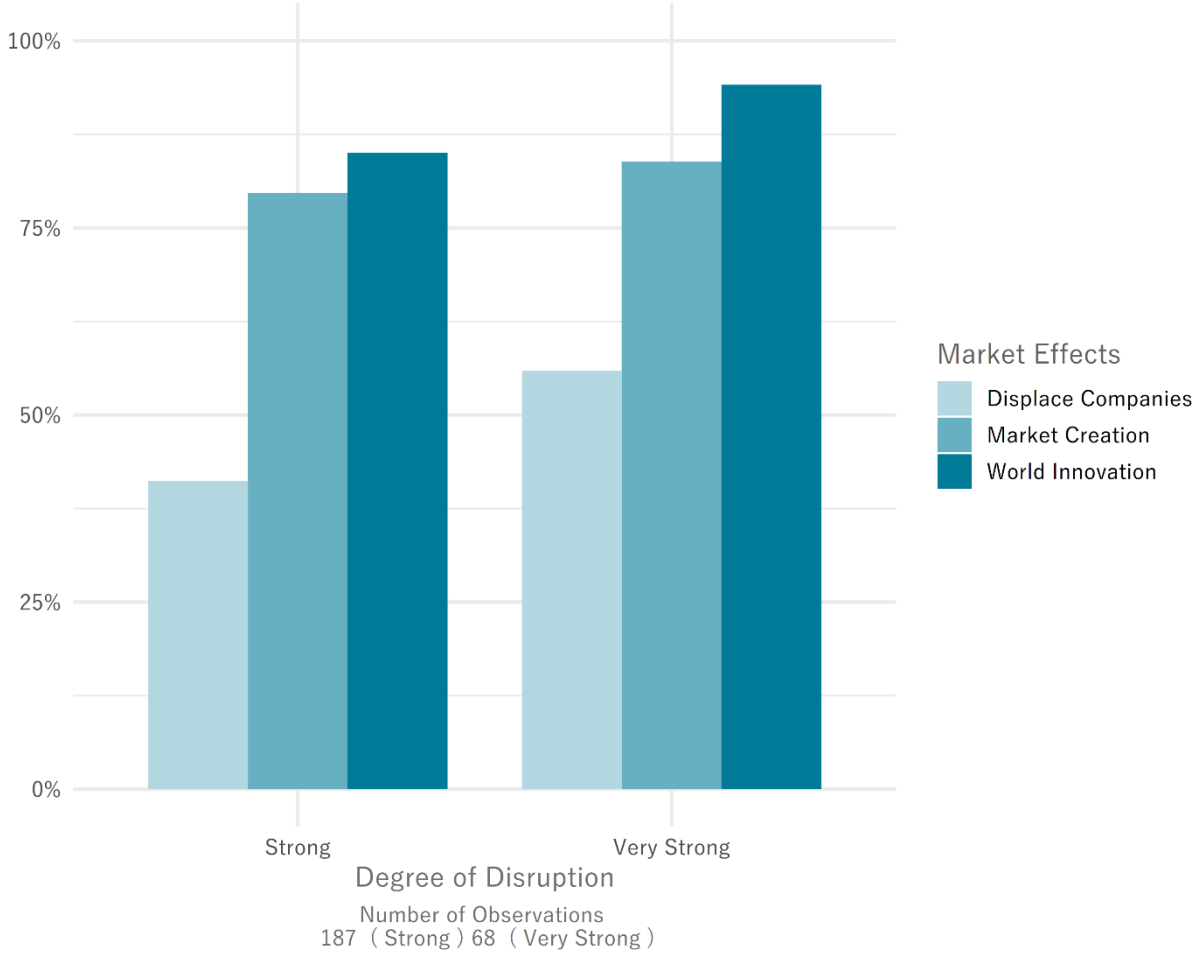


Key findings:

1) On average, **most groups** see their innovations somewhere **between weakly and middle** disruptive
   - Only **startups**, firms that receive **international funding** and especially those that see their innovations as **radical** record an average disruption that is **above *middle***
2) Three dimensions show **no difference** in the average disruption of their innovations
   - Approved and rejected applicants
   - Companies funded by projects and cheques
   - SMEs and large firms
3) There are **significant differences** between …
   - **International** collaborators and only national collaborators
   - **Startups** compared to established companies
   - Companies with **radical** innovations

Disruption of innovations

Question: If your innovations showed disruptive effects, what are the market effects?



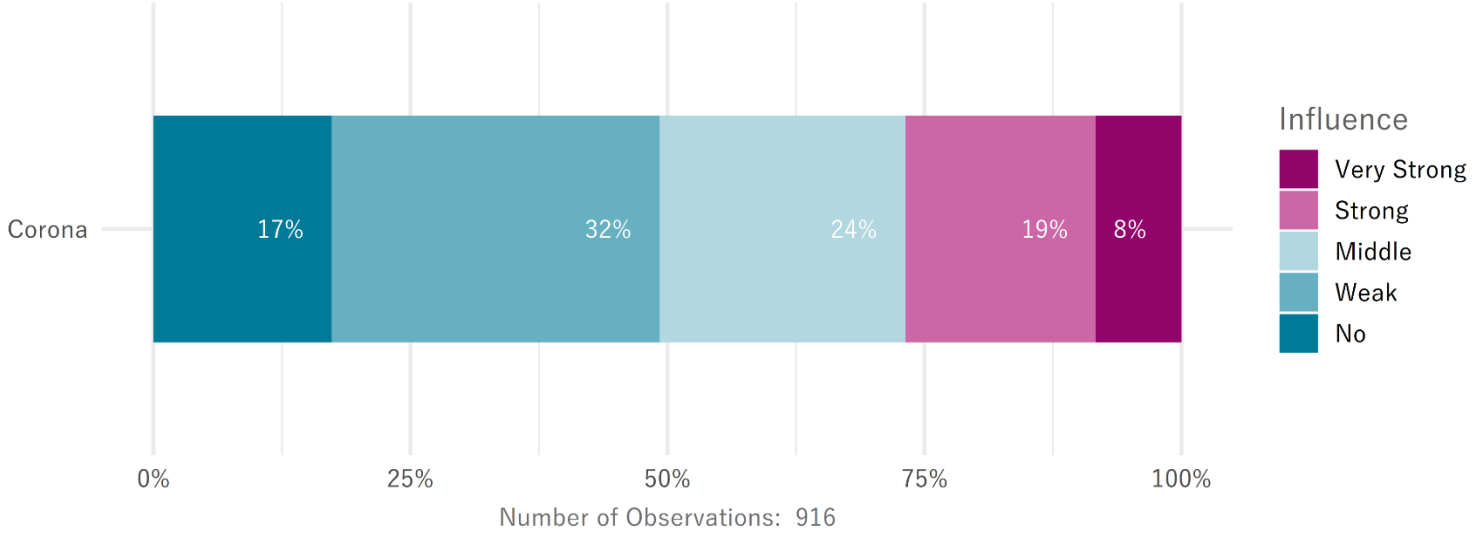
Key findings:

1) The creation of a **novelty** on the **world market** (*world innovations*) is the **most common** reason of disruption
   - 94% of companies that see their innovations as very strongly disruptive and 85% of those that see them as strongly disruptive say that their innovations create that market effect
2) The creation of **completely new markets** (*market creation)* is the **second** most **frequent** reason of disruption
   - 83% of those with very strongly disruptive innovations and 79% of those with strongly disruptive indicate that market effect
3) The displacement of companies from the market (*displace* companies) is the least common reason that firms attribute disruption to their innovations
4) The stronger the disruption, the more likely each reason becomes

The impact of the COVID-19 pandemic

The impact of the COVID-19 pandemic

Question: Does the pandemic influence the innovation processes of your company?

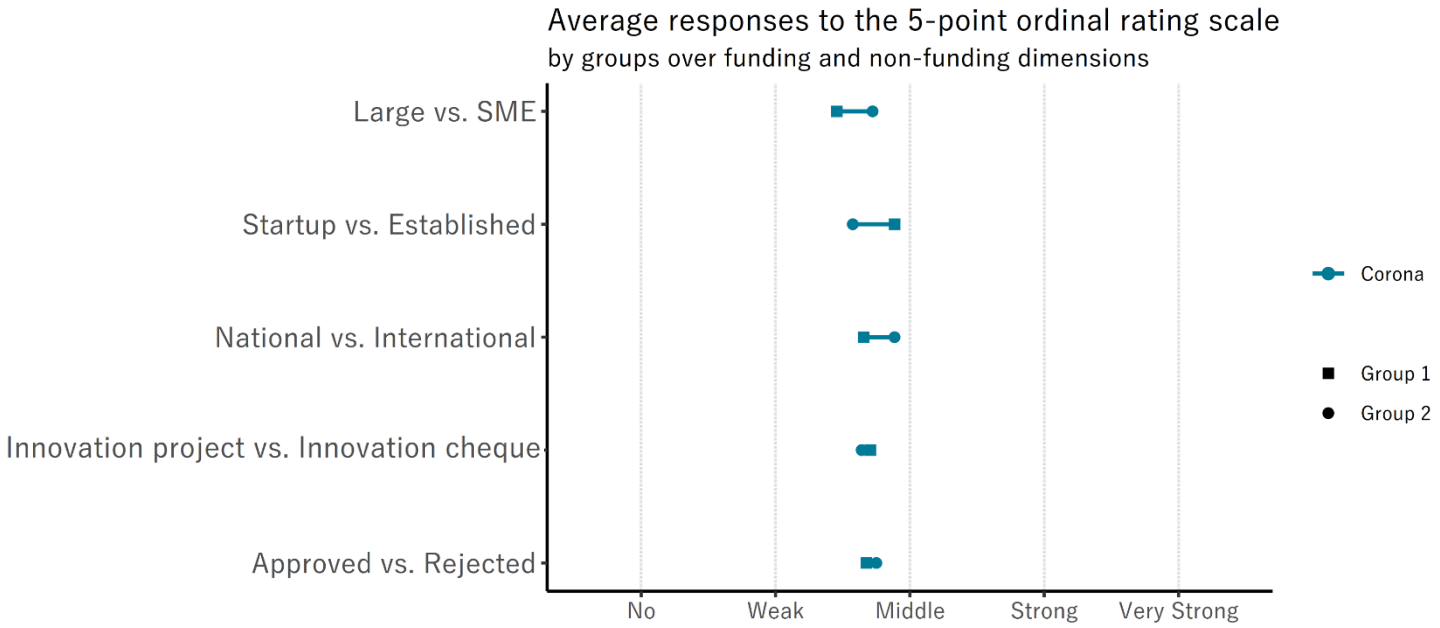


Key findings:

1) **About half** of all firms were **not significantly impacted** in their innovation endeavors by the pandemic
   - 17% recorded no impact at all
   - 32% were weakly affected
2) **Over a quarter** of all firms was **substantially impacted** by the pandemic
   - 18% were strongly impacted
   - 8% were very strongly impacted
3) The remaining quarter was significantly but not substantially impacted by the pandemic
4) The **question** is **neutral**! It is about the **strength**, **not the direction** of the impact

The impact of the COVID-19 pandemic

Question: Does the pandemic influence the innovation processes of your company?

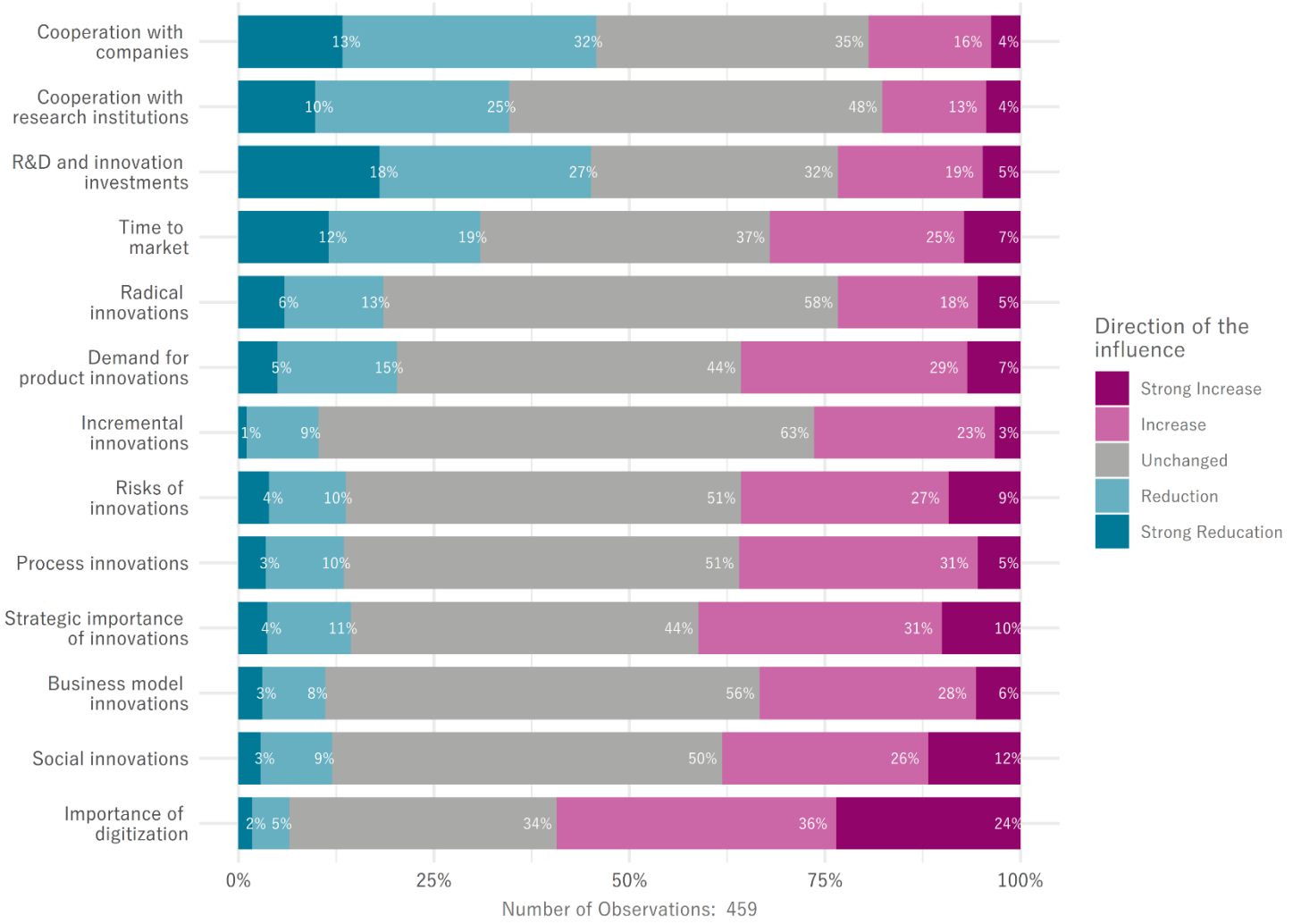


Key findings:

1) The average impact of the pandemic is identical for
   - Approved and rejected applicants
   - Companies with project and cheque funding
2) The pandemic had a stronger average impact on
   - Startups opposed to established firms
     (the difference is statistically significant at a 5% level)
   - Internationally funded companies opposed to nationally funded
     (the difference is not statistically significant at a 5% level)
   - SMEs opposed to large firms
     (the difference is not statistically significant at a 5% level)

The impact of the COVID-19 pandemic

Question: If the pandemic influenced your innovation processes (middle, strong, very strong), in which areas?



Key findings:

1) Although **half** of all companies were **substantially influenced** by the pandemic, the **direction** of the impact is **often positive** and only few areas record predominantly negative impacts

2) The **strategic importance** of innovations increased and **business models** were re-invented
   - 41% indicate an increasing or strongly increasing strategic importance of innovations
   - 34% indicate an increase or strong increase in business model innovations

3) **Digitization** and **social innovations** became massively more important
   - 60% indicate an increasing or strongly increasing importance of digitization
   - 38% indicate an increasing or strongly increasing importance of social innovations

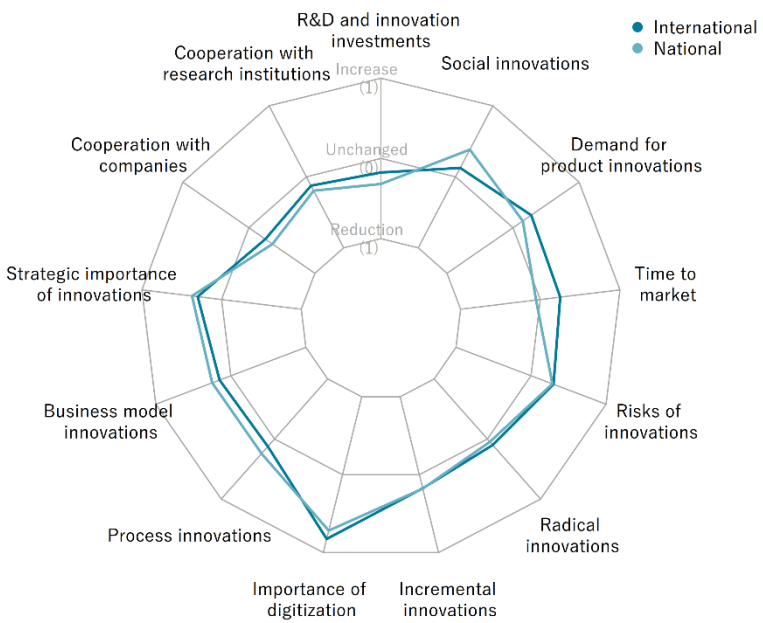
4) In some areas the pandemic had a substantial **negative effect**
   - Slightly less than half of all companies suffered from reduced innovation **cooperation**
   - A large share of companies had pandemic-induced reductions in their innovation **investments**
   - **Risks** of innovations grew for most companies

5) Radical innovations are affected worse than incremental innovations
   - Larger share indicates a reduced activity and smaller share indicates an increased activity

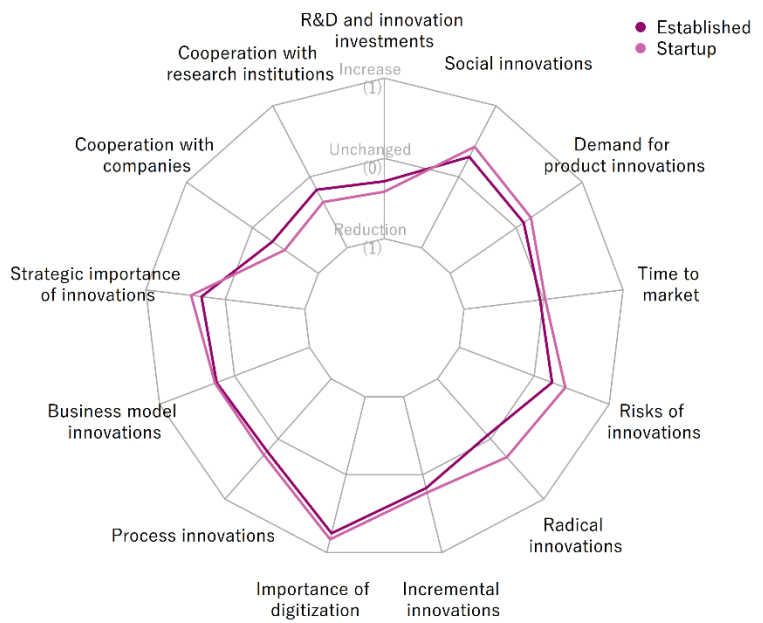
The impact of the COVID-19 pandemic

Question: If the pandemic influenced your innovation processes (middle, strong, very strong), in which areas?

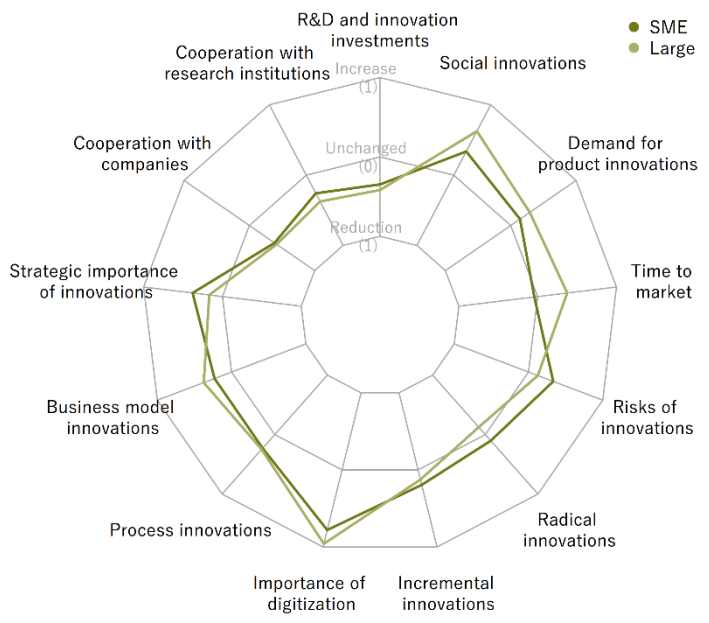
Average response the 5-point likert scale



Average response the 5-point likert scale



Average response the 5-point likert scale



Key findings:

1) On average, the pandemic had a similar impact on innovation activities for internationally funded a well as for nationally funded companies
   - The time to market seems to increase for internationally funded while staying unchanged for nationally funded companies
   - The awareness for social innovations seems to increase for nationally funded while staying unchanged for internationally funded companies
   - None of the differences are statistically significant at a 5% level

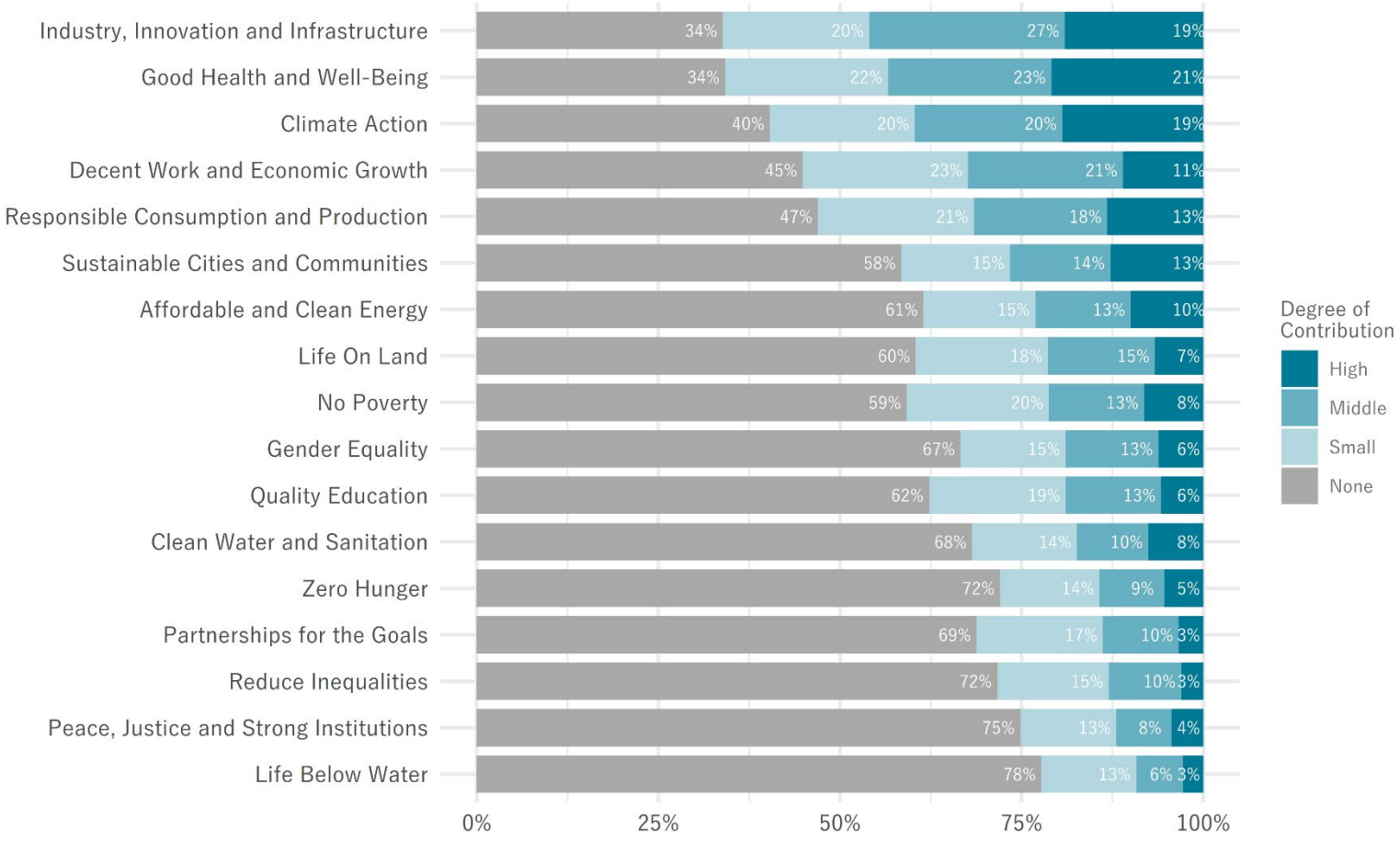
2) The pandemic
   - Reduced the cooperation with research institutions and firms, although more pronounced for startups than established firms
   - Had a positive effect on radical innovations for startups while having no effect on established firms
   - Increased the risks of innovations but more accentuated for startups
   - Those differences are statistically significant at a 5% level while all others are not

3) The pandemic
   - Increased the time to market for large firms while leaving SMEs unaffected
   - Increased the awareness of social innovations for large firms while leaving SMEs unaffected
   - However, those differences as well as all others are not statistically significant at a 5% level

Sustainable Development Goals

Sustainable Development Goals

Question: Do the R&D or innovation activities of your company actively contribute to the thematic areas of the United Nations' "17 Sustainable Development Goals" listed below?



1) The **biggest contributions** are in
   - ***Industry, Innovation and Infrastructure***
     - 46% indicate middle or high contributions.
   - ***Good Health and Well-Being***
     - 44% indicate middle or high contributions
   - ***Climate Action***
     - 39% indicate middle or high contributions

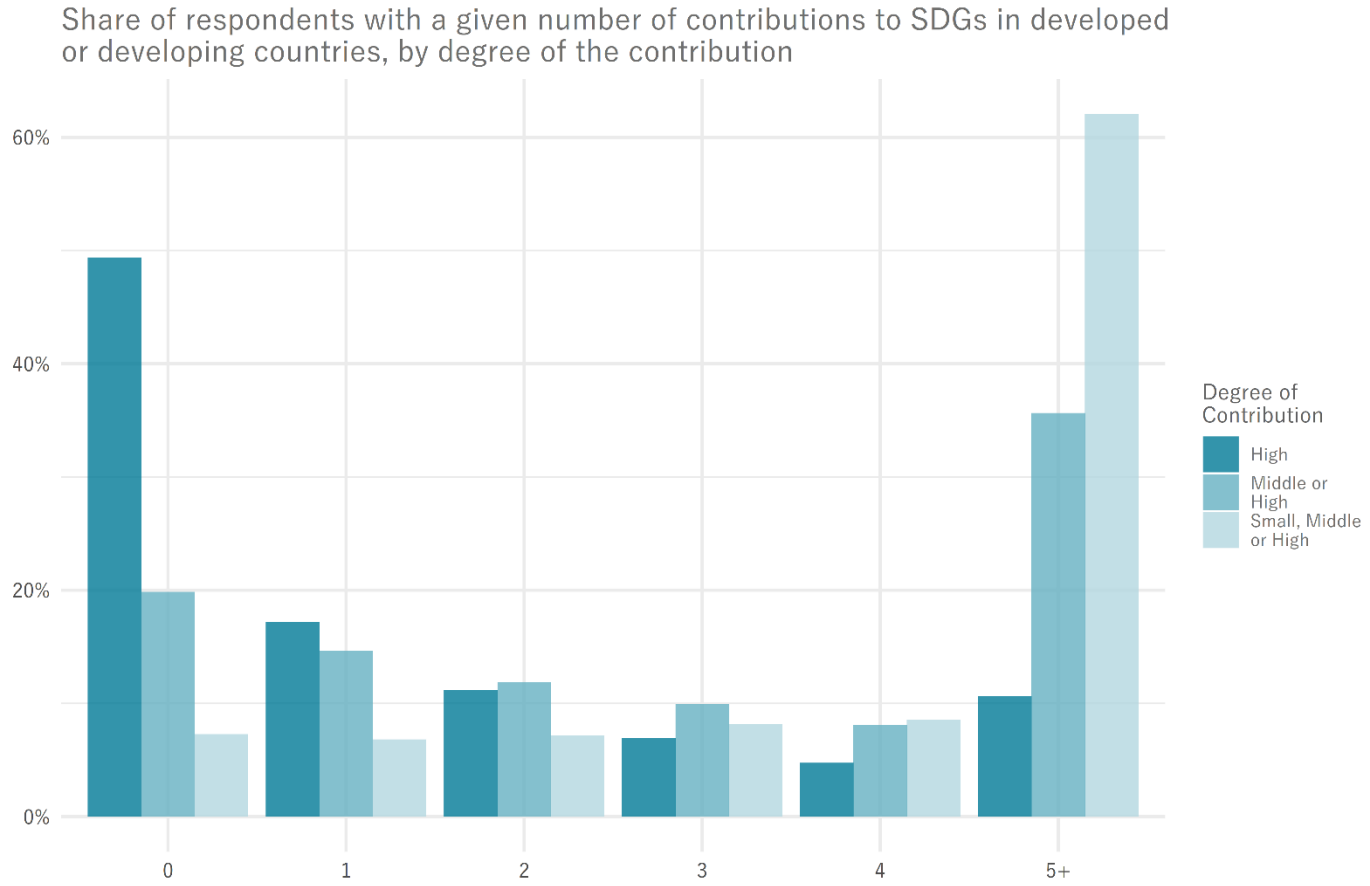
2) More than a quarter of all firms also contribute to
   - *Decent Work and Economic Growth*,
   - *Responsible Consumption and Production*
   - and *Sustainable Cities and Communities*

3) Less than 15% contribute significantly to
   - *Life below Water*,
   - *Peace*, *Justice and Strong Institutions*,
   - *Reduced Inequalities*,
   - *Partnerships for the Goals,*
   - and *Zero Hunger*

The SDGs in these slides are named after the UN terminology. You can find a more detailed description with the exact wording of the UN in the appendix

Sustainable Development Goals

Question: Do the R&D or innovation activities of your company actively contribute to the thematic areas of the United Nations' "17 Sustainable Development Goals" listed below?

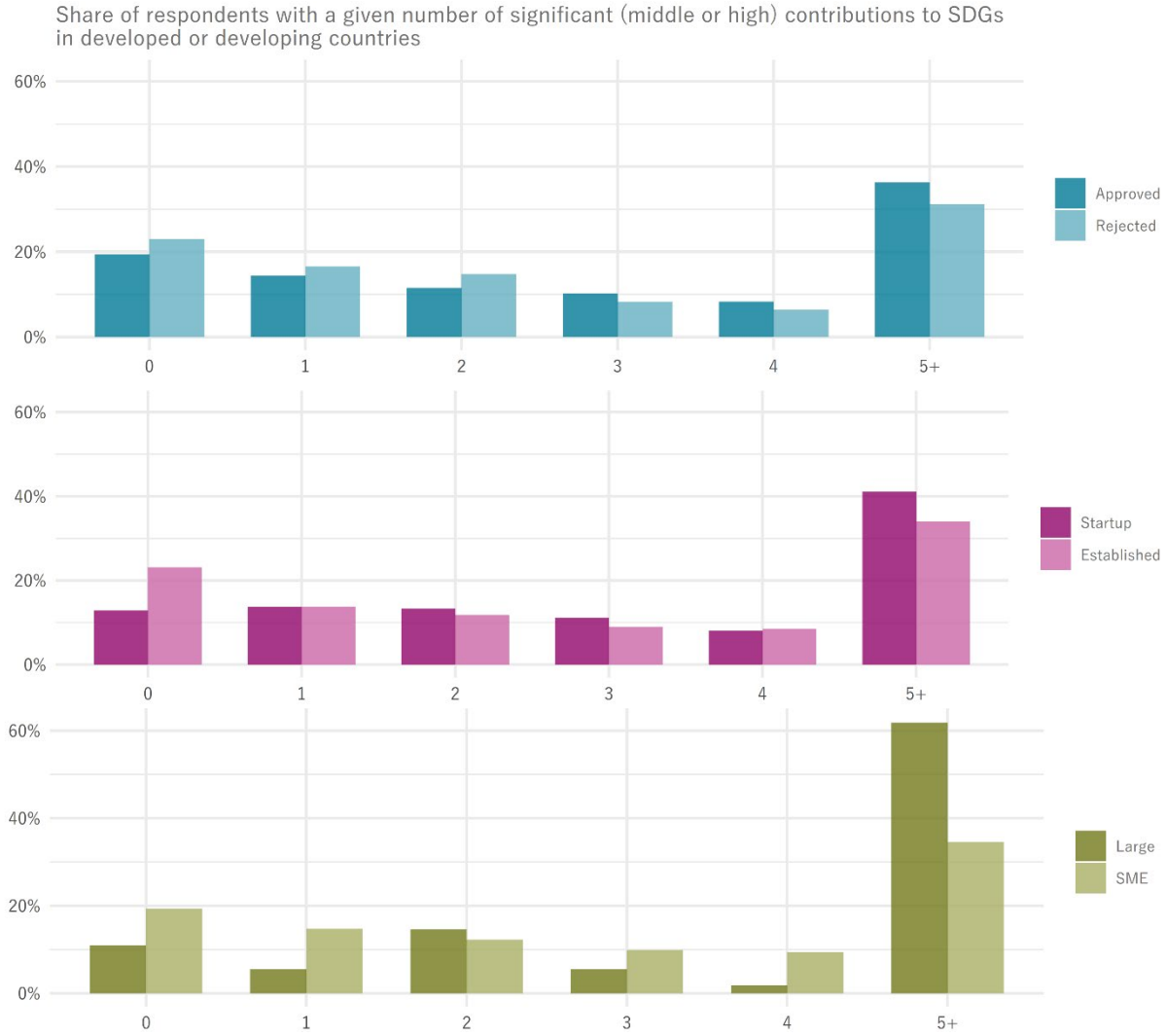


Note: The first category of bars is the most informative one. It shows the share of respondents that do not contribute to any SDG by at least a certain degree. The minimal degree of the contribution is indicated by the coloring (high, middle small).
As such, the first bar says that 49% do not have a high contribution to any SDG. The second bar says that 20% do neither have high nor middle contributions to any SDG. This can be inverted to state that 80% have a middle or high contribution to at least one SDG and 51% have a high contribution to at least one SDG.
The difference between those bars also has a meaning namely that 29% of respondents have no high contribution (and thus either middle, small or no contributions) but at least 1 middle contribution (since otherwise they would belong to the 20% that have no high or middle contributions). The same logic applies for the last bar concerning at least small contributions.

1) Innosuisse applicants: a significant **contribution** to **at least one** SDG is **quite frequent**
   - **51%** of all respondents have **at least one high** contribution
   - **29%** of all respondents have **at least one middle** contribution **but no high**
   - 13% of all respondents have at least one small contribution but no middle or high
   - 7% of all respondents have no contribution
2) Contributions to **multiple SDGs (5+)** is frequent
   - 62% considering some contribution (small, middle or high)
   - 36% considering significant contributions (middle or high)
   - 11% considering high contributions
3) The SDG contributions occur **more frequently** and to a **higher degree** in **developed countries**

Sustainable Development Goals

Question: Do the R&D or innovation activities of your company actively contribute to the thematic areas of the United Nations' "17 Sustainable Development Goals" listed below?

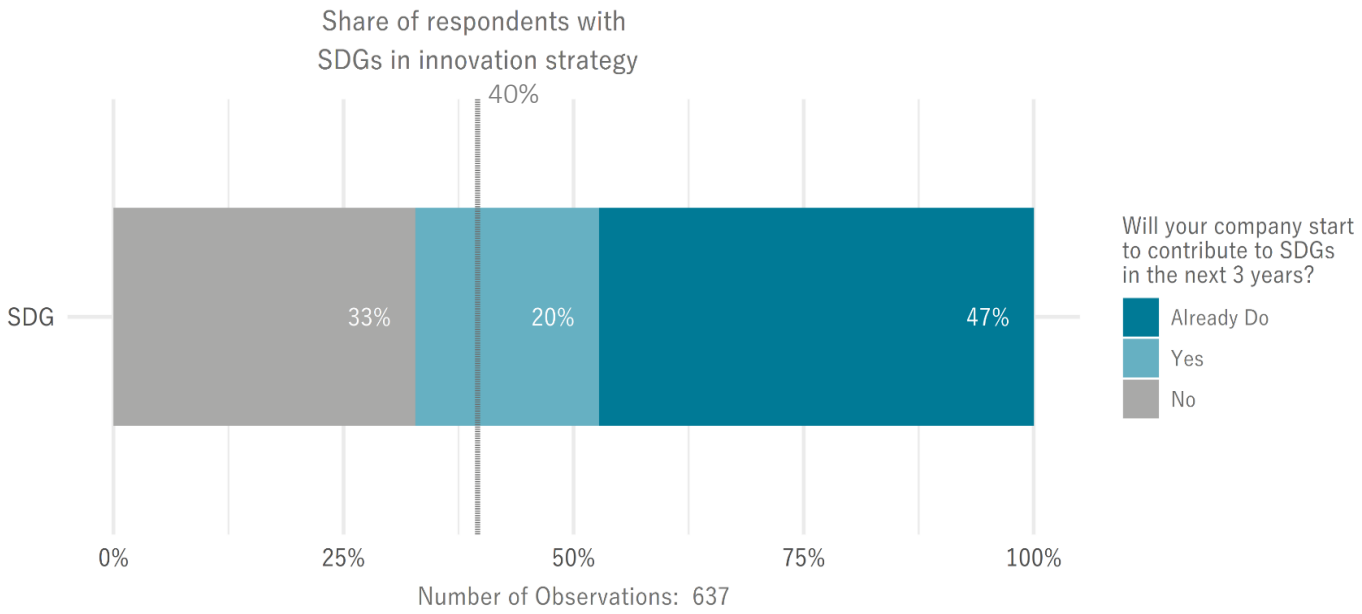


1) **Approved** applicants **contribute** to **more** SDGs than rejected ones
   - 55% of approved applicants have a middle or high contribution to 3 or more SDGs while the share for rejected applicants is 46%
   - This is no proof that the contribution to SDGs is a selection criteria for innovation funding
2) **Startups** have **more contributions** than established firms
   - 41% of startups have middle or high contributions to 5+ SDGs while only 34% of established firms do so
   - 23% of established firms have no middle or high contributions to any SDGs while only 13% of startups
3) **Large** firms have **substantially more contributions** than SMEs
   - 62% of large firms have middle or high contributions to 5+ SDGs while only 35% of SMEs
   - Firm size (and likely financial capacity) is an indicator for firms contribute to more SDGs

Sustainable Development Goals

Question: Will your company contribute to the one of the 17 Sustainable Development Goals in the next three years?

Answers: Won't contribute, will start to contribute, are part of the documented innovation strategy, already are contributing



1) **Almost half** of all respondents **are already contributing** to the SDGs
2) 38% of non-contributors start to contribute within the next three years
3) **1/3** of respondents **will not contribute** to SDGs in the next three years and **2/3 will contribute**
   - Compared to the 80/20 ratio of companies that indicate that they made some significant (middle or high) contribution to any SDG in the past, the contributions in the next three years will be slightly lower
   - This might be a result of a smaller time span (only 3 years opposed to open ended)
   - SMEs and established companies are more likely to have no contributions in the next three years
4) About **40%** of all respondents anchored the **SDGs in their innovation strategy**

Turnover shares of firm and market novelties

Turnover shares from innovations

Average share of turnover in 2020 from (in %)	Innosuisse applicants (N = 311)	Approved applicants (N = 283)	Approved projects (N = 175)	Control group (N = 275)
Product innovations	55.0	54.4	51.7	30.4
… new to the firm	31.0	30.6	29.9	24.7
… new to the market	24.0	23.7	21.8	5.7

- Opposed to R&D active firms that never applied for Innosuisse funding (control group),
  - Innosuisse applicants, approved applicants (cheques and projects) and approved project applicants have substantially higher turnover shares from product innovations, especially from market novelties
  - Approved and rejected applications have comparable turnover shares from innovations while approved project applicants have slightly lower turnover shares, especially from market novelties
  - The distribution of turnover shares is comparable across all groups with one exception: Innosuisse firms (all except control group) report substantially more often that 100% of their turnover stems from innovative products.
- Those differences do **not allow** any **causal statements**
  - We cannot say if the Innosuisse is responsible for a higher share of market novelties
  - We also cannot say if firms with more radical or disruptive innovations apply more frequently for Innosuisse funding since the shares are measured at the end of the survey period, i.e. in 2020

Technical notes

- Innosuisse clientele comprises firms that applied for funding from Innosuisse since 2016
- Approved applicants comprise approved innovation cheques or innovation projects
- Control group comprises firms that never applied for funding from Innosuisse since 2016, but are R&D active
- The reported percentages are the average shares of turnovers from innovations per group in the year 2020 of firms that have product innovations
  - Product innovations comprise new (a1) and improved (a2) products
  - And can also be divided into those that are only new to the firm (b1) or new to the market (b2)
  - Both divisions add up to the total product innovations (a1 + a2 = b1 + b2)

Continuation of monitoring

Benefits of continued monitoring

- Monitoring allows measurement of the evolution of the Innosuisse Clientele
  - Important basis for evaluation studies, e.g., short and long-term performance effects of the Innosuisse funding
  - Basis for measuring the impact of funding measures
  - Important basis to identify temporal trends - requires information from the same companies (panel) from at least 3 points in time
- Monitoring allows comparisons over time and between innovative companies
  - Comparisons between Innosuisse clientele and other innovative companies
  - Creates basis for in-depth control group analyses between supported and non-supported companies
- Empirical basis for new "policy designs“
  - Recognizing longer-term trends is important for better policy measures
  - Anecdotal evidence is often insufficient for design changes and makes it difficult to take sensible or discontinue ineffective measures

Benefits of continued monitoring

- Platform for contemporary problems
  - Repeated panel maintenance allows adaptation of surveys to current issues
  - e.g., COVID-19, SDGs, Digital Transformation
- Data availability in the *KOF Microdata Centre* - access for all researchers
  - Information sharing benefits research and scientific advancement
  - Benefits for applied research and evaluations of real-world issues
- Reliable empirical basis for political inquiries, reports, presentations, or statements
  - Statistical material can be processed for different formats and provides broadly supported facts on various topics relevant for Innosuisse

Appendix

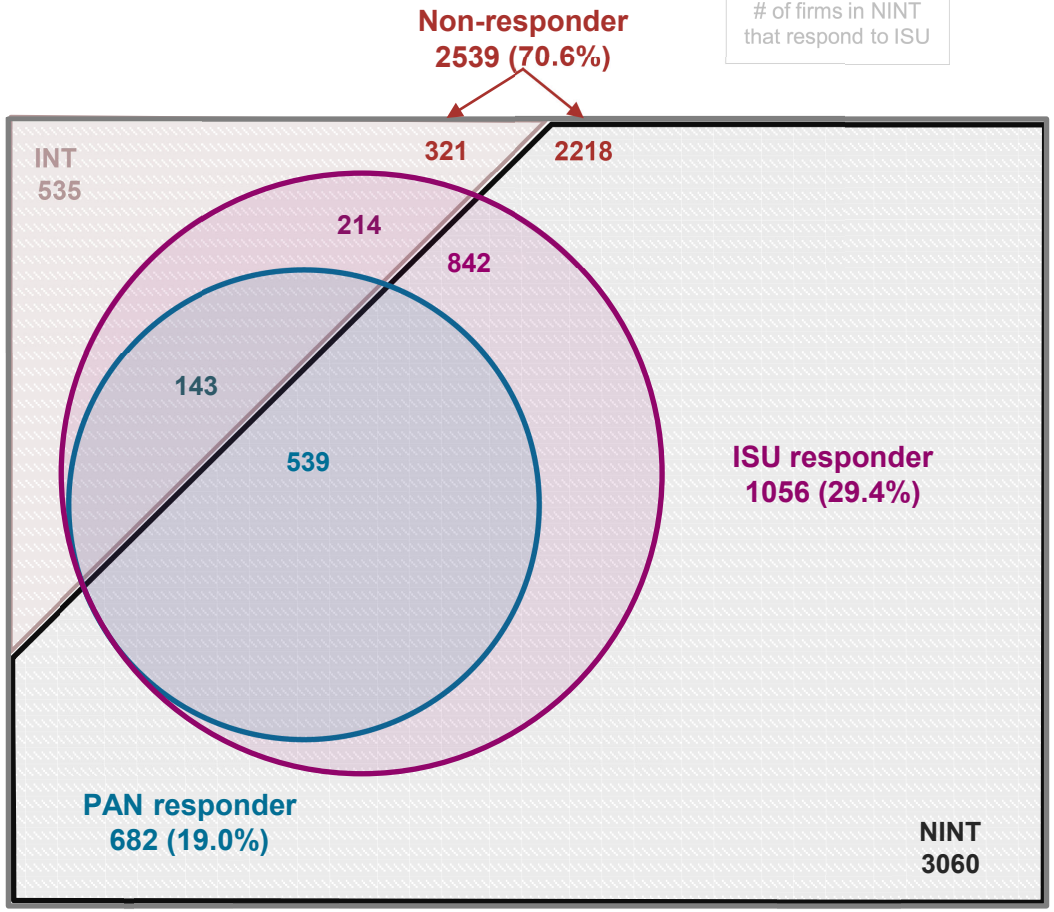
The appendix contains all the auxiliary information created during the evaluation including graphs and tables used in earlier presentations

Sample and Response

Sample composition and response rates

- There is a total of 3595 applicants
  - 2106 observations have an application after the ISU 2019
  - 1489 observations only have applications prior to the ISU 2019
- 535 applicants are also part of the KOF Enterprise Panel and by default part of the KOF Innovation Survey PAN (INT i.e. intersection)
- 3060 have no obligation to fill out the KOF Innovaiton Survey (NINT i.e. non-intersection)
- Both set of firms can respond to either survey encouraged by the merger of the Innosuisse Survey [ISU] and the KOF Innovaton Survey [PAN]
- **Response rates** are substantially **higher** than in pilot project
  - 29.4% (vs. 23.4% in 2019) answer ISU
  - 19.0% (vs 11.4% in 2019) answer both ISU and PAN
- Everyone that answered the PAN also answered the ISU
  - no cases left that only answer the PAN
  - explained by the merger of the surveys and precedence of ISU
- Responsiveness is higher for INT (40.0%) opposed to NINT (27.5%)
  - May be due to smaller sample size or due to the fact that they are more accustomed to fill out KOF surveys

# of firms in INT that respond to both ISU and PAN



# of cases

response rate (of INT + NINT)

sample size of NINT (including respondents and non-respondents

Response rates

by subcategory, in % points

	2019	2021	Overall
Applied for			
Innovation project	23.9	30.0	**27.5**
Innovation cheque	22.5	28.6	**26.5**
Application received			
Approval	25.5	34.4	**31.0**
Rejection	18.0	15.6	**16.5**
Overall	**23.4**	**29.4**	**27.1**

- The response rate is balanced between firms that applied for projects or cheques
- Firms that received the funding are far more responsive than firms that did not receive funding
  - This lack of response from rejected applicants might introduce response bias, but we cannot assess the size of the bias due to a lack of non-response analysis
- A breakdown for different firm sizes, ages and industry affiliations is not possible since the former two rely on firm's reported values in the surveys (which are trivially not available for non-participants) while information on the latter was not provided by Innosuisse.

Development of innovation activities

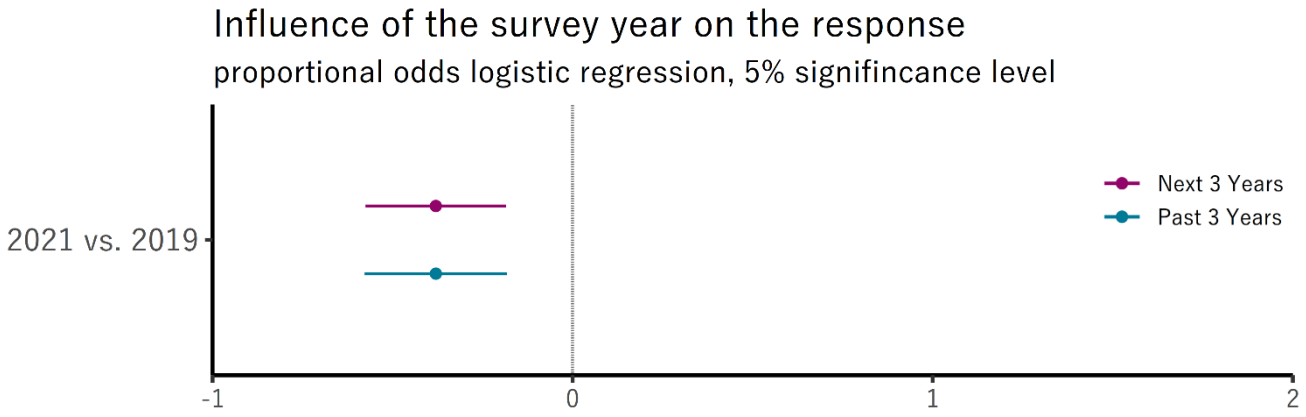
Development of innovation activities

Questions: How did the innovation activities in your company develop in the last 3 years?
How will the innovation activities in your company develop in the next 3 years?

		Past 3 years		Next 3 years	
		2019	2021	2019	2021
How did the innovation activities in your company develop? (in %)	Strong Reduction	0.8	1.4	1.6	2.1
	Reduction	4.7	6.4	6.0	6.5
	Unchanged	31.6	36.8	23.3	30.7
	Increase	43.4	43.0	42.3	41.6
	Strong Increase	19.5	12.5	26.8	19.1

Development of innovation activities

Questions: How did the innovation activities in your company develop in the last 3 years?
How will the innovation activities in your company develop in the next 3 years?

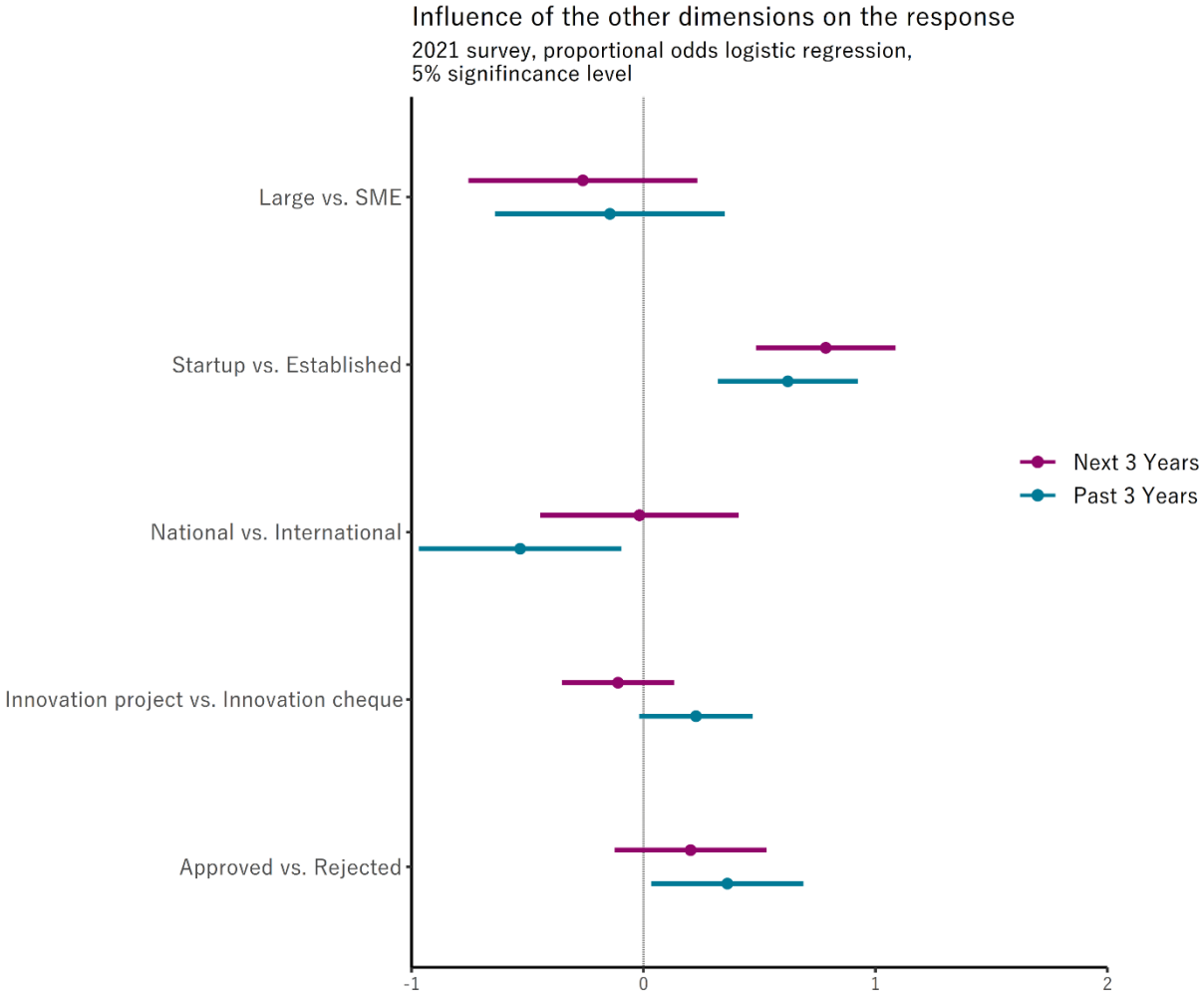


- This graph shows the **sign** and **statistical significance** of the difference between the replies to the two above questions between 2021 and 2019.
- Since these replies are measured on an ordinal scale, it is best to apply an ordinal regression model, in our case a proportional odds logistic regression
- The validity of the proportionality assumption is checked for each regression
- The graph indicates if the two groups differ in their response to every category of the ordinal variable (here every level between strong reduction and strong increase) and if these differences are statistically significant
- In this case, we see that the responses to the past and expected future development of a firm's innovation activities were **slightly lower in 2021** and that these **results are statistically significant** on a 5% level.

Development of innovation activities

Questions: How did the innovation activities in your company develop in the last 3 years?

How will the innovation activities in your company develop in the next 3 years?



Key findings:

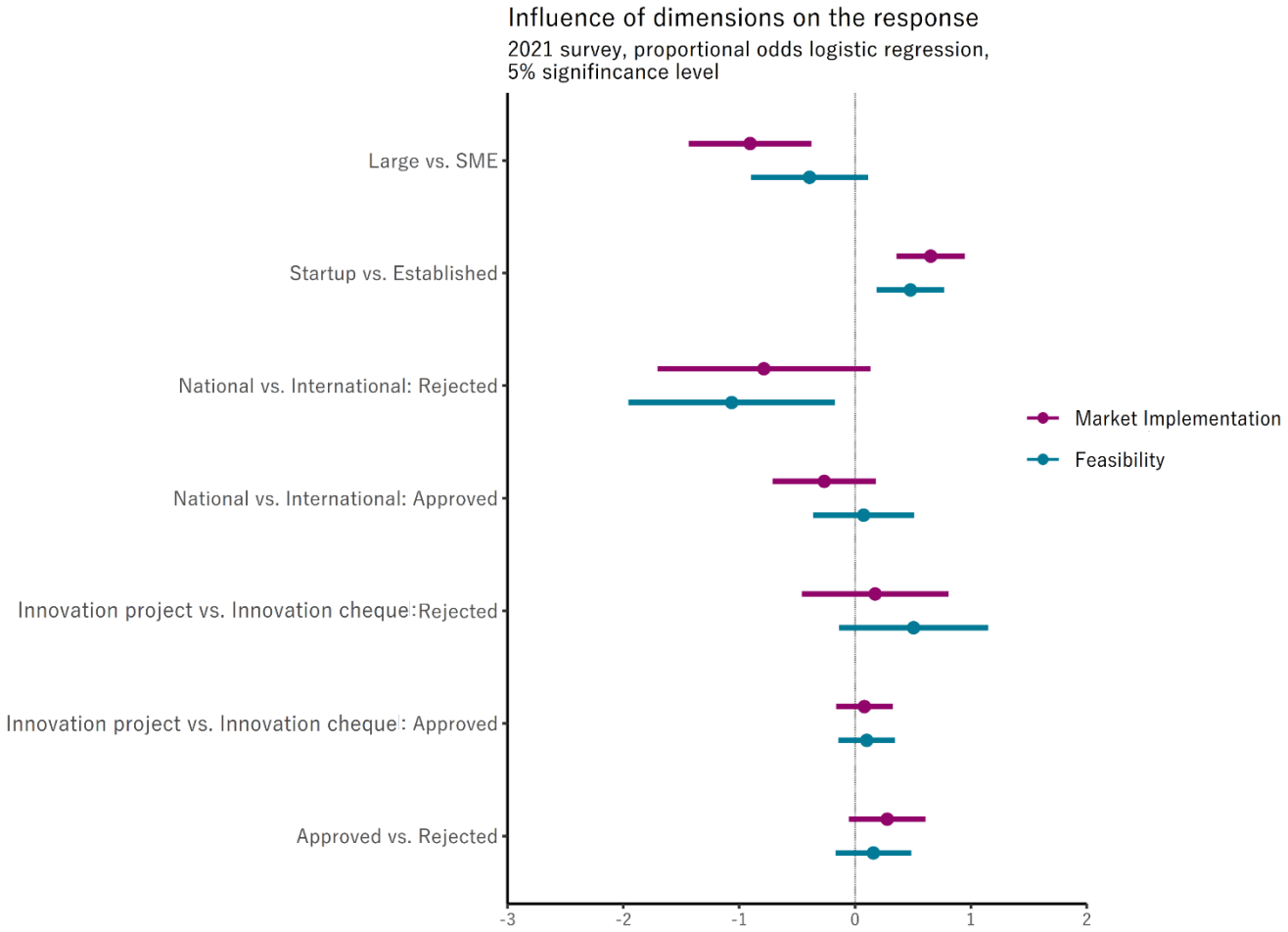
1) The only differences between the responses of groups to their realized past and expected future development of innovation activities that are statistically significant at a 5% level are:
   i. Approved funding proposals have better past developments
   ii. Internationally funded have better past developments
   iii. Startups have better past and expected future developments
   iv. All of these are highlighted in the main slides
2) Once again,
   i. these differences only stem from 2021 survey data
   ii. The dots and lines correspond to the point estimate and confidence intervals from a proportional odds logistic regression where the validity of the proportionality assumption was checked

Risk of innovation activities

Risk of innovation activities

Questions: How high are the R&D and innovation risks of your company related to **feasibility?**

How high are the R&D and innovation risks of your company related to **market implementation?**

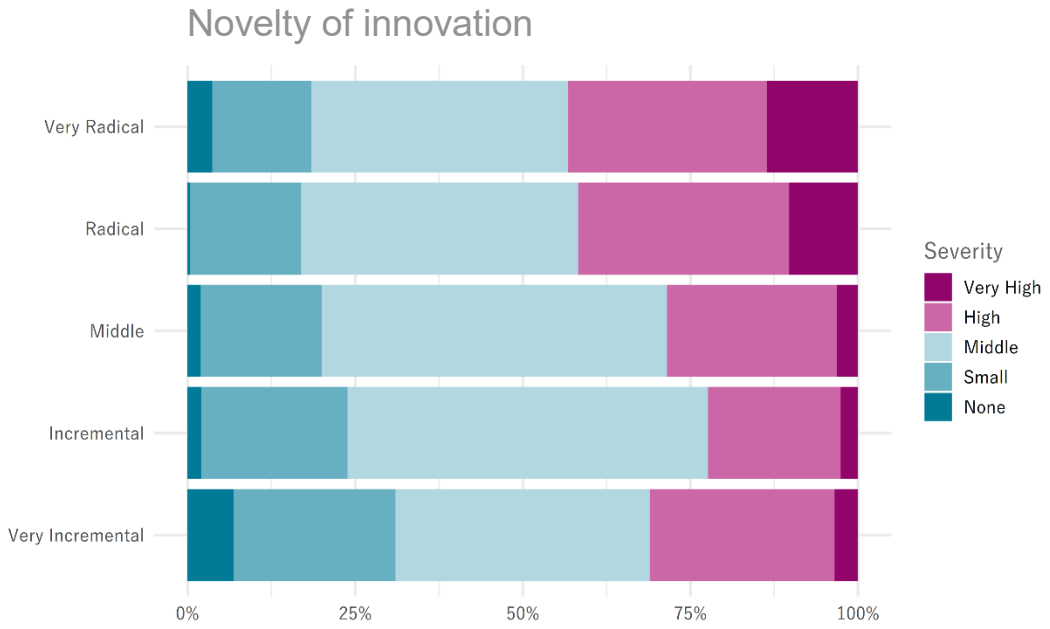


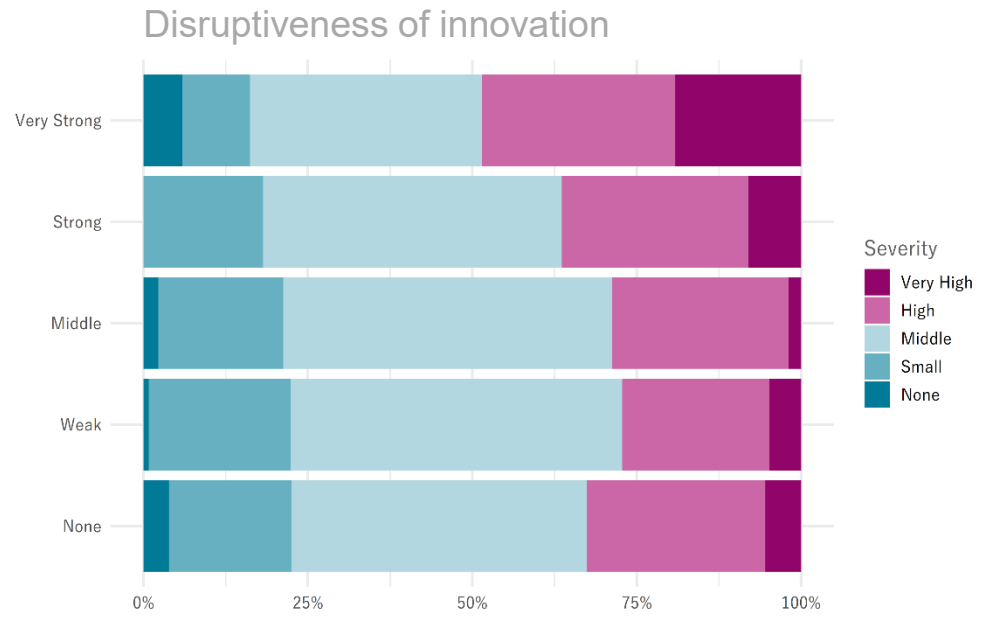
Key findings:

1) The only statistically significant differences at a 5% level concerning innovation risks are
   - Companies that apply for international funding but get rejected have higher feasibility risks than companies that apply for national funding and get rejected
   - Startups have higher feasibility and market implementation risks than established companies
   - SMEs have higher market implementation risks than large companies
2) Once again,
   i. these differences only stem from 2021 survey data
   ii. The dots and lines correspond to the point estimate and confidence intervals from a proportional odds logistic regression where the validity of the proportionality assumption was checked

Risk of innovation activities

Questions: How high are the R&D and innovation risks of your company related to **feasibility?**

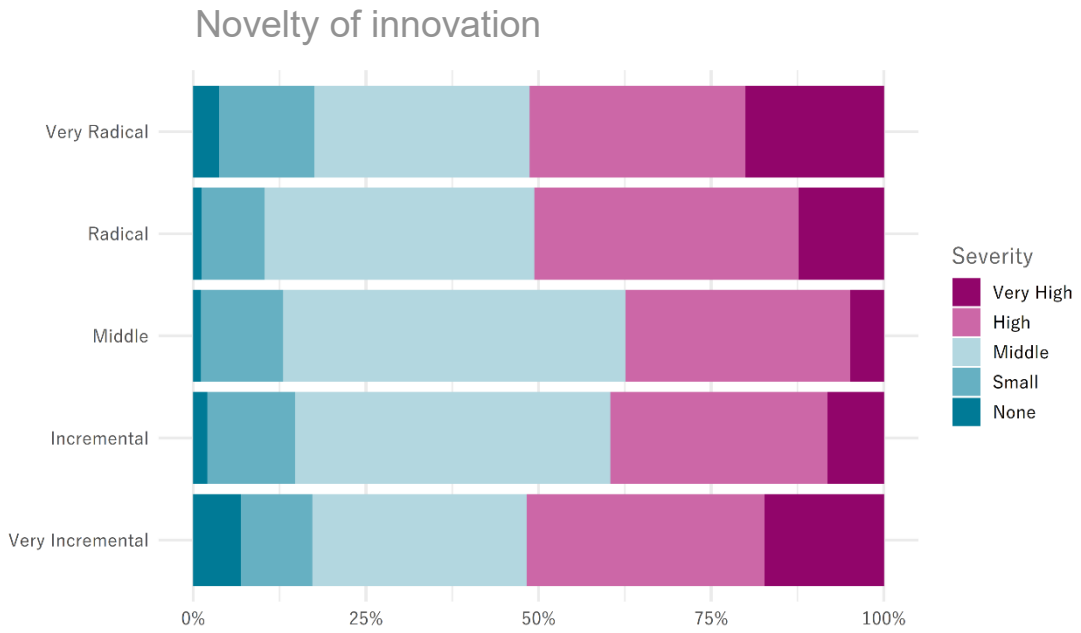


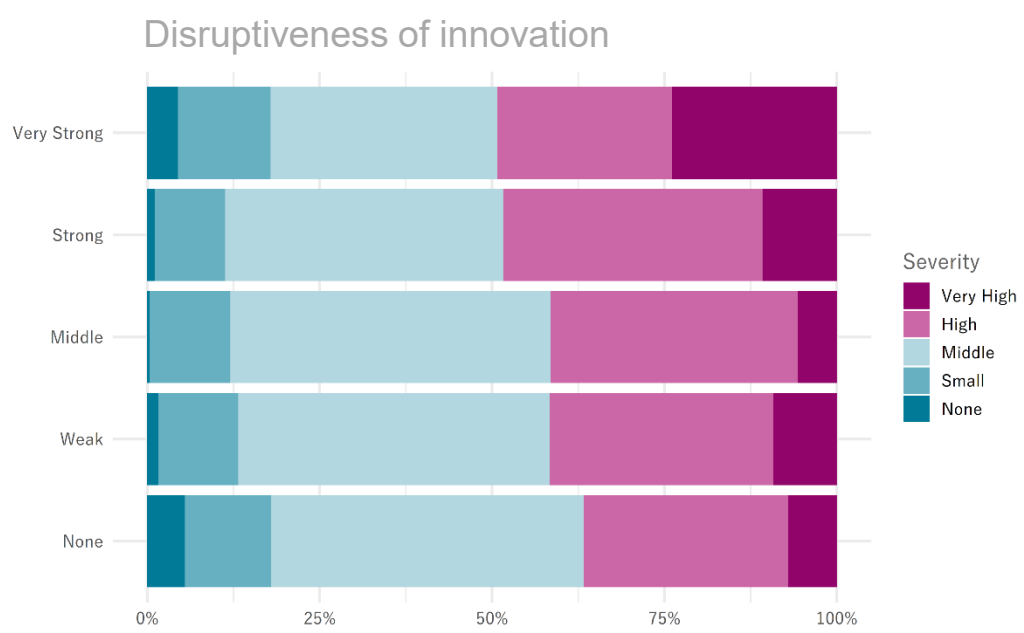


- High and very high feasibility risks are more common among firms with radical and disruptive innovations

Risk of innovation activities

Questions: How high are the R&D and innovation risks of your company related to **market implementation?**



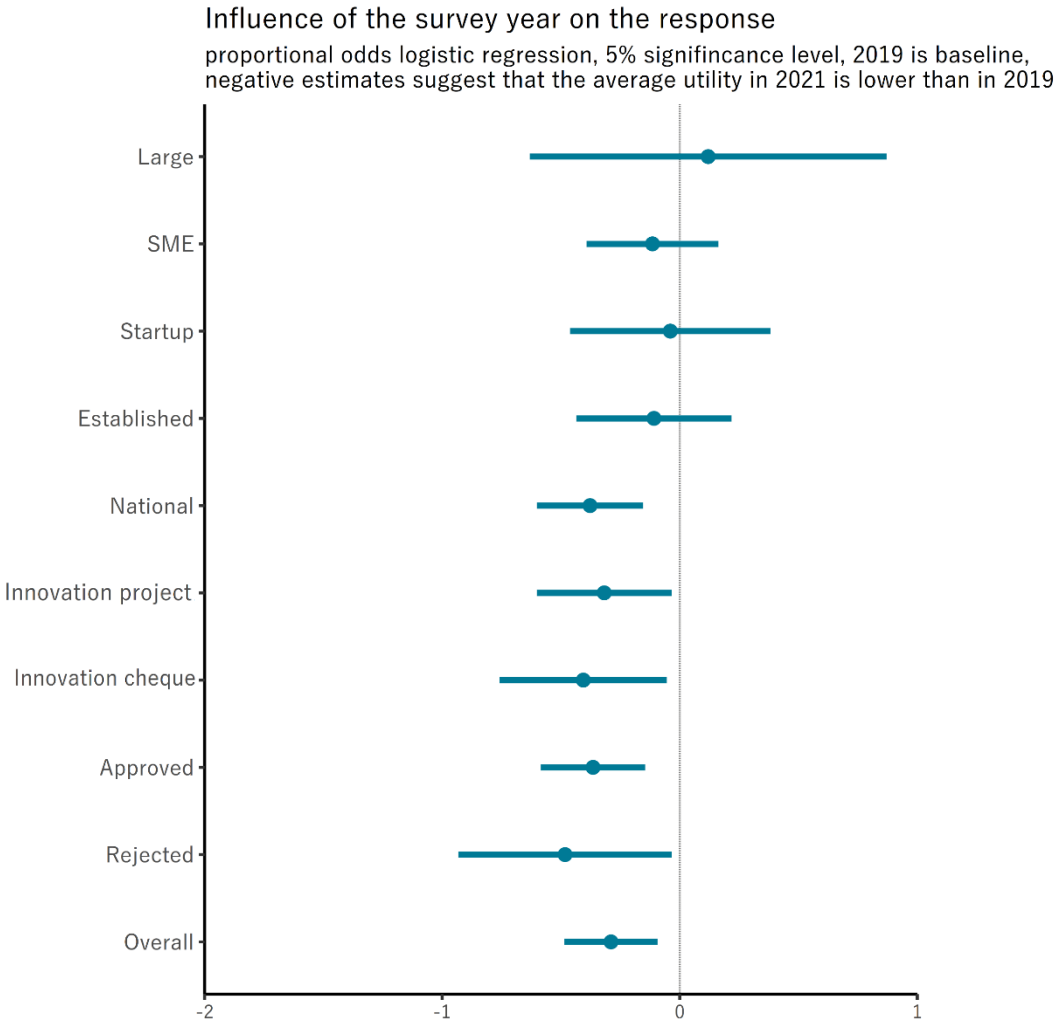


- Market implementation is the far bigger risk and equally pronounced among firms irrespective of the novelty of their innovations
- Very high market implementation risks are more pronounced among firms with higher disruptiveness of their innovations

Utility of innovation support

Utility of innovation support

Question: How would you rate the overall utility of Innosuisse's innovation funding?



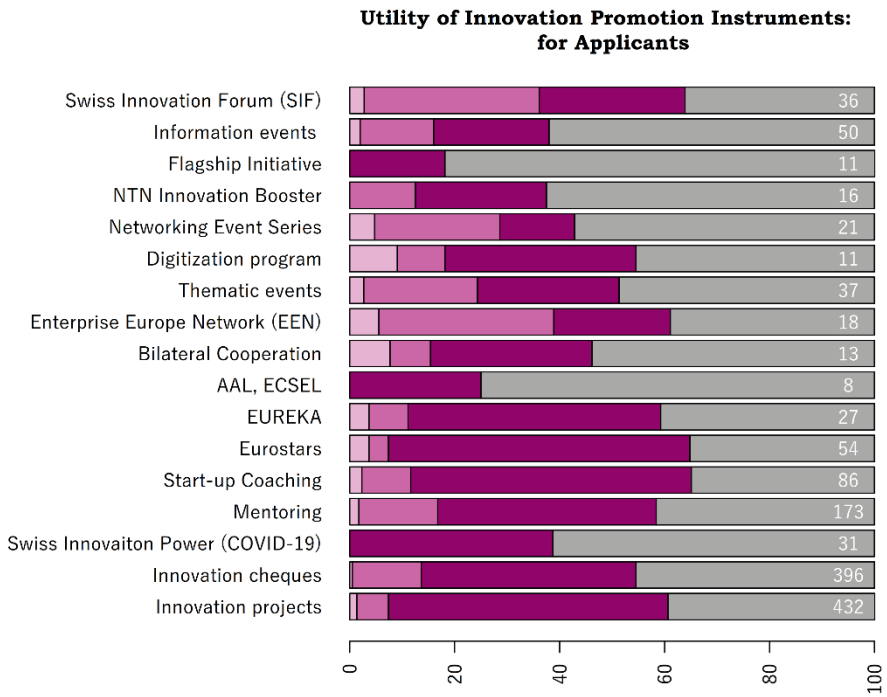
Key findings:

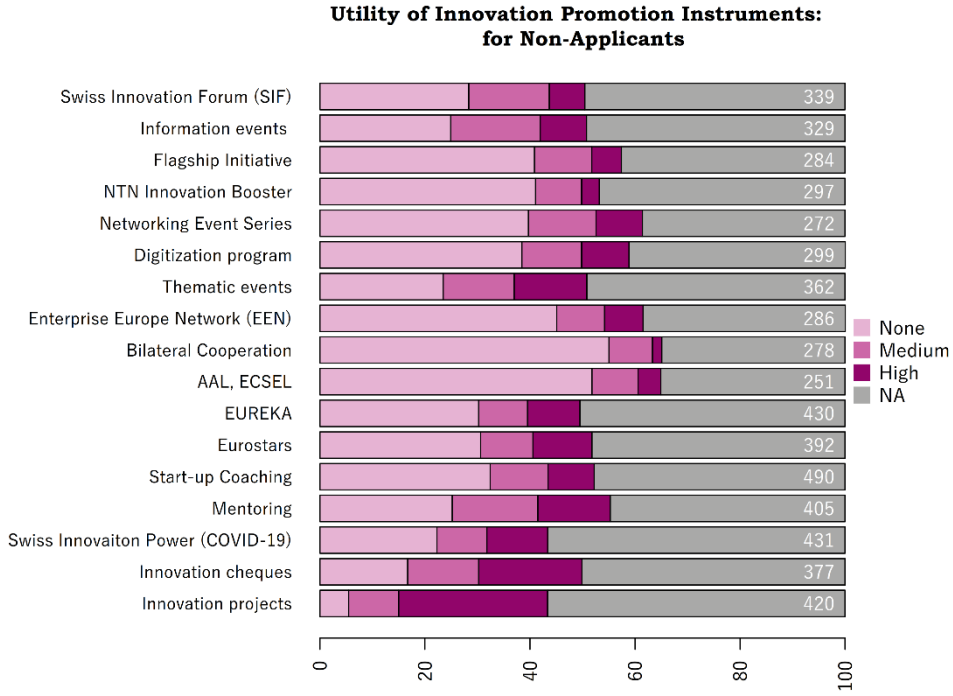
1) The statistically significant reductions in the average utility assigned to the Innosuisse's innovation support between 2019 and 2021 at a 5% level occur only for the following funding dimensions
   - Rejected applications
   - Accepted applications
     - Cheques as well as Projects
     - Nationally funded companies (international is not assessable)
2) Once again,
   i. these differences only stem from 2021 survey data
   ii. The dots and lines correspond to the point estimate and confidence intervals from a proportional odds logistic regression where the validity of the proportionality assumption was checked

Innovation Promotion Instruments

Innovation Promotion Instruments

Question: How do you assess the utility of these instruments for your company?





Key findings:

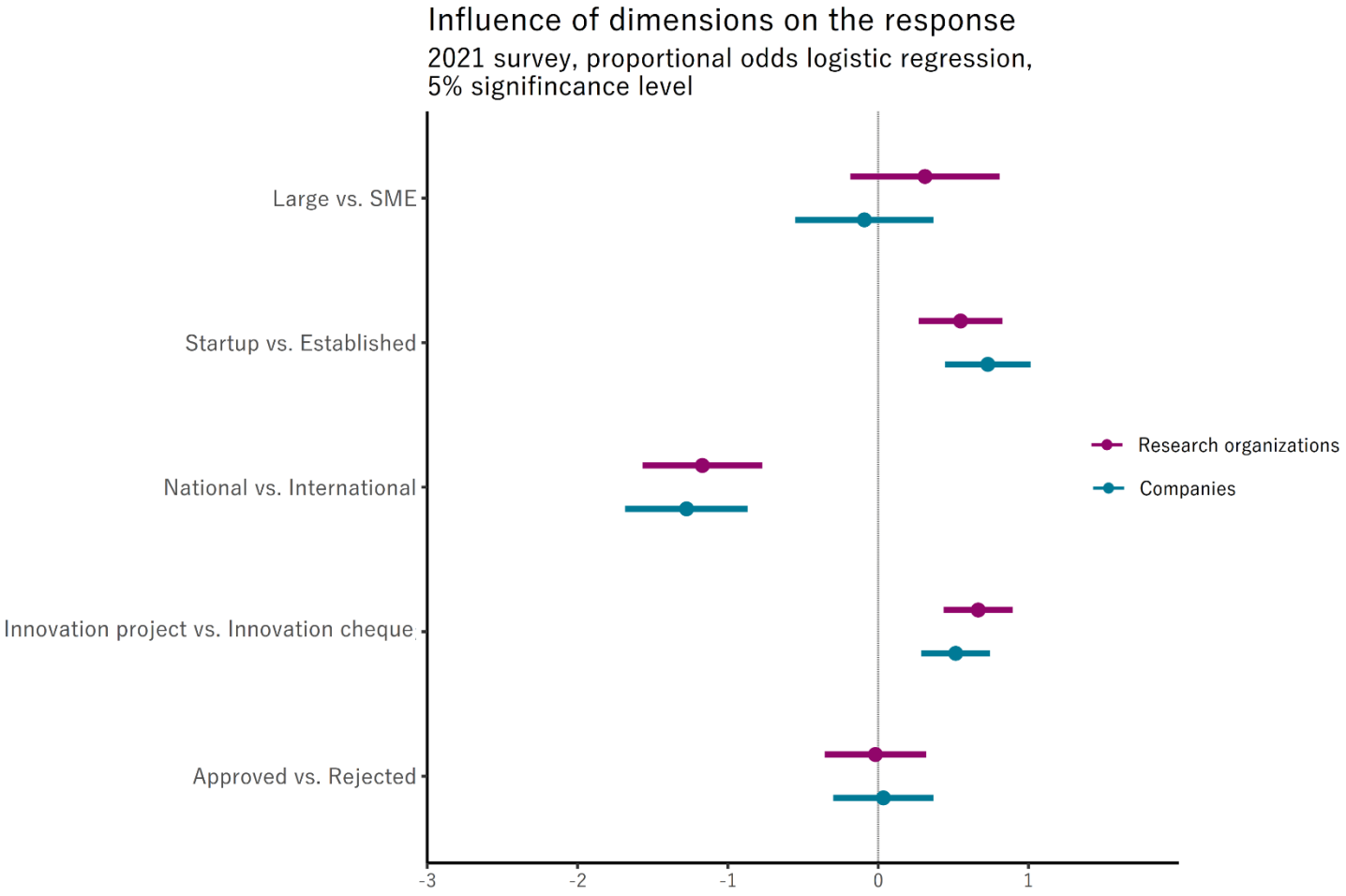
1) Applicants assign a high utility to the respective innovation promotion instrument
   - There are almost no firms that applied to a promotion instrument but see no utility in the instrument
   - For most instruments, applicants assign a high utility (except for EEN, Nationale Netzwerke, and SIF where a medium utility dominates)
2) Non-applicants often see no utility in the instruments
   - Except for Innovation projects and Innovation cheques, where even non-applicants see a high (or medium) utility more often (is probably driven by the fact that they applied for at least one of the two, otherwise they would not be in the sample)
3) These results carry a **lot of uncertainty** and should **not** be regarded as **representative** of the true satisfaction with the instruments
   - Applicants and non-applicants most often fail to indicate if they derive any utility of the instruments (NAs), and we cannot say where those NAs would go (none, medium or high utility)
   - For many instruments, the number of applicants is low aggravating the uncertainty towards the true utility even further

International innovation collaboration

International innovation collaboration

Questions: How relevant is innovation collaboration with foreign companies for your company?

How relevant is innovation collaboration with foreign research organizations for your company?



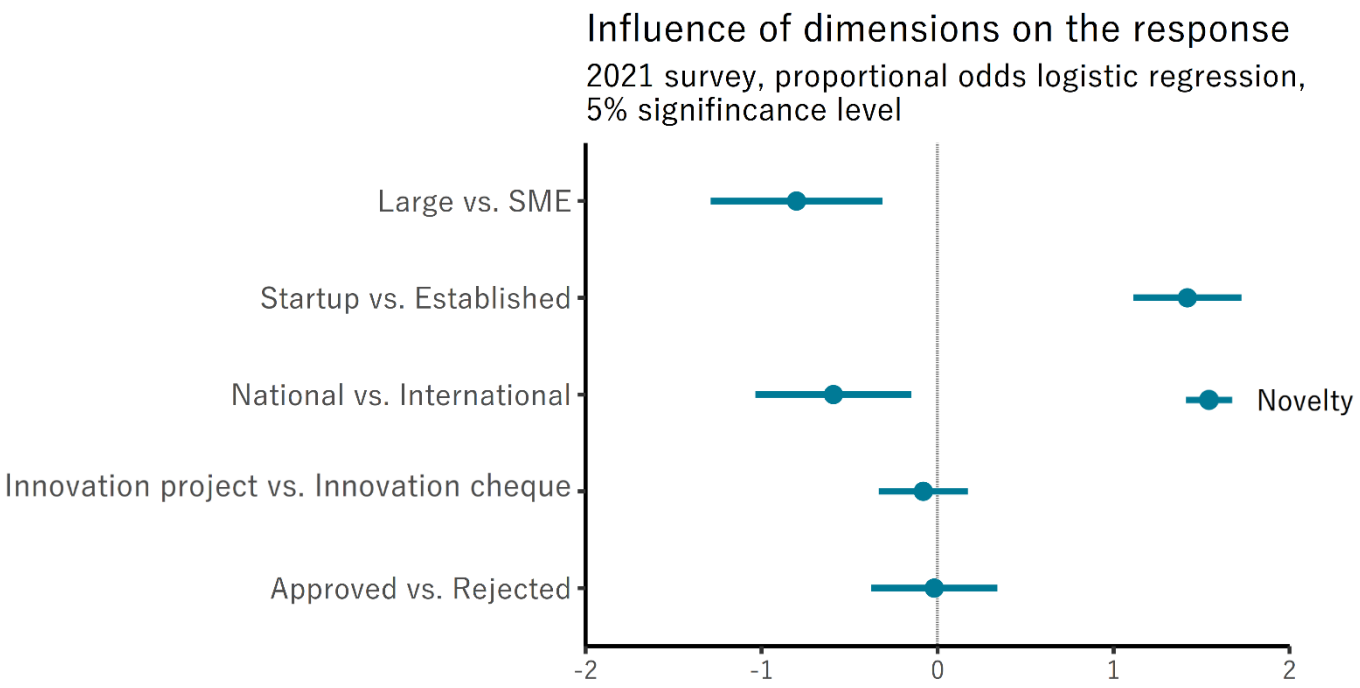
Key findings:

1) The statistically significant differences in the relevance of international collaborations at a 5% level occur for the following dimensions
   - more relevant for applicants to “Innovation projects” than “Innovation cheques”
   - more relevant for applicants to “International” than “National” innovation funding (truism)
   - more important for “Startups” than “Established”
2) Once again,
   i. these differences only stem from 2021 survey data
   ii. the dots and lines correspond to the point estimate and confidence intervals from a proportional odds logistic regression where the validity of the proportionality assumption was checked

Novelty and disruption of innovations

Novelty of innovations

Question: How would you rate the degree of novelty of the innovations of your company in the last two years?

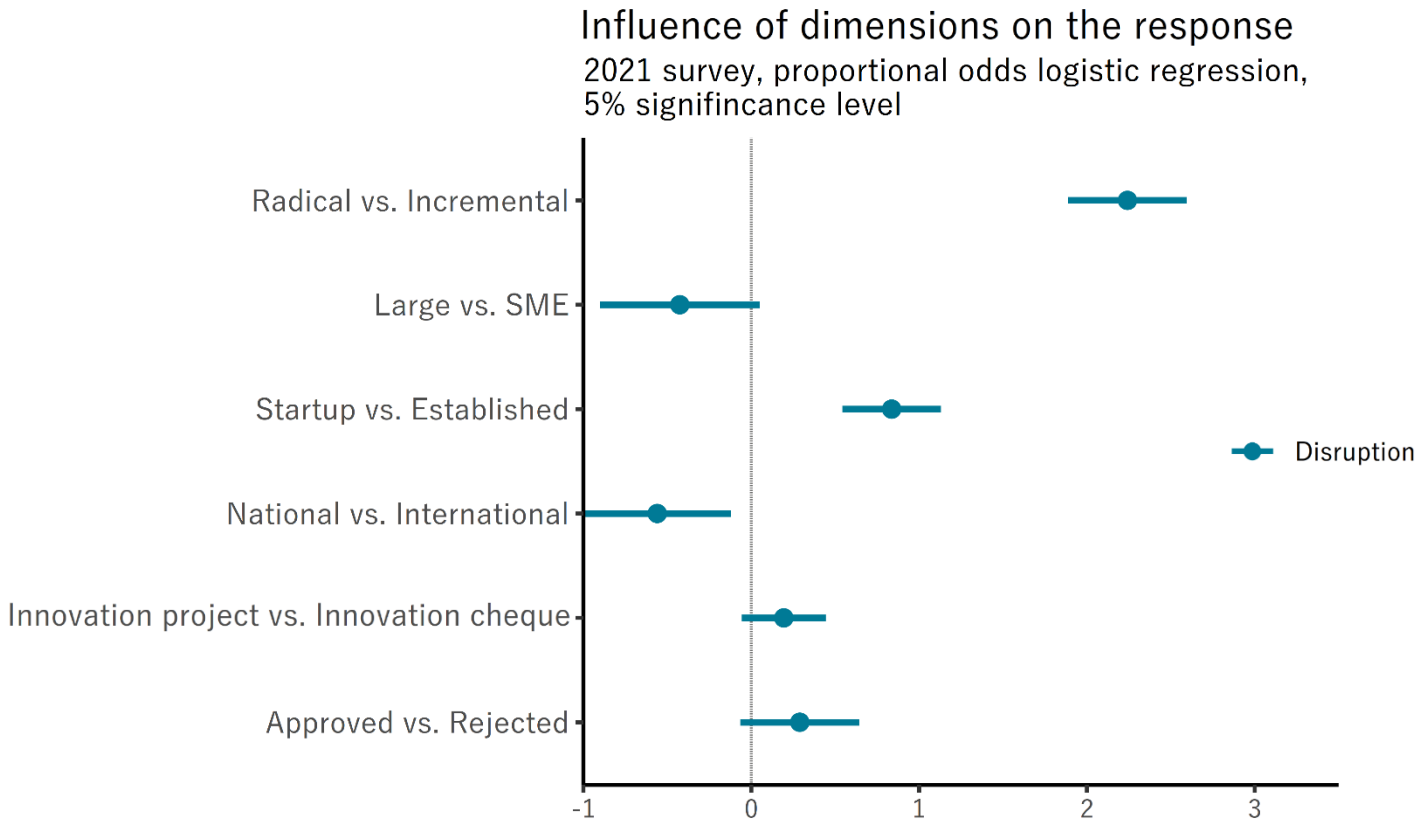


Key findings:

1) The statistically significant differences in the degree of novelty of innovations at a 5% level occur for the following dimensions
   - International indicate more radical innovations than National
   - Startups indicate more radical innovations than Established
   - SMEs indicate more radical innovations than Large
2) Once again,
   i. these differences only stem from 2021 survey data
   ii. the dots and lines correspond to the point estimate and confidence intervals from a proportional odds logistic regression where the validity of the proportionality assumption was checked

Disruption of innovations

Question: Do the product and process innovations of the last five years of your company show disruptive effects?



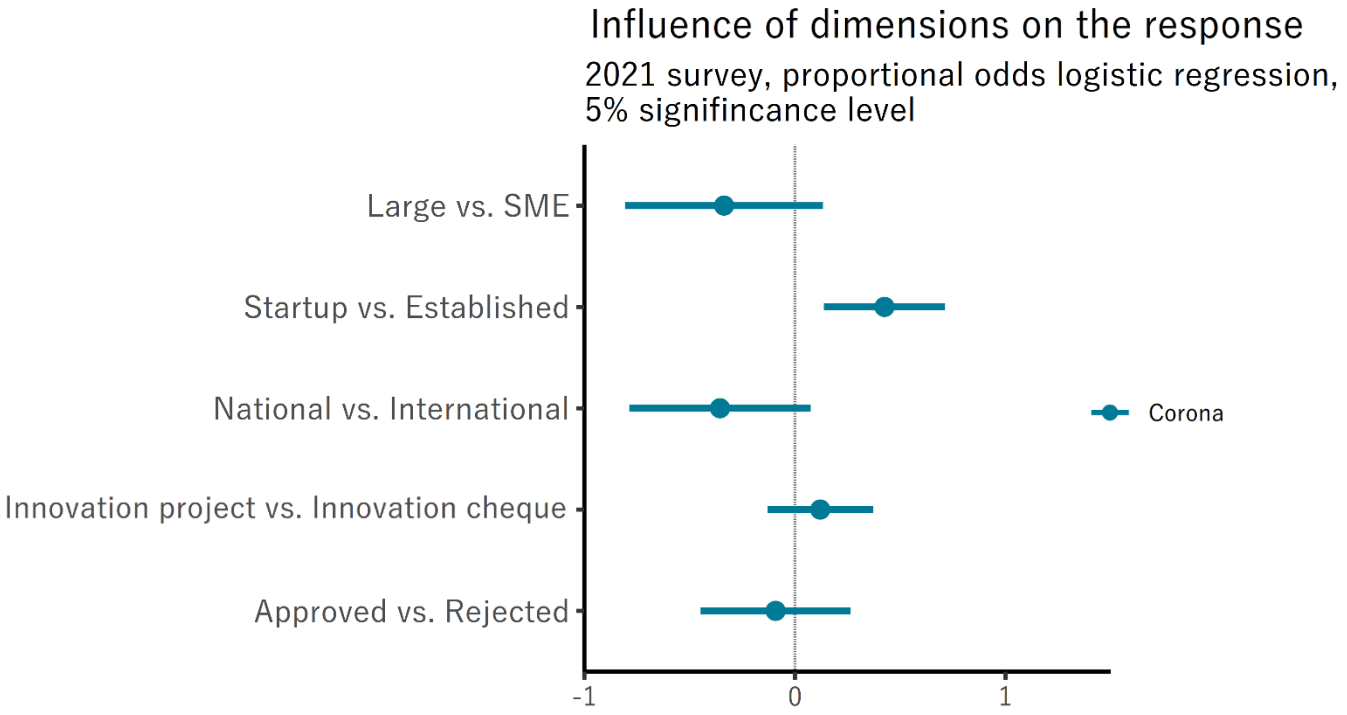
Key findings:

1) The statistically significant differences in the disruptiveness of innovations at a 5% level occur for the following dimensions
   - International indicate more radical innovations than National
   - Startups indicate more radical innovations than Established
   - SMEs indicate more radical innovations than Large
2) Once again,
   i. these differences only stem from 2021 survey data
   ii. the dots and lines correspond to the point estimate and confidence intervals from a proportional odds logistic regression where the validity of the proportionality assumption was checked

The impact of the COVID-19 pandemic

The impact of the COVID-19 pandemic

Question: Does the pandemic influence the innovation processes of your company?

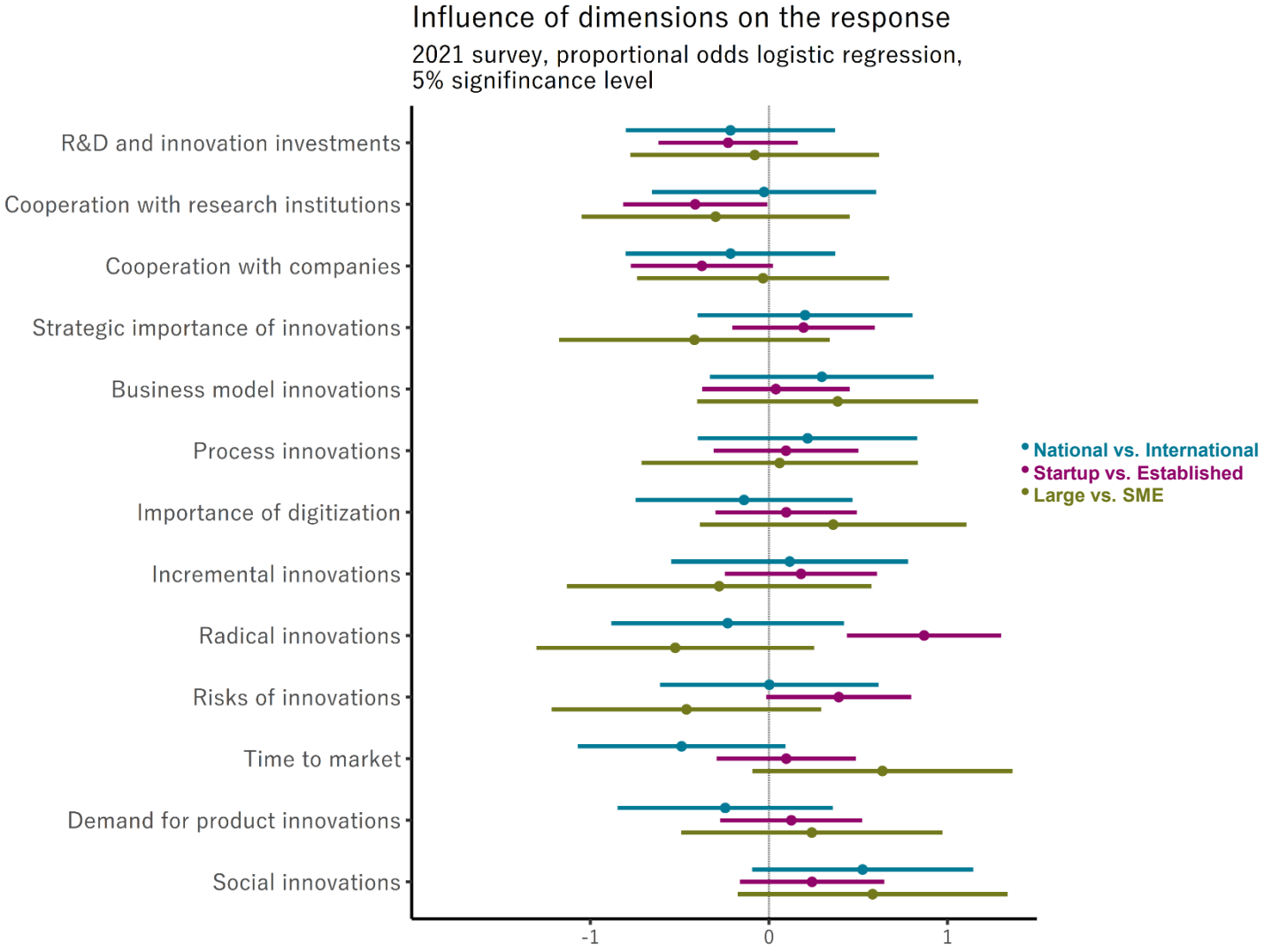


Key findings:

1) The statistically significant differences in the impact of the COVID-19 pandemic on innovations at a 5% level occur for the following dimensions
   - Startups were stronger affected than Established
2) Once again,
   i. these differences only stem from 2021 survey data
   ii. the dots and lines correspond to the point estimate and confidence intervals from a proportional odds logistic regression where the validity of the proportionality assumption was checked

The impact of the COVID-19 pandemic

Question: If the pandemic influenced your innovation processes (middle, strong, very strong), in which areas?



Key findings:

1) The statistically significant differences in the impact of the COVID-19 pandemic on innovations at a 5% level occur for the following dimensions
   - Startups recorded a stronger reduction in innovation cooperation opposed to established firms
   - Startups recorded a stronger increase in radical innovations opposed to established firms
   - Startups recorded a stronger increase in the risks of innovations opposed to established firms
   - All other innovation areas and dimensions show no statistical differences in the influences of the pandemic
2) Once again,
   i. these differences only stem from 2021 survey data
   ii. the dots and lines correspond to the point estimate and confidence intervals from a proportional odds logistic regression where the validity of the proportionality assumption was checked

Sustainable Development Goals

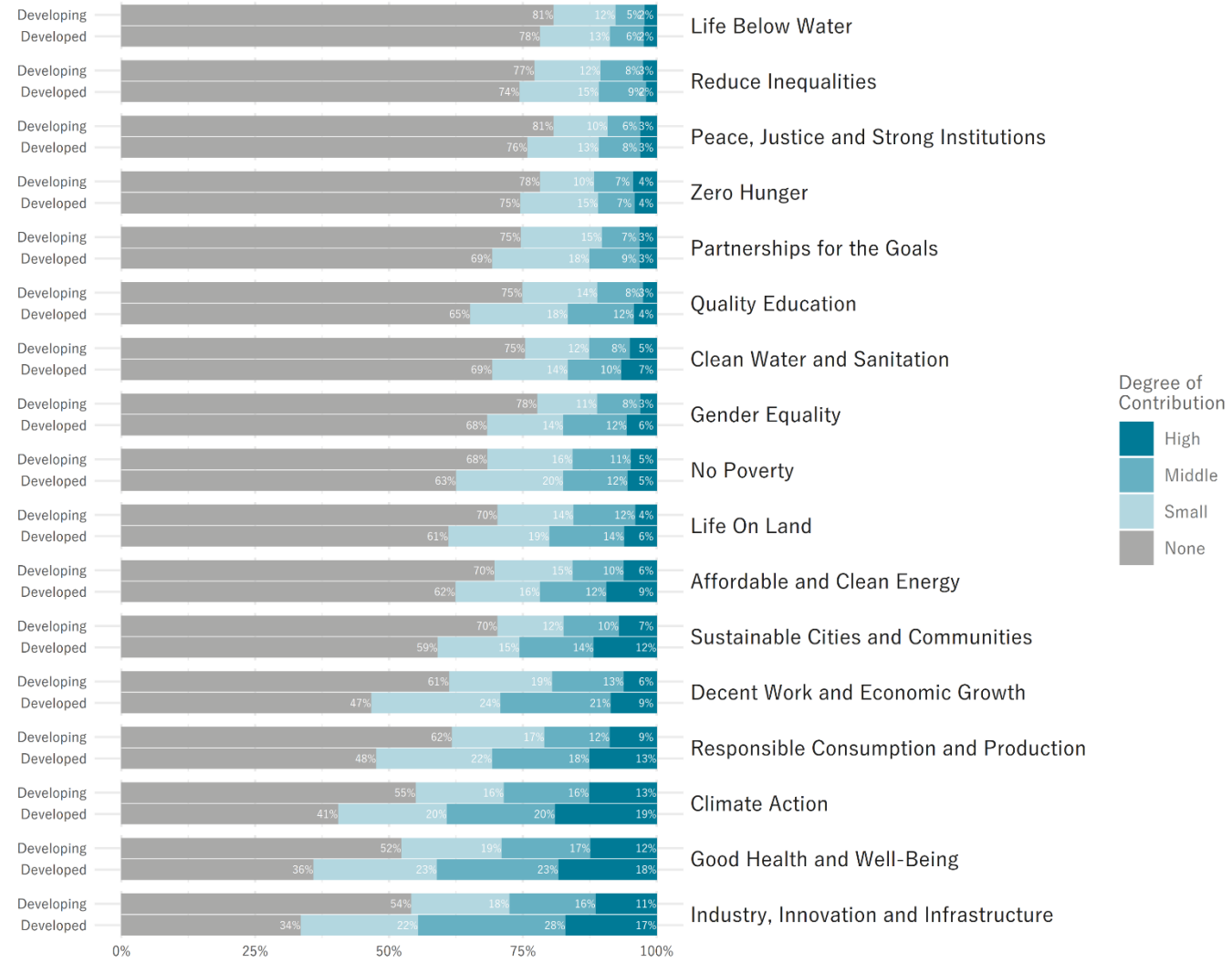
Sustainable Development Goals

Question: Do the R&D or innovation activities of your company actively contribute to the thematic areas of the United Nations' "17 Sustainable Development Goals" listed below?

UN short title	UN description
Goal 1: No Poverty	End poverty in all its forms everywhere
Goal 2: Zero Hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3: Good Health and Well-Being	Ensure healthy lives and promote well-being for all at all ages
Goal 4: Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5: Gender Equality	Achieve gender equality and empower all women and girls
Goal 6: Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all
Goal 7: Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8: Decent Work and Economic Growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9: Industry, Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10: Reduced Inequalities	Reduce inequality within and among countries
Goal 11: Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12: Responsible Consumption and Production	Ensure sustainable consumption and production patterns
Goal 13: Climate Action	Take urgent action to combat climate change and its impacts
Goal 14: Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15: Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16: Peace, Justice and Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17: Partnerships for the Goals	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Sustainable Development Goals

Question: Do the R&D or innovation activities of your company actively contribute to the thematic areas of the United Nations' "17 Sustainable Development Goals" listed below?



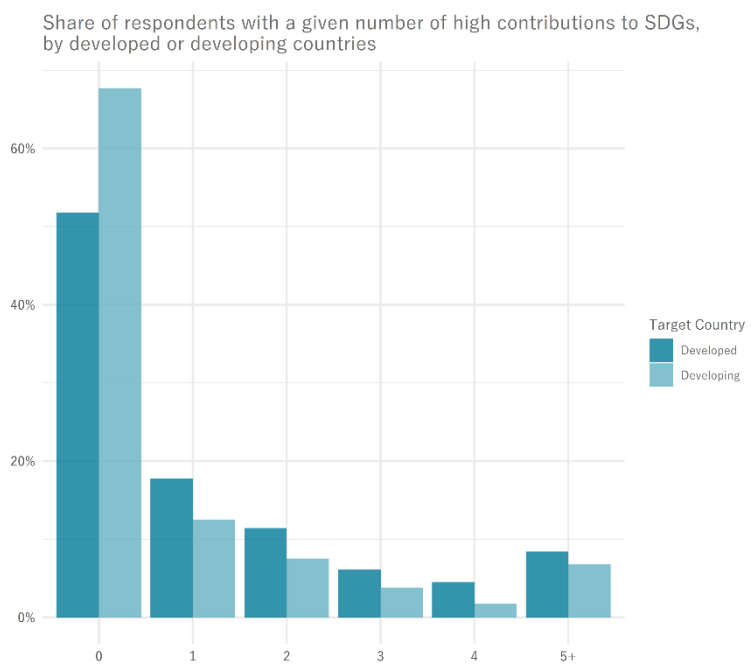
Key findings:

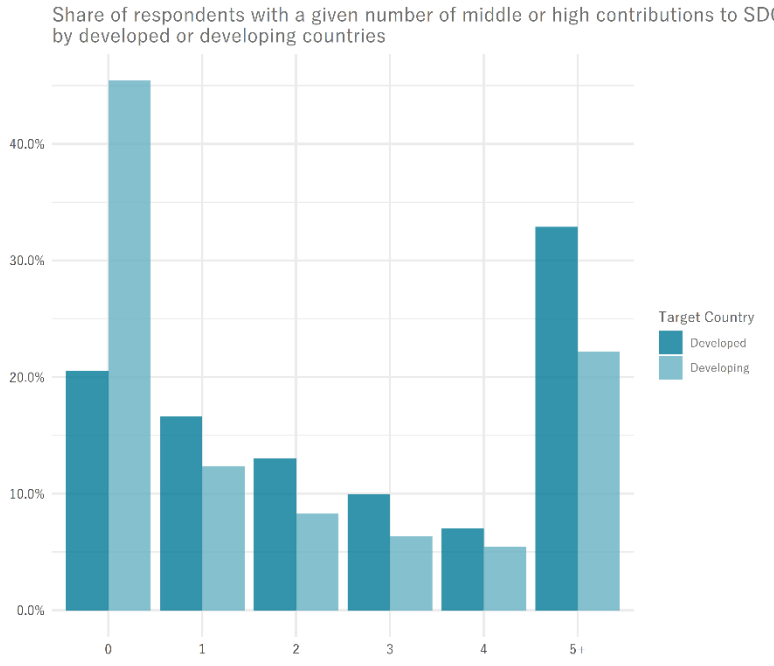
1) More contributions occur in developed countries
   - For each goal, the share of companies with significant contributions (middle or high) to developed nations exceeds the one to developing nations
   - The share of companies without any contribution to an SDG is always bigger for developing nations than developed ones
2) This discrepancy is especially pronounced in
   - *Industry, Innovation and Infrastructure*
     - 20% points in any contributions
     - 18% points in significant contributions
   - *Good Health and Well-Being*
     - 17% points in any contributions
     - 13% points in significant contributions
   - *Decent Work and Economic Growth*
     - 14% points in any contributions
     - 11% points in significant contributions
   - *Climate Action*
     - 14% points in any contributions
     - 10% points in significant contributions
   - *Responsible Consumption and Production*
     - 14% points in any contributions
     - 10% points in significant contributions

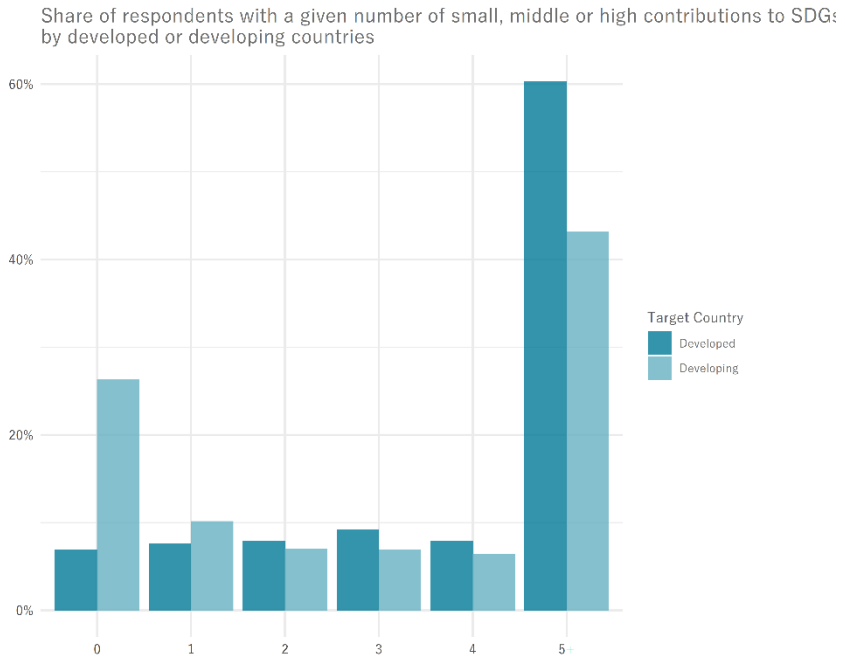
Hulfeld, Spescha & Wörter

Sustainable Development Goals

Question: Do the R&D or innovation activities of your company actively contribute to the thematic areas of the United Nations' "17 Sustainable Development Goals" listed below?







Key findings:

1) The SDG contributions occur **more frequently** and to a **higher degree** in **developed countries** opposed to developed countries
   - The discrepancy is not so big for high contributions where 48% contribute highly to at least one SDG in a developed country opposed to 32% in developed
   - The discrepancy becomes more apparent with middle contributions where 80% contribute highly or middle to at least one SDG in a developed country opposed to 55% in developing countries (also, there are 33% that contribute in that way to 5 or more SDGs in developed countries and only 22% that do so in developing countries)
   - There are 60% that contribute in some way (small, middle or high) to 5 or more SDGs in developed countries where only 43% do so in developing countries

Sustainable Development Goals

Question: Will your company contribute to the one of the 17 Sustainable Development Goals in the next three years?

Answers: Won't contribute, will start to contribute, are part of the documented innovation strategy, already are contributing