

**Units (and Levels) of Analysis in Strategy Research:
From Proliferation to Cumulative Knowledge Building**

*(Rough initial draft for presentation and discussion at the Strategy Summit, August 2024
Apologies for typos, grammatical errors, and incomplete referencing)*

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“The firm, the transaction, the business model, resources, the network, the ecosystem, the platform—is the proliferation of units of analysis healthy or unhealthy for the field?”

Faced with this prompt, our initial step was to validate the premise that we see a proliferation of units of analysis and to assess in what manner. Rather than undertake a bibliographic analysis, we chose to survey invitees to the Strategy Summit to assess this claim. A five-question survey was emailed to invitees in late March 2024 and remained open until early June of 2024. We received 75 complete responses to the survey. We draw attention to a few highlights in the following text and the Appendix presents raw data.

The general perception of respondents corroborates the prompt for our session. We asked, “Over the last 20 years, do you think that there has been an increase, no change, or decrease in the number of units of analysis used in strategy research?” Eighty-four percent of respondents believe that there has been an increase, and no one believed that there has been a decrease. Five percent responded that they perceived no change and 11 percent responded that they were not sure.

We further asked respondents to identify if they perceived an increase, decrease, or no change in the use of specific levels of analysis over the last twenty years. The three units with the greatest perceived increase are ecosystems, individuals, and teams (63%, 56%, and 52%, respectively). We wish to note that ecosystems are a more macro unit than the firm, whereas individuals and teams are more micro units than the firm. Although there is the perception that the number of units of analysis has increased, there is also the perception that some units of analysis are utilized less often. Respondents perceived a decline in the use of the industry, country, and transaction as units of analysis (41, 31, and 31 percent, respectively). Again, these

specific units of analysis are both more macro (industry, country) and more micro (transaction) than the firm.

Finally, we asked respondents the question that we are tasked with: “Is the proliferation of units of analysis a good or bad thing?” 68 percent believe it’s a good thing, 27 percent believe it’s neither good nor bad, three percent believe it’s a bad thing, and three percent were unsure. A common sentiment was that the appropriate unit of analysis depends on the research question. And implicit (and sometimes explicit is asking why) is that scholars should study the questions of interest to them.

Our assessment:

*The proliferation of units of analysis has not been unhealthy for the field –
at the same time, it has the potential to be unhealthy.*

The following sections will develop our assessment that the proliferation of units of analysis *can* be healthy for the field; but that requires understanding exactly why and how, and encouraging research that adopts such an approach. We fear the current trend in proliferation can lead to drift, which would be unhealthy for strategy research, and the field will fail to embrace an opportunity to make our research more cumulative, rigorous, and relevant to decision makers.

A conceptual structure to address the question.

To guide our assessment of the whether the proliferation of units of analysis is healthy or unhealthy for the field, we found it necessary to couch this within a conceptual structure. We introduce two elements that play a central role in our assessment. First, we distinguish among the following key elements: unit of analysis, level of analysis, and phenomenon of analysis. Second,

we argue why it is important to couch those key elements within the *context* of strategy research (i.e., the empirical reality of what we study).

Key elements

Unit of analysis

The unit of analysis is the unit of study, or the unit at which data are collected. For example, a researcher could study firm level data, such as profits or other financial measures. Alternatively, researchers could use data at more micro levels, such as the level of the patent, (e.g., patent characteristics that indicate whether a patent represents more radical or more incremental innovation), or the level of the individual (e.g., characteristics of an individual, such as experience in an industry).

Level of analysis

While the unit of analysis is the unit studied, the level of analysis is the level at which the data are analyzed to answer the question. The level of analysis matches the research question and is the level where variance is invoked. It need not match the unit of analysis, although it often does. Using the above examples, a researcher could study whether firm actions lead to more radical innovation. This is a question of firm innovation (i.e., actions firms take), but a possible research design would be to regress the patent-level data on firm actions. In this case, the unit of analysis is the patent, but the level of analysis is the firm. Variance in this research design could be invoked across firms or within firms. Namely, differences in the extent to which patents reflect more radical innovations could vary across firms or over time within firms.

In the second example, a researcher could study whether firms with leaders that have more industry experience have greater survivability. In this case, individual-level data can be aggregated to the firm level, and variance in this measure is used to explain variance in survival.

Again, the research question is at the firm level and variance is invoked across firms, although individual-level data are key in the research design.

The above examples involve research questions pertaining to firm-level outcomes, despite data collection at more micro levels. The suggestion of proliferation of units of analysis in these cases, indicated by what researchers are studying, does not necessarily indicate a proliferation of different levels of analysis. The availability of different types of fine-grained data in recent years may have increased the different units of analysis used in strategy research. However, this does not indicate that researchers are drifting away from studying firms. This comports with the responses to our survey, where a large percentage of respondents indicated that their scholarship is at the firm level. In addition, a large percentage of our respondents said that they believe research using the firm as the unit of analysis has increased. So it may be that the proliferation of units of analysis is about just that, the level at which data are collected, and not the level of analysis at which research questions are studied.

Phenomenon of analysis

We add one more consideration beyond units and levels: phenomena of analysis. What we mean by this is the phenomena of study. For example, many studies of ecosystems employ units of analysis (level of data gathered) and levels of analysis (level of variance invoked in the research design) at the sub-ecosystem level. In this case, the phenomenon of analysis is the ecosystem – but it is neither the unit nor the level of analysis. For example, the research question can be studied at the firm level and the data can be collected at other levels (e.g., technology, product). We add this consideration because studies can examine phenomena that are units or levels of analysis in other studies.

Examples

We provide the following three examples from our work to help clarify the above concepts. These examples also demonstrate how and why multiple units or levels of analysis can be employed in a study.

Guenther & Shaver (2024) aggregate individual-level data to replicate the industry experience-venture survival relationship. Previous studies find that ventures with founding team members who possess industry experience are more likely to survive. Because ventures don't have experience (it is the individuals within ventures that have prior experience), scholars aggregate individual-level data to form a measure of venture experience. They then regress survival (a venture-level measure) on the measure of venture experience. Therefore, the level of analysis in the research design is at the venture level, although individual-level data shape a key variable. To help unpack the causal mechanisms leading to this relationship, the authors focus on individual-level data to examine individuals' mobility. In these analyses, the unit and level of analysis shifts to the individual because the research design tracks the mobility of individuals after they leave the venture. Therefore, this study uses multiple units and levels of analysis to address the phenomenon of venture survival.

Adner and Kapoor (2010) study the phenomenon of a firm's commercialization of new technologies. They focus on the research question: how do challenges in the ecosystem impact the benefits that accrue to firms that pioneer new technologies? The research question focuses on firm-level value creation in the context of an ecosystem. The primary level of analysis and unit of analysis is the firm; they study firm-level market share for a given technology and firm-level entry timing for a given technology. In addition, they include a moderator, which varies over time at the ecosystem level (i.e., the ecosystem-level challenge measure for a given technology:

Upstream components vs. Downstream complements). As a result, the analysis includes both ecosystem- and firm-levels to unpack mechanisms and shows how upstream components and downstream complements can have opposing effects on firm's value creation.

Benner & Waldfogel (2023) study the phenomenon of digitization in the context of movies. Economists have often studied digitization, focusing on the consumer welfare benefits that arise from the proliferation of products enabled by digitization. The authors ask how digitization and digital distribution channels (i.e., movie streaming) influence firm behavior. In particular, does digitization change the types of movies that firms produce? The level of analysis for the question and the study is firms. The unit of analysis is more micro – the individual movie products and specific characteristics of those products. Data on movie products are then aggregated to the firm level to study variation both within and across firm, before and after the major technological changes that enabled digitization and digital distribution channels.

The strategy context

What does it mean to ground the assessment of units and levels of analysis within the strategy context? We believe that assessing if the proliferation of units and levels of analysis is beneficial can only be meaningfully accomplished with an appreciation for the questions we hope to address within the field and the theories and data we have to address them. Therefore, meaningful answers to the question we were posed is not an abstract conceptual exercise – but one that should be tailored to the nature of what we study as strategy scholars.

We take the view that the central issues in strategy center on value creation and capture among firms. We believe that this is consistent with the field's historical roots, the focus of many of our classes, and the insights from our research that are of interest to business professionals. As

such, it suggests that the key unit and level of analysis is the firm. Our survey results are consistent with this. Ninety-seven percent of respondents report doing research at the firm level.

Nevertheless, the empirical reality of assessing issues of value creation and value capture among firms bring to the forefront many issues directly related to units and levels of analysis. For example, the complexity stemming from the following contexts requires rethinking levels of analysis.

Multi-business firms. The empirical reality of many firms – especially firms of any measurable size – is that they operate multiple businesses. That can include providing multiple products or services, operating in multiple geographies, or competing in different technological spaces. For example, Amazon provides online retail service, ships products to consumers, and operates cloud computing services. Tesla builds automobiles in the United States, Germany, and China. Toyota is developing and commercializing low emission vehicles using hybrid, battery and fuel cell technologies.

Value-creation in inter-organizational contexts. Value-creation does not happen with a firm in isolation. At a minimum, it requires customers and input providers. However, more complex relationships can also come into play. For example, alliances with other companies can become a key part of value creation. Likewise, ecosystems and platforms suggest that relationships among many actors factor into their value creation efforts.

Reflection on units and levels of analysis as the field has evolved

We would like to note that the evolution of theory and data access has led to the proliferation of units of analysis and the separation between units and levels of analysis within a study. When the field was nascent, scholars were often limited to industry-level data. As a result, the match of industry-level theories (e.g., Bain-Mason IO) and data lead to a straightforward

mapping of units and levels of analysis. As the field began to mature, there was greater access to firm-level data (e.g., Compustat). Such data access aided the advancement of firm-level theories because firm-level tests were possible. Once again, the match between firm-level theorizing and firm-level data led to a match between units and levels of analysis.

Since the Napa Conference 35 years ago, access to data from many sources has grown. Part of this reflects the ease and availability of data collection as technology has changed. Part of this reflects ingenious research designs by strategy scholars. Regardless of the underlying cause, the access to more data sources is one of the reasons why the field has seen a proliferation of units of analysis. This is one of the reasons why we believe that this is an important question to ask at this summit, although we believe it was not an issue of discussion at Napa – though we weren't there :)

Potential benefits from proliferating units of analysis

With the aid of this conceptual structure, we are in a better position to assess whether the proliferation of units (and levels) of analysis is healthy or unhealthy for the field. Drawing on the importance of focusing on the strategy context, we start with the following question. If the key questions in strategy research revolve around firm-level value creation and value capture, then why would one deviate from the firm as the unit and level of analysis?

Better capturing the locus of value creation and value capture

The complexity stemming from the strategy context that we highlight in the previous section often requires that studies change unit or level of analysis to better map the locus of value creation. This can result in focusing on sub-units of firms. For example, the business unit might be the appropriate level of analysis when the goal is to examine value creation and capture within

a line of business of a multi-business firm. Whereas, when value creation stems from platform competition, moving the unit of analysis to this supra-firm level might be appropriate. Thus, a key motivation for changing units and levels of analysis is that the business unit, partnership, network, platform, or innovation better aligns to the question of value creation-value capture.¹

Identifying and isolating theoretical mechanisms

A second motivation for proliferating units of analysis is it allows scholars to identify and isolate the theoretical mechanisms that lead to a particular relationship. Unpacking theoretical mechanisms to aid in causal inference is a key element in the evolution of empirical strategy research (Shaver, 2021). Because many of the theoretical mechanisms that we advance in our theories are manifest at levels other than the firm, it is often appropriate to alter units and levels of analysis. For example, theoretical mechanisms that rely on sub-firm level mechanisms related to human capital can motivate scholars to move to more micro units of analysis because doing so allows them to invoke variation that is important to assess the hypothesized theoretical mechanism. Likewise, theoretical mechanisms at the national institutional level, such as the rule-of-law, can motivate scholars to move to more macro units of analysis because doing so allows them to invoke variation that is important to assess the hypothesized theoretical mechanisms.

Implications

The proliferation of multiple units and levels of analysis has the *potential* to advance strategy scholarship when it better captures the locus of value creation or better unpacks theoretical mechanisms that lead to value creation and capture. Therefore, it has the potential to

¹ In the discussion we return to the point that despite value-creation motivating the move to different units of analysis, firm value capture is still a fundamental issue that requires consideration.

be healthy for the field. However, what is required to translate the potential for positive impact into the realization of positive impact?

Building a cumulative body of knowledge

It is important for scholarship that deviates from the unit/level of analysis of the firm to explicitly make the connection of how doing so better captures the locus of value creation or better isolates theoretical mechanisms. When this occurs, the proliferation of units and levels of analysis helps build a cumulative body of research because it brings either (or both) concepts of locus of value creation or isolation of theoretical mechanisms into focus with respect to a specific study.

When an explicit connection is not made – as one could argue is the current state of the field, at best we lose the opportunity to build cumulative knowledge. At worst, it creates theoretical or empirical drift in the literature. An indication of this occurring is when research designs and units/levels of analysis appear to be driven by the convenience of data or of an event that is declared as a ‘shock.’

Although scholars can tackle any question they find of interest, those seeking to contribute to the understanding of strategy should be thoughtful about how their units and levels of analysis connect to the central issue of firm value creation and capture. Failing to do so can lead to confusion about what constitutes strategy research as opposed to human resource, organizational behavior, labor economics, or political science research, for example.

To illustrate this point, we compare two papers that use job listing data as the unit of analysis. In Barach and Horton (2021), the authors focus on the question of how the provision of workers’ compensation history to employers affects the hiring process. In this paper, the level of analysis is the firm because some firms get access to the compensation history of potential hires,

and some do not. Therefore, the variance is invoked at the firm level, through an experiment. The authors find that firms without access to compensation history engaged in more thorough search as part of the hiring process.

Barach, Kaul, and Leung (2010) also use job listings as the unit of analysis. They focus on the question of how firms strategically decide to rely on third-party platforms (and their corresponding big data capabilities) versus using their own internal screening capabilities to search for labor. In this paper, the level of analysis is also at the firm level. A key finding is that firms' use of the platform's recommendations is lower in for firms with greater experience on the platform. They conclude that firms may strategically choose to limit such use to maintain independence.

Both papers use a similar unit and level of analysis. However, the former paper is a labor economics paper where the phenomenon of analysis is the hiring process. The experiment is at the firm level, but the discussion is about the hiring process. The latter paper is a strategy paper focused on how firms use external recommender systems versus internal capabilities, based on their desire to capture value. In this case, the granular data allows them to investigate firm-level choices.

Implicit assumptions when changing levels of analysis

We highlight that one benefit of altering the unit of analysis is that it better captures the locus of value creation by better mapping how a firm, coupled with other entities, and customers create value. Nevertheless, if the firm is the fundamental unit of analysis for strategy research, then value capture is still ultimately a firm-level question. For instance, although value might be jointly created by a firm, its partners, and customers on a platform, there is still the question of how much value a specific firm captures – as reflected in its profits or stock price appreciation.

Although value creation can be at many levels, firm-level capture should still be an important focus for strategy scholars.

Approaching the notion of units/levels of analysis in this manner draws attention that firms decide whether they operate in multiple lines of business, whether they participate in an ecosystem, or whether they participate with cross-sectoral partners. Therefore, when one changes units/levels of analysis to better capture the locus of value creation/capture one implicitly introduces an endogeneity issue. Therefore, the proliferation of units of analysis to better capture the locus of value creation not only requires cognizance that studies should be interpreted with an eye toward building cumulative knowledge, but that scholars will have to explicitly recognize the endogeneity issue to most effectively do so. We stop short of offering guidance of how to do this because that will be a function of the questions asked, the units of analysis employed, and the nature of the firms and the decisions that they make.

Opportunities of using multiple levels of analysis in strategy research: A possible agenda with respect to Artificial Intelligence (AI):

To illustrate how and when multiple units and levels of analysis can help build a cumulative body of knowledge, we propose a possible agenda for strategy scholars with respect to AI. We choose this setting because AI is increasingly recognized as an important enabler of value creation and capture for firms in a broad array of industries. For strategy scholars, incorporating AI into the research agenda represents a greenfield of opportunities with theoretical mechanisms across multiple levels of analysis (i.e., innovation, task, resource, business unit, ecosystem). However, it is important for this agenda to have a consistent focus on uncovering

sources of firm-level heterogeneity and performance and not simply studying “AI effects” that cannot be readily translated to clear and actionable insights at the firm-level.

To study the interaction between firms and AI, it is also important to first define the scope and nature of the technology under consideration. AI is a broad technological field that includes generative AI, machine learning, natural language processing, and more. Each of these “component” technologies offers unique capabilities and interactions, necessitating specific consideration in strategy research. Additionally, the nascent stage of AI and the rapid evolution of AI technologies, such as the progression of open-source generative AI from OpenAI’s ChatGPT 3.5 to 4.0 or from Alphabet’s Bard to Gemini (or specific proprietary technologies), highlights the importance of considering the technology’s progress trajectory. Rather than treating AI as a black box, one needs to explicitly note not only what type of AI is being studied but also the stage of its technological maturity, as these factors are likely to influence the nature of the strategic outcomes and the boundary conditions of the inferences that can be drawn from the research.

We offer the following illustrative ways that strategy scholars can incorporate AI into their research agenda across different levels of analysis while offering clear implications at the firm-level.

Activity-level

Strategy scholars have long considered firm as a system of activities that shape its relative cost and/or differentiation in a given industry, and hence, as a source of its competitive advantage (Porter, 1985). AI has the potential to enhance a firm’s competitive advantage through its integration within the firm’s activity system. This can be done through substituting or augmenting firms’ human capital. However, such an integration process can entail many

variations in terms of how the system of activities within a firm is reconfigured, and its relative effectiveness within a given organizational and industry context (e.g., Siggelkow, 2002).

Accordingly, while a potentially useful starting point, strategy research cannot simply explore how AI might generate efficiency gains for a given activity (e.g., substituting or augmenting human capital). Rather, strategy scholars need to situate that “activity-level AI effect” in a given organizational and industry context so as to draw clear firm-level implications.

Resource-/Capability-level

An obvious avenue for strategy scholarship is to explore how firms are leveraging AI to adapt their existing resources and capabilities or to create new resources and capabilities (Barney, 1991, Helfat and Peteraf, 2003). This exploration can consider differences across industry entrants and incumbents in the face of technological change, a long-studied phenomenon within strategy research. The key here is to identify mechanisms that take into account the AI-specific context. For example, given the fungible nature of AI capabilities, an important and novel opportunity for strategy scholars is to consider the relative effectiveness of AI within the context of zero-order operational capabilities or first-order dynamic capabilities within firms (Winter, 2003), and the associated differences across firms. Similarly, strategy scholars can identify other novel mechanisms associated with firms’ resources and capabilities, and that may explain why performance advantage stemming from AI may accrue to some firms over others, and how might that evolve over time,

Innovation-level

AI presents an important opportunity to study value creation and capture from a given AI-based innovation (Teece, 2018). However, such an opportunity needs to take into account the context for value creation and value capture for the focal innovation, and the relevant strategic

choices available to firms. For example, the context for value creation entails the ecosystem of components and complements that generate the AI-based value proposition (Adner and Kapoor, 2010), which are likely subject to bottlenecks such as those stemming from hardware or data. Similarly, the context for value capture entails competition from substitutes and imitators (Teece, 2006), and potentially, regulatory constraints on AI as well. Strategic choices could entail choices with respect to the business model and market entry. Recognizing the features of the context can help strategy scholars unpack how firms pursuing AI-based innovations can compete and create value over time.

Ecosystem-level

Another salient aspect of AI is that it enables new ways of creating value in existing ecosystems such as those in the context of education, healthcare, financial services or media. This implies that at the ecosystem-level, firms can take advantage of new sources of complementarities presented by AI technologies. At the same time, such complementarities may introduce new types of technological interdependencies that may create constraints on firms' value creation and capture over time (Kapoor, 2018). An important research domain for strategy scholars then becomes how coordination among firms in an AI-enabled ecosystem takes place and explore sources of heterogeneity among firms in terms of value capture over time. AI-based technologies can also facilitate emergence of new ecosystems that can potentially displace existing ecosystems such as the displacement of land line ecosystems by mobile telephony ecosystems. Such a displacement effect has significant implications for both established and new enterprises, and presents an important line of inquiry for strategy scholars.

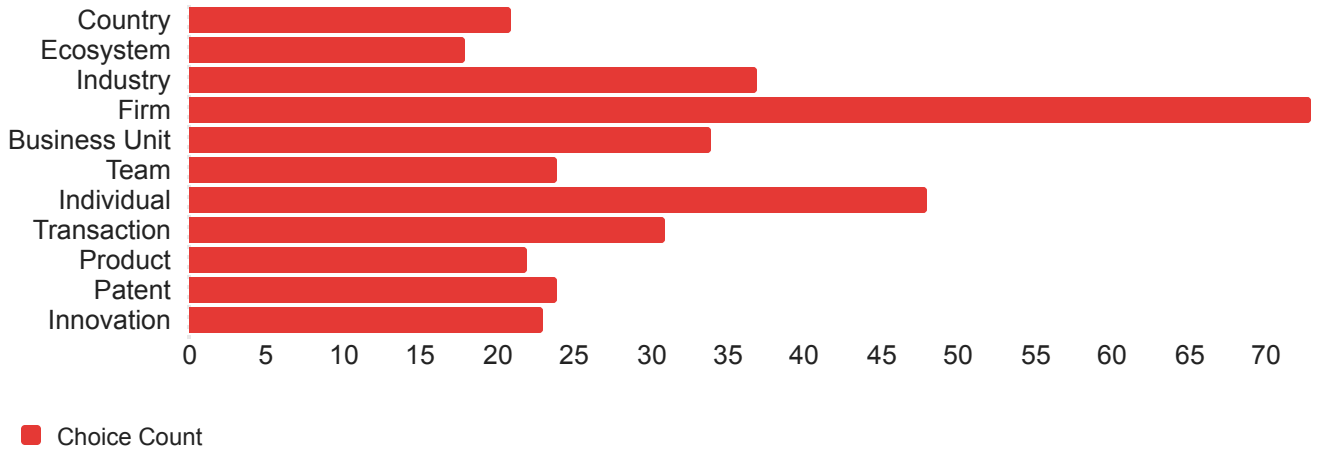
Conclusion

The proliferation of units of analysis in the strategy field holds significant potential for advancing the field by providing richer, more granular insights into the mechanisms that drive firm value creation and capture. However, realizing this potential requires careful attention to the alignment of research questions, units of analysis, and levels of analysis, along with a commitment to building a coherent and cumulative body of knowledge with clear implications at firm-level. The convenience of data availability or the appeal of novel units of analysis might overshadow the need to connect findings back to core strategic questions about firm-level value creation and capture. It is crucial for strategy scholars to avoid the pitfalls of fragmentation and drift, and instead thrive in a more complex and interconnected business landscape by explicitly articulating how their chosen units of analysis enhance the understanding of strategic phenomena.

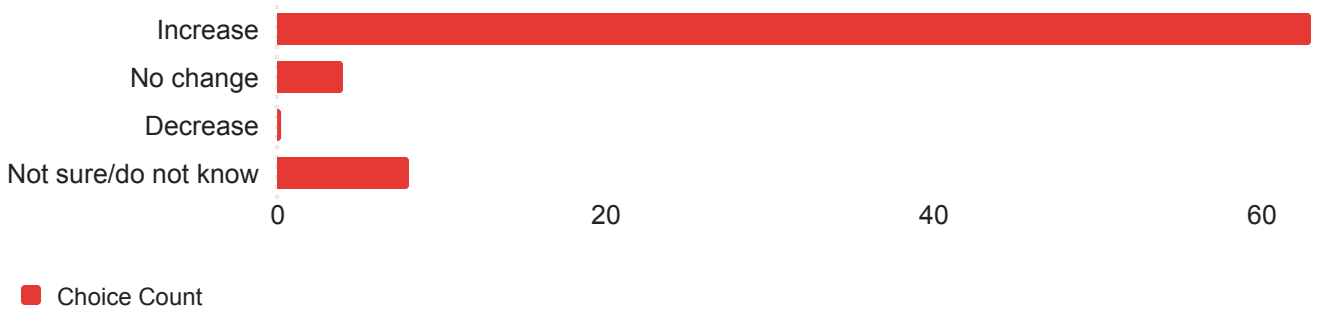
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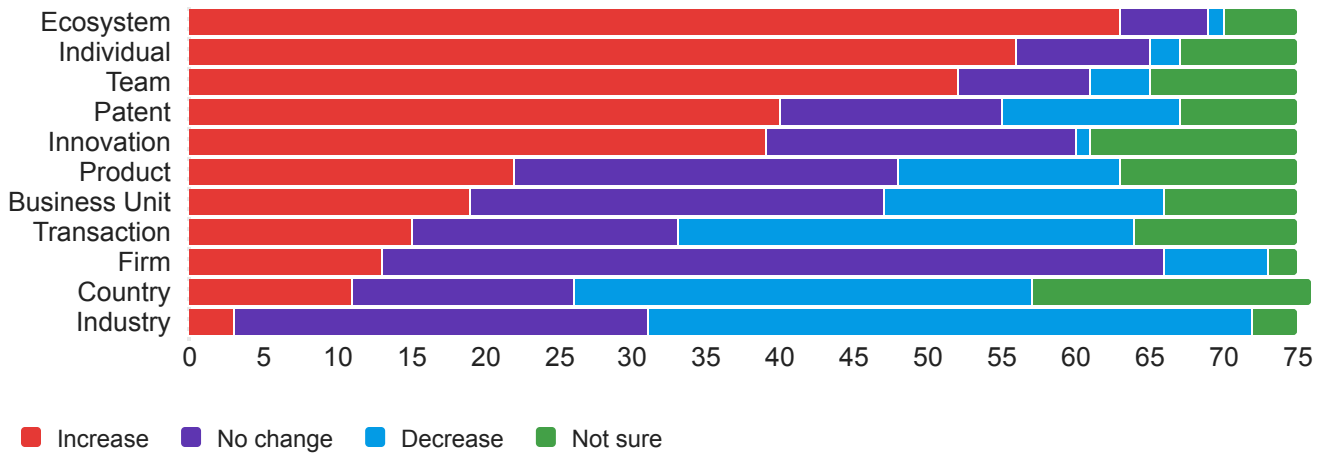
Q1 - Units of analysis that you use - Selected Choice



Q2 - Trend



Q3 - Trend by type



Q4 - Desirability

