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Lessons from Leaders: Mainstreaming corporate valuations of impacts and dependencies on nature

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We are immensely grateful to our respondents for so generously sharing their time, experiences, and insights.

Executive Summary

Business leaders understand that their companies' impacts and dependencies on natural resources are critical to their success. Companies rely on natural resources for raw materials (timber, coffee, minerals) and they also have impacts on air, water, and soils—key elements of the biosphere. Collectively, these natural resources are sometimes referred to as “natural capital” and the “services” they provide to business and society are sometimes referred to as “ecosystem services.”

Rather than assessing these impacts in terms of tons of greenhouse gas emissions or liters of water, forward-looking companies desire to calibrate such impacts and dependencies in monetary units, a metric that puts them on the same footing as other business decisions. Although the lexicon and methods are still being developed, accounting trends towards integrated reporting and impact-weighted accounting are both premised on this notion. Despite concerns about internalizing what are currently treated as externalities (i.e., soil degradation from agribusiness practices), these leaders emphasize these accounting practices allow them to take actions today to protect their company's long-term viability.

Our research studies leaders' experiences in their companies' efforts to conduct a monetary valuation of their impacts and dependencies on nature. Our empirical analysis of their experiences includes in-depth, semi-structured interviews with 30 high-level executives and experts from 14 multinational corporations, 4 consulting firms, and 5 NGO partners. Thematic analysis of the data reveals the following findings.

First, companies' motives to undertake valuations of natural capital are varied and include traditional business motives such as risk management, cost savings, and marketplace advantage. In addition, our respondents stress that the existential threat their businesses face from existing activities that degrade and destroy the planet provides the ultimate motive. To drive change, these leaders use financial (monetary) metrics to assess environmental considerations using the same currency as other business decisions.

Second, our data reveal common challenges in the process of quantifying impacts and dependencies on nature, including (a) confusion in the process arising from unfamiliar lexicon, complicated and proliferating methodologies that are tough to navigate, and valuation coefficients that vary across companies and regions; (b) difficulties in data collection that further exacerbate this complicated process; and (c) status-quo thinking that creates internal tensions and push-back. Anticipating these known challenges can help other companies undertaking their own valuation efforts proactively anticipate and develop strategies to address these challenges. Moreover, collaborating with consultants, NGO partners, and others offers key expertise to navigate these challenges and maintain motivation and momentum.

Third, in addition to providing an apples-to-apples comparison of environmental impacts and dependencies to other business decisions, companies use monetary valuations of natural capital to prioritize various environmental sustainability initiatives, to undertake more sophisticated scenario planning, to integrate natural capital reporting with comprehensive integrated reporting (“integrated capitals”), and to address biodiversity impacts. In addition, our leaders' future-oriented predictions suggest that greater accessibility to easier tools for natural capital assessment and planning will facilitate greater adoption across more companies.

Based on these findings, we offer the following lessons and insights for companies looking to provide a financial valuation of their impacts and dependencies on nature:

- Get clear on motives for the valuation. Although our leaders express traditional business motives to quantify their impacts and dependencies on natural resources (such as cost savings, risk mitigation, and market expectations), the urgency they felt around the very survival of the business was a key driver for doing things differently.
- Proactively anticipate and tackle known challenges in the process. Anticipating in advance the known challenges around lexicon, methods, valuations, data, and internal resistance can provide the fortitude to persevere and the insights needed to address those challenges.
- Find external allies and partners to help navigate the technical details. Consistently our respondents noted the value of collaboration, not just for their own journey but to help diffuse the idea of natural capital valuations more broadly in order to drive impact and scale.
- Persevere despite imperfect data and imperfect valuations. Our study highlights the reality that no data are perfect. Rather than letting this reality stymie their efforts, leaders leverage the data they have to reprioritize their strategies around environmental risks and vulnerabilities. They lead with courage to transform their businesses' engagement with nature.

Our systematic study of leading companies' experiences in developing and using financial valuations of impacts and dependencies on nature provides key guidance to facilitate the mainstreaming of this important tool in companies' efforts to be environmentally sustainable and to transform the way businesses operate.

INTRODUCTION

For years, companies have proactively taken actions to incorporate environmental impacts and dependencies into their strategic planning processes. These actions include identifying key risks arising from possible supply chain disruptions and sourcing key ingredients/ materials, clearly communicating environmental impacts to stakeholders (customers, financial markets, and watchdog groups), and developing innovations to lessen environmental harms (Nidumolu, Prahalad, & Rangaswami 2009).

Industry leaders continue to forge ahead in infusing sustainability considerations into strategic decision making by quantifying their impacts and dependencies on nature, sometimes referred to as valuations of natural capital (Bernick 2017). Natural capital consists of the components of the natural environment that provide essential benefits to businesses and society, including “goods” (tangible things) such as timber and mineral deposits as well as “services” such as absorption of rain waters by soil, storage of flood waters by wetlands, long-term storage of climate-altering greenhouse gases in forests, dilution and assimilation of wastes by rivers, and numerous other “ecosystem services” (Costanza et al. 1997). “Impacts” generally refer to how a company’s business operations affect the natural environment (say, through air or water pollution, negative impacts on soil, biodiversity, etc.) while “dependencies” generally refer to the resources a company needs to run its business (e.g., raw materials).

Like financial capital, natural capital can be a source of opportunities or threats (UNEP FI 2018). Certainly, if a business does not attend carefully to its dependencies and impacts on nature, it may become vulnerable to shortages of key inputs or to backlash from communities and environmental groups. In addition, experts recognize that businesses face an existential crisis if they do not address years of ongoing environmental degradation (Hawken 2010; IUCN 2012; Keating 2020; McCormick 2020; Mohr 2020; UNEP FI 2018; World Economic Forum 2020).

In recognition of the need to manage these risks and contribute to a more sustainable future, industry leaders such as Nestle, Kering, Eileen Fisher, and others are quantifying and valuing their natural capital impacts. For example, Kering (maker of Gucci, Puma, and a host of other products) measures and monetizes natural capital impacts through an innovative approach called “Environmental Profit and Loss” (EP&L), shown in Exhibit 1. Kering produced their first EP&L account in 2012, and since then, they’ve broadened the scope of their assessments, improved analysis through technical advances, and made their methodology open source. Kering now publishes an interactive version of this EP&L, as well as associated datasets, on their website (Kering EP&L Group Results, 2018). Similarly, the Natural Capital Coalition launched the Natural Capital Protocol, a structured process to help guide companies in assessing environmental impacts and dependencies (<https://naturalcapitalcoalition.org/natural-capital-protocol/>). These and other natural capital methodologies are presented in Appendix 1.

With the old adage “you can’t manage what you don’t measure,” these companies are placing natural resources on the same footing as financial resources, allowing an “apples to apples” comparison by calibrating natural capital impacts in financial terms – also referred to as integrated reporting (Eccles and Saltzman 2011) or impact-weighted accounting (Serafeim, Zochowski, and Downing 2019).

Exhibit 1. Kering – Environmental Profit and Loss. In the figure, colors correspond to “impact areas” (e.g. Air Emissions, GHGs, etc.) and the size of the circles indicate level of impact (in Euros) relative to other areas of impact (Kering EP&L Group Results, 2018).



When companies explicitly consider the quantitative impact of environmental dependencies on their bottom lines, they make decisions that to some may seem illogical, but actually deliver returns in unexpected ways. For example, when understanding the financial costs of environmental damages due to corporate activities, companies find that by internalizing what previously had been viewed as an “externality,” they can actually grow revenues, cut costs, and reduce risks (KPMG 2014). For example, cocoa companies invested \$800 million in improving farmer productivity and sustainable products practices after a financial assessment of revenue at risk (KPMG 2014, p. 19). Similarly, assessments of “materiality,” or the financial impacts of environmental risks, guide a company’s efforts (Deloitte 2017). Rather than working to reduce all negative environmental impacts (say, to lessen greenhouse gas emissions, to reduce water

footprints, and to recycle waste), valuations of impacts and dependencies on nature highlight the financial stakes of these various impacts, and can re-direct a company to focus on, say, water as the key issue to gain the greatest benefit.

Despite the importance of financial valuations of impacts and dependencies on nature, and the pioneering leadership exhibited by a host of companies, the use of such valuations is nascent. Our research seeks to understand and provide a systematic review of these leaders' experiences in order to glean important lessons and insights for other companies. Hence, our research delves into companies' practices in valuing natural capital. In particular, we study the *motives* companies express for their efforts to quantify their impacts and dependencies on nature; the *process and methods* they use to do so; the *challenges and barriers* they face in these efforts and *how they overcome those barriers*. Finally, we seek to understand *how companies use the information in decision making*.

We interviewed 30 high level executives and experts from 14 multinational corporations, 4 consulting firms, and 5 NGOs (including different area experts from the same company, to gain diverse perspectives). Thematic analysis of these interviews underpin the findings we present here. In turn, our findings offer key lessons for companies looking to provide a financial valuation of their impacts and dependencies on nature. These lessons include: get clear on motives for the valuation; proactively anticipate and tackle known challenges in the process; find external allies and partners to help navigate the technical details; and persevere knowing that the data will never be perfect.

Our systematic study of leading companies' experiences in developing and using financial valuations of impacts and dependencies on nature provides key guidance to facilitate the mainstreaming of this important arrow in a company's quiver of sustainability tools.

METHOD

Because businesses' attempts to quantify natural capital impacts and dependences are relatively new and emergent, qualitative research methods are appropriate. In particular, qualitative methods are effective when the phenomenon of interest is complex and/or poorly understood (Lindlof & Taylor 2002; Glaser & Strauss 2017). Hence, we undertook a series of in-depth, semi-structured interviews to gather first-person experiences from a range of companies and managers. Through an iterative process of analyzing individual transcripts vis-à-vis the emerging understanding of the collective dataset, lessons and insights can be distilled.

Data Collection and Sample

We began our research process in Fall 2017 by analyzing a number of secondary resources including scholarly literature and industry white papers regarding valuations of natural capital. We attended the GreenBiz Conference in Scottsdale, Arizona in February 2018 with the goal of identifying companies developing valuations of natural capital and to request interviews with the key managers involved in these efforts. This initial set of interviews generated further recommendations regarding other companies, consultants, and NGO partners to interview. We supplemented our initial U.S.-based efforts with more global outreach, including interviews with business leaders in Europe and Southeast Asia. A member of our research team also attended

Natural Capital Week and the European Business and Nature Summit in Madrid in November 2019.

We sought diverse perspectives to enhance our understanding of the way various companies conduct natural capital valuations. For example, given the different regulatory environments and stances towards sustainable business practices, companies in both the US and in Europe were interviewed. In addition, we included a wide range of industries and company positions. Respondents were granted anonymity in their interviews and they were surprisingly candid. Table 1 provides an overview of the 25 interviews with 30 respondents for this project.

Our semi-structured, in-depth interviews opened with a set of general questions (motives, process, challenges, impact on decisions, etc.), but the respondents ultimately guided the flow of the discussion based on their unique organizational circumstances. We interjected questions to clarify and probe as needed. This semi-structured approach allowed us to obtain answers to queries, and provided the benefits of organization and flexibility while minimizing the risk of interviewer-induced bias (McCracken 1988). Each interview lasted about one hour, and was audiotaped and professionally transcribed. These interviews yielded over 500 single-spaced pages for analysis.

Data Analysis and Identification of Themes

The interview transcripts were uploaded to Dedoose, a software tool designed to facilitate qualitative data analysis. By itself, Dedoose is not an analytical method; it is a software tool that allows qualitative researchers to be more systematic in their categorization and analysis of large amounts of data. After the interview segments were loaded and categorized, Dedoose then allowed us to retrieve all interview segments with a particular label (i.e., “motivations”) and to read those segments alongside one another.

The data presented below, in the form of representative/illustrative quotes for each of our findings, were themes that emerged consistently across our data. Because these themes were voiced by multiple respondents, the supporting Appendices are used to provide additional evidence.

Table 1. Anonymized list of respondents, positions, industry sector

Valuing Natural Capital		Not valuing Natural Capital		Other experts	
Sustainability Manager “Bastien”	Luxury Conglomerate	3 Sustainability Professionals (“Annika,” “Sasha,” and “Evonne”)	Outdoor Gear and Apparel Company	Senior Director and Scientist “Rebecca” Interviewed with Head of Relationships “Hailey”	Nonprofit NGO
Director of Sustainability “Marcus”	Luxury Conglomerate	Packaging Director “Kayla”	Retailer	Managing Director “Lisa”	Financial Services Company

(continued on next page)

Sustainability Manager "Ulrich"	Dairy/Food Conglomerate	Senior Sustainability Director "Katherine"	Food and Agribusiness Company	Head of Sustainability Programs "Alice"	Consulting Firm
Sustainability Leader "Tanner"	Chemical Company			Executive Director "Miles" Relationships Manager "Stefanie" Head of Communications "Joey" (all three interviewed together)	NGO
Head of Sustainability for North America "Suzanne"	Multinational Conglomerate			Scientist/ Researcher "Dennis"	NGO
Global Environmental Manager "Calista"	Industrial Textiles Company			Senior Sustainability Consultant "Catie"	Consulting Firm
Sustainability Manager "Sean"	Forest Products Company			Sustainability Professional, Former CSO "Lily"	Independent Consultant
Vice President "Carl"	Chemical Company			Consultant "Isaac"	Consulting Firm
Senior Sustainability Director "Kyle"	Cosmetics Company			Scientist/ Researcher "Clara"	NGO
Senior Sustainability Coordinator "Taylor"	Food and Agribusiness Company			Environmental Business Director "Harry"	International NGO
Finance Director "Melanie"	Food and Agribusiness Company				
Senior Strategist "Gabriella"	Global Insurance Company				

The most common respondent background was the hard sciences; nine of our 30 respondents had studied engineering, chemistry, biology, environmental science, or some combination of those disciplines. Five of our respondents had policy backgrounds, and had moved from working on the governmental or regulatory side of sustainability to the business side. A handful of these individuals who had science or regulatory backgrounds decided that, “to really make a difference,” they “had to learn more about the business side,” and so several pursued an MBA or business training as well. “It’s really important, if you want to change something in business, you have to understand how it works really in the operational mode, and what are the concerns of the production sides people, or the engineers, or the operational staff” (Catie, Senior Sustainability Consultant, Consulting Firm). Consistent with the need to understand business, two respondents had worked previously in positions in finance and accounting, and one respondent had spent many years in corporate strategy before moving to the natural capital space. Finally, a handful of respondents had a background in philosophy and religion. For example, one individual who had a degree in philosophy was very motivated to focus on international labor and social standards around human rights. So, he joined the human resources department of his company 15 years previously, before broadening his focus to environmental aspects, which eventually “included the whole valuation piece, including natural capitalism” (Carl, Vice President, Chemical Company). In addition, many respondents expressed strong personal motivations for driving their companies’ natural capital valuations forward, to tie their beliefs about environmental sustainability to meaningful work in their organizations.

RESULTS AND INSIGHTS

Before delving into the findings, we acknowledge that for many people, the very idea of referring to the environment/nature in the language of business (i.e., as a type of capital) can be problematic. For example, some decry the effort to commodify nature, stating that placing a cash value on natural assets undermines their intrinsic value and turns the natural world into “a subsidiary of the corporate economy” (Monbiot 2012). In addition, people question whether one can value an asset where “its true value is apparent only when it is part of a coherent whole” (Timperley 2016). Our respondents, too, acknowledged this: “But I think there is a lot of struggle here too, because it [natural capital] is a metaphor, right? The economic concept of capital. So the whole fact that of dealing with ‘natural capital’ and the need to look for approaches to measure and value natural capital, it is still something that people struggle very much with” (Rebecca, Senior Director and Scientist, Nonprofit).

On the reverse side of this argument is the idea that perhaps it is better to put an imperfect price on nature than to continue with business models that regard the natural world and the services it provides as valueless (Harmon 2016; Timperley 2016), and that it is the “economic invisibility of nature” that has led to its ongoing degradation – treating environmental impacts as a “free” externality has further contributed to environmental decline. A Sustainability Leader at a Chemical Company, Tanner, acknowledged that “if you don’t measure it, you can’t prove it. And if you don’t value it, by default its value is zero, and so it is worthless. I think everyone knows that nature is not worthless, but the big debate for a while was, “is it invaluable?” Therefore it could not be valued, and therefore there was more of a morality play—versus putting a value on that and whether or not that would devalue it.”

Despite this discomfort—and perhaps even because of it—business leaders for at least the past decade have been urging companies to assign a cash value to the natural resources on which they depend. As John Viehmeyer, Global Chairman of KPMG International stated, companies must “measure, understand and proactively manage the value [they] create, or reduce, for society and the environment, as well as for shareholders” including quantifying externalities to assess the potential impact on company’s earning capability in the future (KPMG 2014, p. 4).

Our data suggest that undertaking quantitative valuations of natural capital impacts and dependencies is an unfolding journey. While some companies have been working at this effort for more than 15 years, others are early in the trajectory.

What drives companies to consider natural capital?

Many respondents expressed the fundamental concern that without understanding natural capital impacts, and taking specific actions today to mitigate those impacts, their businesses would not survive. The Vice President of a Chemical Company, Carl, expressed that “we can't continue as we do today, because if we keep our consumption patterns and business models running as of today, it's just a matter of time until we have destroyed the planet, and that means until we have destroyed society, and that means until we have destroyed business.” For him, understanding his company’s impacts and dependencies was a step towards the “fundamental transformation, [of] how we are running our business.” The Finance Director of a Food and Agribusiness Company, Melanie, said that they embed natural capital in financial strategy because their company “is convinced that it is actually key for business continuity.”

Our respondents consistently emphasized the importance of placing environmental considerations on the same footing as other business decisions. For example, the Global Environmental Manager of an Industrial Textiles Company, Calista, stated: “We hired some consultants in natural capital valuation and we went through this project to monetize those impacts, to give us a monetary value. And the concept was you're going to be able to communicate environmental impacts to the C-suite, because you're going to talk about it in dollars. And I'm going to be able to say, ‘our environmental impact... our potential for damage to natural capital is forty million dollars a year.’” The expectation then, is that having that information will drive decision making to mitigate risks, lessen environmental impacts, and even improve financial performance.

This monetization of environmental impacts has elevated the role of sustainability in the companies we spoke with. For example, a Senior Sustainability Manager at a Dairy/Food Conglomerate, Ulrich, noted that “in general, the approach, the natural capital approach, the monetization approach, has gained a lot of interest by people that usually did not necessarily see sustainability as such a central element for business decisions makers, because they developed that [natural capital valuation] to actually see that, yeah, there is potentially... impacts-- financial impacts-- also assigned to it.”

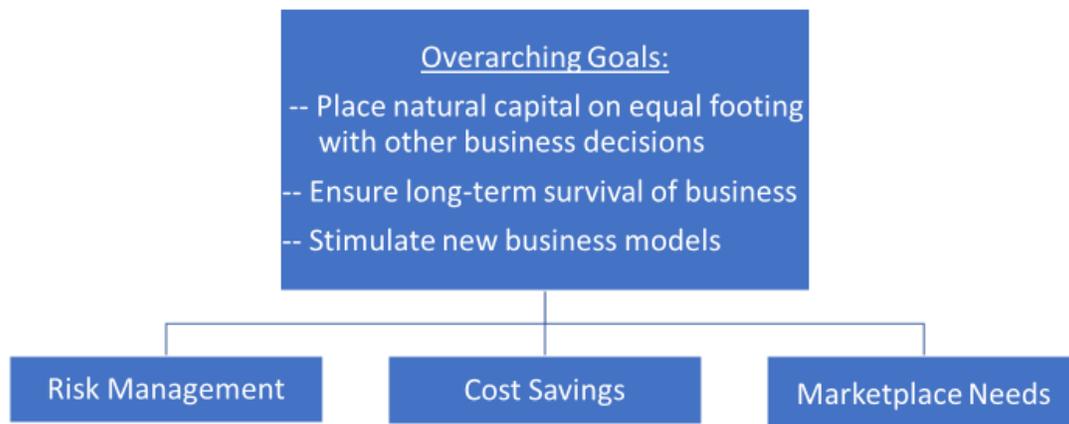
Assigning a dollar value to environmental impacts and dependencies was, to the Sustainability Director of a Luxury Conglomerate, Marcus, “a back door into launching a lot of our environmental initiatives. Because once you start to measure it, executives are interested in you know, how they improve it.” This was echoed by one NGO respondent, Head of Relationships, Hailey: “that's one of the things that we hope natural capital can do because communicating

sustainability in an economic way makes it harder and harder for your senior management to ignore it.”

Ultimately, many respondents focused on the opportunity that natural capital valuations can offer to stimulate thinking about new business models: “And then to think about how their business works, and how their business will work in the future—as well as in the next 10 years. I think a lot will be changed, and the whole business model will change in some way. And they have to think about [the natural capital that is impacted by the business activities] and understand the whole complex topic about sustainability” (Catie, Senior Sustainability Consultant, Consulting Firm).

Underneath the common goal of assigning a dollar value to environmental impacts and dependencies lay a diverse array of more specific motivations, as presented in the next section and illustrated in Figure 1.

Figure 1. Motivations for Monetary Valuations of Impacts and Dependencies on Nature



SPECIFIC BUSINESS MOTIVATIONS

Our respondents identified a wide range of specific business motives for engaging in natural capital valuations. These included, but were not limited to, understanding and mitigating risk (particularly in investments and in supply chain management), reducing costs, and meeting marketplace demands.

1. Risk management

First and foremost, consistent with the need for organizations to effectively identify and manage risk, many participants in our study said that understanding impacts and dependencies on nature was an increasingly important part of their companies’ risk management strategies. In fact, in 13 of our 25 interviews, respondents indicated that risk was a motivator for their businesses (or their clients, in the case of consultants and NGO representatives). For example, some of our

respondents wanted to assess and quantify their vulnerabilities. Sean, a Sustainability Manager stated, “Applying the Natural Capital Protocol and working with a consultant ... gave us a sort of a theoretical range of value on water... and we’re thinking about risk exposure at our different sites around the world. What we’re doing is matching up that range with our facilities, ranked by what we believe is their exposure to all kinds of different water related risks.”

A number of respondents also mentioned regulatory risk. Sean also stated: “A key reason for investigating natural capital value and working to integrate it into our models is to ‘future-proof’ our operations regarding future regulations such as a carbon tax or increased price of water. By building in risk-based projections ahead of time, we’ll be better prepared as a business if/when those policies do come to pass at national, state, or local levels.”

Other respondents were motivated by the risk of exposure in their investment portfolios. The Managing Director at a Financial Services Company, Lisa, expressed this motivation: “[F]or example, by understanding carbon or water exposure in an equity investment portfolio, and understanding what is the potential long-term financial risk related to those impacts, it becomes a way for an investor to prioritize or manage different risks.”

Relatedly, respondents expressed concerns over supply chain risks. These companies were computing natural capital impacts and dependencies, and then making strategic investments in assuring the viability of the natural capital upon which the long-term viability of their supply chain depends. The Environmental Business Director of an International NGO, Harry, noted: “With [client X], they’re really, really progressive in helping us think about preserving natural capital and nature so that they maintain a supplier relationship that maintains [environmental] quality. So, you always have to put it from a business lens like, you know. Why does it make good business sense to be better with suppliers?” A public example of this type of thinking can be found in the UK, where Nestlé is paying a premium to its UK dairy farmers to plant hedgerows and install fencing on watercourses to prevent erosion and species decline. “The project signifies a change in tone of debate around natural capital ... [which has] remained stuck for some time as a form of CSR. Only when companies begin to see how important [it is] for increasing resilience against future shocks will it become possible to make the business case for investment in natural capital” (Mehta 2018).

Risk emerged also as a primary motivator for business-to-business (B2B) companies. For example, Sustainability Professional and former Chief Sustainability Officer at a tech giant, Lily, contrasted the anticipated motives of consumer-facing companies with B2B ones: “Those consumer-facing companies get a lot of cachet by tapping into the conscious consumer movement... On the B2B side ... the risk component is compelling.”

2. *Cost savings*

Additionally, companies found that when they invested in nature to perform key functions – purifying water by creating a wetland, for example – they could save on costly industrial processes for those functions. Using a public example, Dow’s 110-acre Seadrift project to build a natural wetlands cost \$1.4 million, compared to \$40 million for a typical water treatment plant (DiMuro, et al 2014). In like fashion, former-CSO Lily described one company’s investments in mangroves to provide a natural barrier to erosion of shoreline from unpredictable water levels (say, from storm surges) in order to protect its real-estate investments. She noted that the

mangrove project was “a super-practical decision that not only makes sense; it saves money in the long run.”

For another company focused on making decisions about whether to build a conventional facility or an environmentally-friendly one, Senior Sustainability Director Katherine expressed that “[the operational director of the plant], he knows nothing about valuing nature for nature's sake. You know, that's not going to work for him... So, providing a monetary value of natural capital was much easier to have a discussion in terms of fork in the road. Do you build it, or do you use nature? And I just think that that is easier for operational people to implement and understand” (Katherine, Senior Sustainability Director, Food and Agribusiness Company).

3. Marketplace advantage

In addition to focusing on risk mitigation and cost savings, participants described marketplace drivers for measuring their impacts and dependencies on nature. For example, some respondents wanted to position their products to meet market concerns: “At the moment that your product positioning is really off from what society wants, then you start already trying to position yourself a bit differently” (Ulrich, Senior Sustainability Manager, Dairy/Food Conglomerate). Ulrich continued to explain this his company uses the outputs of its natural capital assessments to develop the “next generation of products.” He explained that “we wanted to have a tool at hand that allows us to... bring the different criteria or the different environmental indicators... into a perfect one indicator or one context that then gives us the result that helps state the position.”

Consultants stated that clients expressed their desires to establish leadership and competitive advantage by being early movers in natural capital valuations. One NGO Director shared that “We’ve got lots of businesses that are doing it, because it brings them advantage. It brings them competitive advantage, it brings them efficiencies... they’ll ... see [benefits] for their organization and for the communities and for nature. But that’s why they’re doing it” (Miles, Executive Director, NGO).

Others were focused on the communications value (signaling and image impacts) of their efforts to link their reporting efforts to impacts on nature. We heard from a few consultants and NGO representatives that some companies embark on natural capital journeys with the goal of producing useful material for communications. One consultant noted that “[Company X] want to use the natural capital idea to both show that they control the environmental impacts, but also they bring economic value to local communities, etc. And have that all in sort of one neat package tied with a bow that they can communicate externally... they want to use it for communicating with stakeholders, and by this I mean both communities and politicians and all that sort of thing,” (Isaac, Consultant, Consulting Firm).

As an aside, it’s important to note that the communications motive was viewed skeptically by other respondents. For example, an NGO representative working in this space stated, “I cannot guarantee that companies don’t use natural capital to endorse what they're already doing. And one of the main reasons we came out with this [natural capital tool] this year is because we had a couple of case studies where you read it and you just think “Someone had an objective in mind when they did this study, didn't they?” (Hailey, Head of Relationships, NGO). Dennis, a Scientist and Researcher from a different NGO, explained that “what’s discouraging – is actually getting to more procurement, at least in the case of like agriculture, being able to get to procurement teams. It's sometimes hard to get past that public relations/corporate affairs/public affairs sort of

space where Sustainability teams tend to reside.” He went on to give an example; he felt that a particular food and beverage company “wasn’t going to make different decisions because they had that valuation information,” but were instead interested in the “short term communications, or the *sizzle*.”

What prevents companies from engaging in natural capital valuations?

Related to understanding company motives for undertaking valuations of natural capital, we wondered about the reverse: what reasons do companies give for *not* undertaking such valuations? Some companies expressed an unwillingness to account for natural capital impacts because it wasn’t mandated under reporting requirements. They felt that simply meeting the existing regulatory requirements (e.g., Sarbanes-Oxley) placed enough of a burden on them in terms of cost and time, they couldn’t fathom adding more complexity to existing reporting requirements. This avoidance was voiced primarily by US-based companies: “And there’s been some pushback from American companies, thinking that [our efforts to encourage natural capital disclosures] is adding more work” (Miles, Executive Director, NGO). We heard this sentiment voiced during our initial inquiries at the GreenBiz conference as well.

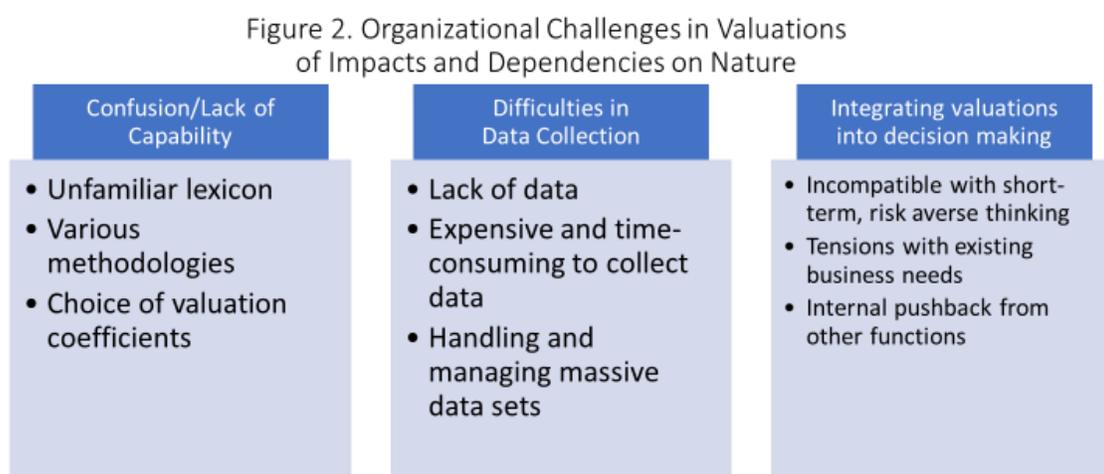
Relatedly, some respondents expressed concern that, if they did report natural capital impacts, there might be negative backlash from stakeholders. Despite this concern, one Environmental Director stated that the negative backlash didn’t materialize, and they’ve moved forward with these assessments: “[W]e do publish our environmental impact. We say “here’s our carbon footprint;” we are claiming that we are contributing to global warming by x kilograms per square meter of our product. And we haven’t had a backlash from the public on ‘Oh my gosh, [that company] is killing the earth! Because they’re putting out all this carbon.’ Although we did think about [the risk of backlash] before we started publishing all the data...”(Calista, Global Environmental Manager, Industrial Textiles Company). Similarly, other respondents were concerned that if their companies were to report natural capital impacts, they might be subjected to lawsuits or legal action. Relatedly, companies repeatedly expressed concern that were they to measure natural capital impacts, the actual monetary valuation of those impacts might exceed their actual financial profitability, a scenario that they would rather not have hard data to support. By not collecting the data, they could claim innocence about possible negative impacts.

Motivations: Summary

Ultimately, companies had varied motivations for either approaching natural capital valuations or not. It is important to note that rarely did a company express a single motivation – respondents repeatedly indicated that a number of factors influenced the company’s gravitations towards or away from natural capital thinking. One Agribusiness Representative expressed that while her company doesn’t yet use natural capital thinking, she felt that “what I could see [my company] doing in the next few years is understanding... if we have unhealthy soil in the regions where we are sourcing ingredients from, that literally costs me x dollars to go to another continent... So, I can see it popping up for us within the next couple of years when it comes to sourcing and needing to change suppliers or geographies because of agricultural yields being impacted negatively” (Katherine, Senior Sustainability Director, Food and Agribusiness Company). Here, she clearly links multiple motivations for approach natural capital thinking: mitigating risk, keeping costs down, and maintaining supply chain stability.

CHALLENGES

Having the motivation to value their natural capital interactions, as discussed in the previous section, represents one element of companies' attempts to value natural capital. Once companies engage in this work, they face challenges and concerns. Depending upon where they are in the process – and what their motives are for undertaking the valuation effort – they will experience different types of challenges. Our conversations with company executives and sustainability experts reveal the following key challenges, as summarized in Figure 2: 1) confusion over terminology, methods, and valuation coefficients, 2) data challenges and limitations, and 3) integrating valuations into decision making. This list is not exhaustive; rather it gives a flavor for those challenges most commonly encountered. Each business is different, and will face a different set of roadblocks to navigate.



1. Confusion/Lack of Capabilities

Once companies embark on their journeys to value natural capital impacts and dependencies, they face ambiguities in the language and terminology used to talk about natural capital, the methodologies and frameworks to assess companies' natural capital, and the valuation coefficients to assign monetary value to impacts and dependencies. These challenges are further exacerbated by the reality that each company's unique structure and style leads to further fragmentation as each company develops its own terminology, methodology, and valuation coefficients.

a. Terminology

The lack of a common language to talk about natural capital was a frequently mentioned concern. One Vice President shared, "if I say 'profit,' more or less everyone on the globe knows what I mean. If you're talking about [environmental] aspects, should we call them 'extra financial non-financials?' Should we call them 'pre-financials?' Is it sustainability? Is it capital? Is it flows? Is it stocks? What the hell is it?" (Carl, Vice President, Chemical

Company). The Managing Director at a Financial Services Company echoed these sentiments, saying that clients she works with are often confused when she starts talking about natural capital: “[A]nd it’s like what? You know, wait a minute, what are you talking about? So it’s just first of all, a shift in terminology that does not roll off the tongue well, so to speak, for companies in certain regions around the world” (Lisa, Managing Director, Financial Services Company).

Multiple times, we heard directly from companies that they felt they were contributing to this fragmentation of terminology. One Sustainability Leader, Tanner, from a large Chemical Company explained that “[my company] had our own terminology, we have - any big organization has its own culture, and its own lexicon - and there's certain weird quirks about [our company], as there's certainly weird quirks about any big organization.”

b. *Methodology*

Even when companies are eager to embrace the idea of valuing natural capital, they face the methodological challenges of doing so. Numerous methodologies exist for assessing natural capital impacts and dependencies (for a great review, see Bernick 2017), and for companies just diving in, this can be a confusing space to navigate. The complications of choosing or developing a methodology was expressed by those companies that were frontrunners in this space. For example, one respondent whose company had been an early mover in valuing their natural capital impacts expressed that figuring out how to do it was “like building a bus going down the road” (Marcus, Director of Sustainability, Luxury Conglomerate). Lisa, familiar with helping companies develop their own methodologies, acknowledged the challenge as well: “I mean every company sort of has their own unique way of doing something. So, when we create a tool for an apparel company to evaluate natural capital impacts of its suppliers, it’s slightly different for apparel company B, when they ask us to create a similar kind of tool. So every company has their own filter and lens and unique point of view that they want to layer over top of the information. So that’s, that’s one of the barriers, is getting this kind of data standardized” (Lisa, Managing Director, Financial Services Company).

This methodological hodge-podge has been referred to as “sustaina-babble” – the cacophonous proliferation of various methods, standards, and meanings around the word “sustainability” generally, and methodologies specifically. For example, the trio of Sustainability Professionals we interviewed from one company said: “We try to adhere to the most rigorous and most responsible approaches that are out there. [But] we have created a few of our own, which doesn’t really help when you’re thinking of sustaina-babble” (Sasha, Sustainability Professional, Outdoor Gear and Apparel Company).

Additionally, many existing methodologies for valuing natural capital are highly complex and require extensive training in order to be used. This barrier to entry was described by one Researcher who had worked at an NGO. For the tool that he worked on, he felt that “It's not set up in a way that really anybody could use. It has a user interface that's difficult. It still requires sort of an analyst researcher” (Dennis, Scientist/Researcher, NGO).

c. *Valuation Coefficients*

Even when companies have established the method of how they plan to assess their natural capital impacts and dependencies, a barrier exists in translating those scientific

units (tons of CO₂, gallons of water, etc.) into common units that allow for comparison. For most respondents we spoke with, this common unit was a monetary value. “Valuation coefficients” are used to make this conversion – essentially, they quantify how much one unit of a given impact or dependency in a specific region “costs” in monetary terms. Developing these coefficients is a contentious exercise – “it’s the valuation that is difficult to probably figure out. ... If someone could figure that out, that would be helpful. Because we would have a currency we could use” (Katherine, Senior Sustainability Director, Food and Agribusiness Company). One respondent informed us that his company is part of a unified effort to harmonize these valuation coefficients, and to “promote reasoning why you would go with a specific valuation technique for a given context” (Ulrich, Senior Sustainability Manager, Dairy/Food Conglomerate). These efforts are, however, especially challenging because there’s not yet consensus “on how exactly one should do valuation in all possible contexts.”

The challenge of developing *consistent* terminology, methodologies, and valuation coefficients is further exacerbated by the reality that “every company will be different in terms of the way they themselves think about their business model, even if they do exactly the same thing” (Isaac, Consultant, Consulting Firm). Seven of our 30 respondents expressed similar sentiments – each business is so unique in their structure, style, and thinking, that fragmentation is perhaps inevitable.

Although methodological consistency may be something that many companies call for, it’s important to note that some other experts expressed that a lack of standardization isn’t all bad. One consultant explained that the movement towards valuing natural capital is still in its infancy, and, according to him, “having multiple standards, it’s not a bad thing; you get people thinking about it” (Harry, Environmental Business Director, International NGO). Another NGO representative explained that she doesn’t feel there should be quite so much pressure on standardization, because “we just don’t think it’s practical to dictate too much to companies what they should be doing. Because I think for us, encouraging a bit of play and experimentation is more important” (Hailey, Head of Relationships, NGO).

2. *Difficulty and Expense of Collecting Data*

In addition to challenges around the lexicon and methodology, respondents identified data issues as a major (and ongoing) challenge in valuing their natural capital impacts and dependencies.¹ These data challenges present themselves in a few key ways: (a) data often don’t exist for much of companies’ supply chains, (b) data can be expensive and time-intensive to collect, and (c) massive amounts of data are hard to wrangle. These data challenges can lead to the risk of companies leaving out impacts and dependencies for which data are difficult to access.

Such significant challenges prompted some respondents to ask if the output of a natural capital assessment is fundamentally worth the exercise. One company representative expressed concern that “We already are thinking about these things [natural capital impacts and dependencies]... so do we really need to go through the exercise trying to gather a ton of data? It would be a huge actual work project. And, it would have been a difficult task data-wise” (Sasha, Sustainability

¹ See also the report by the Natural Capital Coalition (2019), “Data Use in Natural Capital Assessments: Assessing Challenges and Identifying Solutions” <https://naturalcapitalcoalition.org/wp-content/uploads/2019/05/Final-Data-Full-Report.pdf>

Professional, Outdoor Gear and Apparel Company). Another respondent, however, felt that it wasn't necessarily the output that was the most valuable, but "it was more the process and the assessment itself, as far as which environmental issues get included" (Suzanne, Head of Sustainability for North America, Multinational Conglomerate). Most companies that engage are somewhere in the middle – there is value in the process and the outcomes, both of which lend themselves to decision making.

a. *Data don't always exist.*

Perhaps the biggest challenge associated with collecting data for a natural capital assessment is that *the data don't always exist*: "We don't know all the impact because there's not always scientifically available data, there isn't always [Life Cycle Analysis] data." (Marcus, Director of Sustainability, Luxury Conglomerate). One Managing Director, Lisa, explained that while research analysts might say "there's never enough data," the real challenge is determining how precise, accurate and robust data needs to be "to rely on to make a business decision" (Lisa, Managing Director, Financial Services Company). And, the trio of Sustainability Professionals we interviewed from an Outdoor Gear and Apparel Company noted, "Something we've thought about, in terms of any kind of valuation, even just like lifecycle assessment data, is the risk of leaving out environment impacts that might not be easily quantified. Right now we're looking pretty closely at carbon and water, because those are pretty reliable impact categories. And so when I think eutrophication [when nutrient/fertilizer runoff from nearby land causes an explosive growth of plants in a local water body and a death of animal life in that water due to lack of oxygen], land use and impacts on biodiversity, those are impacts that are a lot harder to actually put a specific number to. So, something that's always in the back of my mind is, like, how do you still acknowledge those ecosystem services, or those impacts, from a quantification perspective, knowing that they might not be easily quantified?"

b. *Data are costly and time-intensive to collect.*

Respondents frequently noted that for data that isn't already available, it can be extremely costly and time-intensive to collect. For example, Lisa helps companies through the cost challenge by determining situations where it is appropriate to use proxies: "whether or not they need to go gather their data, or whether we can use models and estimations to fill data gaps in the absence of having primary data" (Lisa, Managing Director, Financial Services Company). Another noted that having access to robust databases has been critical to helping companies value their natural capital, because "otherwise all the research, it just takes too much time and nobody is willing to pay [a consultant] for that and we [need to] have these tools ready" (Isaac, Consultant, Consulting Firm). Companies confirmed this tension between reliability and cost; one sustainability lead insisted that it must be clear that "it is going to be worth the amount of hours that we are going to dedicate. Because especially in this case, we need to just try to collect the data" (Kyle, Senior Sustainability Director, Cosmetics Company). His company's time investment was significant; "we started this process in [year] and actually took almost two years to deliver the first result."

Furthermore, based on the specific company's scale and scope, the data collection effort can have different levels of complication. For example, one associated data challenge is

the need for geographically-relevant and location-specific data, and the tension of how granular this data should be. One frequently cited example is the value of water across landscapes. While carbon emissions may represent a similar “value” no matter where they are produced, the value of water is highly location-specific: “Depending on where we’re using the water for the cotton, because we [compute a] value for the impact, it could be from an area where water is very scarce and therefore high value, or it could be from an area where water’s not so scarce and it doesn’t have such a high value. So there’s a great deal of uncertainty in the data” (Marcus, Director of Sustainability, Luxury Conglomerate).

For one industrial textiles company, its previous reliance on Life Cycle Analysis data wasn’t sufficient to address these nuances: “In Life Cycle Assessments, a liter of water is a liter of water no matter where it came from.” By conducting a comprehensive natural capital assessment, they found that “when you monetize that based on where [our impact or dependency] is happening, we found that a liter of water is very different in [company headquarters in this US State] than it is in [European country]. And so we were able to understand a new dimension of environmental impact that we hadn’t considered before. I mean, it seems obvious with water, because some regions are more water-stressed than others. But it’s not necessarily where your plant is; it has a lot to do with your supply chain as well. Maybe you’re making [the product] in the [European country], but maybe your raw material is coming from [Eastern European country]. So what is the monetary value of water in [Eastern Europe] versus [Western Europe]? Anyway, it gave us a whole new insight into the regional differences in environmental impacts, along with helping us to focus our efforts on the most important environmental impacts in our products” (Calista, Global Environmental Manager, Industrial Textiles Company).

- c. *Massive amounts of data hard to wrangle.* Another data-related challenge deals with managing the sheer volume of data necessary. As Marcus, the Director of Sustainability at a Luxury Conglomerate noted, “[Another] challenge was how to manage that massive amount of data. We have various spreadsheets now within an application that runs on [a third-party provider] analytics platform.”

Another company expert similarly noted: “We simply weren’t used to collecting that kind of data. We have piloted our calculations in all aspects, and this is one of the limitations as of today is that the IT solutions are currently missing to apply this on a day-to-day basis” (Carl, Vice President, Chemical Company).

It was reassuring to hear that frontrunners in natural capital thinking had experienced similar challenges when they pioneered Life Cycle Assessments. One corporate representative said that “I liken natural capital valuations a lot to Life Cycle Assessment. When we started doing [LCA] in 2000, so many people were resistant, like, “you can’t use that. It’s too complex. It’s not accurate enough. . . . It’s not... those are not real numbers.” And you know, [natural capital valuations have the] same issues.” She felt that as natural capital efforts become more refined and regulated, they could become like LCA’s are now – “more and more people have adopted LCA, and now it’s just public.”

Most of our respondents noted the importance of partnerships and collaboration as part of their efforts to quantify natural capital impacts and dependencies. These partnerships included

working with consultants, whether from major consultancies such as KPMG, EY, Deloitte, PWC, TruCost; individual contractors/consultants; NGO partners with specialties in nature (such as Conservation International; WWF; TNC; etc.); NGO partners in establishing protocols for natural capital valuations (e.g., Natural Capital Coalition/Capitals Coalition), etc. Other partners included investors/banks as well as communities and local governments. Such partnerships offered many benefits, including expertise, credibility, and ability to have greater impact at a landscape scale. These benefits are summarized in the supporting appendices regarding collaboration.

In addition, experts in this space recognize the need to make natural capital valuations more accessible to a broader range of companies. As our respondents noted, the difficulties encountered in the valuation process mean that presently only the most dedicated companies are willing to persevere through the challenges. As one NGO representative noted, “We need to make the whole concept clearer and easier, and dare I say it, more accessible, so [more companies] know exactly what the process involves and feel like they can engage with it. She continued: “We need to make sure that it's more accessible and it's better communicated, because only by doing that will we break ourselves into the second tier of companies who maybe don't want to be a first mover. I think what we're going to need to do over the next 10 years is break these perceptions that natural capital needs to be an expensive exercise, needs to be incredibly technically detailed and full of monetary estimates and methodologies and coefficients and all sorts of things” (Hailey, Head of Relationships, NGO). Ease of use is especially important in achieving more widespread adoption.

Importantly, even when data are not perfect, frontrunners don't let it stop them from acting – “So we don't know how accurate our measure [of financial value of natural capital] is. In fact, we know it's gonna be pretty inaccurate. But, it's the best measure we have” (Marcus, Director of Sustainability, Luxury Conglomerate).

3. Integrating valuations into decision making

Another vexing challenge respondents face is in integrating natural capital valuations into existing decision making processes, including challenges posed by existing business models, tensions with other business needs, and lack of buy-in from key organizational functions. One NGO representative explained that, from his perspective, “there was no conduit or no active channel in a lot of these companies to use [results from natural capital assessments] in a serious way” (Dennis, Scientist/Researcher, NGO).

a. Existing business models focused on short-term / risk averse.

A key challenge in making the valuations of natural capital meaningful for decision makers can be found in existing – and perhaps outdated -- business models that emphasize short-term thinking and profit motives over environmental motives, and a “play-it-safe” (by the existing rules) mentality. Seven respondents referenced the challenge that their current business models create. One corporate representative explained that “we value the short term, something that has a return that can happen in this month, in this quarter, in this year, it's that short-term result that is prioritized” (Tanner, Sustainability Leader, Chemical Company). Despite this reality, he expressed that “Me personally, I don't think that's any way to run a company that expects to be here

for another hundred years, but that's the way that any publicly-traded company has to behave because of the way that our market is set up.”

Publicly-traded companies face the challenge of a “play it safe” mentality. One corporate sustainability lead articulated that “I think also if we were publicly-held, you know, if your board doesn’t like some things you do, and doesn’t like what your CEO does, they’ll fire ‘em... CEO’s are not going to take that level of risk in the US, especially if it isn’t really core to the business” (Marcus, Director of Sustainability, Luxury Conglomerate). This sentiment was echoed by a representative from a publicly-traded company, who felt that although “I don’t think [financial ideals] inherently has to be in conflict with sustainability ideals about how to operate a business. But all business decisions include tradeoffs, and particularly so in a publicly-traded, low-margin commodity business” (Sean, Sustainability Manager, Forest Products Company).

Clearly, publicly-owned companies *can* also take a long-term perspective in decision making. For example, many respondents praised Unilever’s former CEO, Paul Polman, for taking a courageous stance in not reporting quarterly earnings to Wall Street, in order to mitigate the short-term thinking that pervades business decision making and makes it tough to make decisions that play out over years and even decades.

b. Natural Capital competing with other business needs.

It’s no secret that businesses face tensions between making decisions that prioritize sustainability concerns and those that prioritize more traditional criteria. This tension is something we heard many times, “Because currently, the main yardstick is profits, so it’s easy to make a decision. If you say, okay, it’s just about profits, I go ahead for profits. But if you now say that, for example, your climate impact is on the same level as profits, you will have always tradeoffs in every decision you make” (Carl, Vice President, Chemical Company).

Even for brands where sustainability is a prime aspect of their identity, these tensions existed. One corporate representative said “it’s the constant conversation of like, are we only an environmental company? Or are we a technical company? And so that environmental conversation is always there, but we’ve never made that switch to say we’re going to sacrifice product, quality and technical capabilities for an environmental attribute at this point” (Sasha, Sustainability Professional, Outdoor Gear and Apparel Company).

One corporate representative related this tension between natural capital and other business needs to land use. “We look at ecosystem services, natural capital, natural infrastructure, all of those require land. And so a big constraint we have is competition for using the land assets and land resources that [our company] has. Competition for that is future growth, real estate transactions, other transactions that are in the pipeline” (Tanner, Sustainability Leader, Chemical Company).

Another corporate representative related this tension as one between valuations on paper and tangible investments in plant and equipment: “At the end of the day, [the assignment of value to water impacts] is not real... [the real dollars] go into, you know, keeping our machines running, keeping our people safe, you know, the really core stuff to our business. So that’s the big challenge, is just where does this [valuations of water] fit into

our overall capital allocation strategy?” (Sean, Sustainability Manager, Forest Products Company).

c. *Internal pushback.*

Even when companies have expressed the motivation to explore valuations of natural capital, the valuation experts still may experience internal pushback from variety of individuals or departments, from C-level executives to mid-level managers to local communities and business units. Key sticking points include, but are not limited to, board members, finance departments and CFOs, and local business units.

C-Level/Boardroom. Many of our respondents stated that making the case for natural capital valuations in the boardroom was a key challenge. One sustainability executive noted that an important moment was convincing the Board that they “should disclose [the results of our natural capital valuations]. And that was a brutal meeting. The legal department was not happy about it, our financial department was not happy about it, our COO was not happy about it. But, our CEO wanted us to do it. And our head of sustainability of course wanted to do it” (Marcus, Director of Sustainability, Luxury Conglomerate). This executive went on to state that reporting financial valuations of natural capital impacts “if misconstrued, could be a huge impact on our stock.” By working with the investment community in advance, such concerns were mitigated. Ultimately, the Board did agree to make the valuations public, and today, this company is recognized as a leader in transparency and a role model in such valuations.

Finance. In addition to the boardroom, respondents noted finance as one of the most difficult departments to engage, but perhaps the most important. As one consultant put it, “I think it is really important to involve [finance] because they are making the decisions right now. And, if you talk to these guys, they do not understand sustainability or climate change. And then you explain and explain, and explain, and the third time [they say], “ah, that’s really important, yeah.” That’s why we are talking. And then they change their mindset” (Catie, Senior Sustainability Consultant, Consulting Firm). Another corporate representative shared that while the CFO had been a strong advocate for the company’s work on natural capital, that all changed when he left the company. The new CFO doesn’t value the work, “And then nowadays, what we do is that we made all these projects without the involvement of the financial team” (Kyle, Senior Sustainability Director, Cosmetics Company). “If a CFO is the last person to be convinced, so be it! But you know that’s actually the challenge, I think. Actually the challenge is more often internal company barriers than it is external” (Rebecca, Senior Director and Scientist, Nonprofit).

Local Business Units. Respondents also noted the disconnect between headquarters and local business units. One Finance Director responsible for natural capital valuations noted, “I would say where it is much more difficult to activate those plans [findings from natural capital valuations] is really at the local level in our country business units. Why? because the general manager really is incentivized to deliver the financial performance on a very short-term basis, while we [at headquarters] are working on the mid-term basis, and on the long-term basis, and sometimes you might face contradictions. So at our [corporate] level, we need to manage those contradictions, and to explain the measurement part and business planning part, we need to be very good. ... So I would

say yes, committing general manager at the local level, and sometimes supply and marketing teams, it is not so easy” (Melanie, Finance Director, Food and Agribusiness Company).

In order to overcome the challenges of internal push-back, companies used a variety of strategies, including—paradoxically—using the language of finance itself and embedding sustainability in key functions in the organization.

First, using the language of finance itself can be a solution. One respondent recounted a story from when he worked at a large corporation, and repeatedly submitted a request to invest in a sustainability initiative. “And every time it was the CFO that blocked it. And then the first time it was rejected, the second time it was rejected. What I did on the [third] time was I put in some valuation. I did some [natural] capital work on it, and I put it in there. Third time, they opened the paper, they saw the chart, said, if we invest this much here, we get this much return – because I put it in the capitals bit – and didn’t even read it, they just said yes. They said no twice, but they said yes the third time.” Ultimately, he felt that “by putting it into their language, I was able to engage with them, and I got the initiative through” (Miles, Executive Director, NGO). Similarly, another Sustainability Manager noted the importance of selling it - “what I learned is that it’s as important, and in selling it internally with a catchy name and verbal information that is not too complex to use, is at least as important as doing it well” (Bastien, Sustainability Manager, Luxury Conglomerate).

Other respondents stressed that embedding sustainability personnel throughout the organization seeded natural capital considerations into core decision making, whether that was at the corporate strategy level, the functional level, or at the local business unit. As a Vice President noted, “Back in 2011, [our company] released a new [sustainability] strategy, and with the new strategy there was also an internal reorganization, and the Sustainability Team was transferred to Corporate Strategy. The reason is because the whole sustainability aspect becomes more and more relevant for business and it makes just sense to locate it in the Corporate Strategy Team” (Carl, Vice President, Chemical Company). Similarly, a representative from a Food and Agribusiness Company noted that its natural capital team “is reporting to the Chief Procurement Officer, and the Chief Procurement Officer reports to the CFO. So I would say we are keeping this trending, with finance, with business planning, and with strategy planning. It is our way to really work on those topics.” This same company also stated, “And so that’s why our sustainability currently is really embedded in a lot of different functions. That it is not only in corporate social responsibility and communication, but it is much more deeply embedded in the strategy, in the finance team, in the operations team” (Melanie, Finance Director, Food and Agribusiness company).

Importantly, leaders in integrating natural capital valuations into decision making stated explicitly the need to *not* house sustainability initiatives in the PR/Communications function. As noted by one Vice President, “So, if you're looking at other companies, some have it [the Sustainability Team] in the communications department, some have it as a sustainability team division. In the end, for me, the big question is how serious do you mean it with regards to integration with the core processes within the company. And if you keep this [sustainability team] as a standalone, or as communication exercise, will never make its way into decision

making and steer the company” (Carl, Vice President, Chemical Company).

RELEVANCE TO DECISION MAKING

As noted at the outset, the overarching goal of natural capital valuations is to place decisions about natural capital impacts and dependencies on equal footing with other business decisions. One Managing Director of a Financial Services Company expressed that in addition to allowing her to “speak in a language that is most commonly understood within the business world,” using natural capital accounting facilitates decision making in that it “allows us to present environmental data and financial data side by side. And it allows companies to look at performance metrics, with the same denominator” (Lisa, Managing Director, Financial Services Company). A Sustainability Manager felt that by putting environmental and financial information “on a bit of a level playing field,” his company was able to “elevate a topic like water to, to that level where we’re now talking about water more like we do [other raw materials and costs]” (Sean, Sustainability Manager, Forest Products Company). To another consultant, the natural capital movement signifies that “we are on the way to integrate [environmental indicators] and to give them the same weight [as normal financial indicators]” (Catie, Senior Sustainability Consultant, Consulting Firm).

As one might expect, the impacts on decision making closely mirrored the initial motivations for conducting natural capital valuations in the first place. Assessing a monetary value for natural capital facilitates companies’ ability to make traditional business decisions such as mitigating risk, sourcing raw materials, siting new facilities, or communicating with external stakeholders. Moreover, having financial data to sort and prioritize decisions about environmental sustainability emerged as a key decision-making benefit, as did the ability to do more sophisticated scenario planning, to push forward into integrated reporting, and to tackle the next frontier of natural capital impacts: biodiversity.

1. Prioritizing environmental action

First and foremost, we heard from respondents that by conducting natural capital assessments, companies better understand their entire suite of environmental impacts and dependencies and can therefore prioritize action. One Sustainability Manager shared an illustrative example of the value of natural capital for prioritization: “Take a super simple example: You do an audit on, I don’t know, a [product we make]. You have a lot of different impacts. So two different [production] systems, [located in different] countries can give you two different results. One is better in greenhouse gas, the other is better in water; what do we do? Busy executives have no time to understand this. ... So at least putting everything into a single language, which is the translation of the damage to society in term of cost, due to the consequences of the pollution, it started to be comparable. So you can say that okay, it’s way more CO₂, and it’s a bit less water. At least you can give learning; you can give insight, to decision makers” (Bastien). By monetizing the results of various assessments (CO₂, water, etc.), busy decision makers are given the tools they need to effectively and efficiently make decisions from a sustainability standpoint.

The head of sustainability for North America referred to identified priorities as “hotspots,” and shared that, for her company, natural capital assessments are used as a “materiality screen or hot spot screen. For us, I think [our natural capital assessment] goes back to reinforcing or discovering hotspots that we didn’t know existed for this specific business decision. And that’s

definitely very helpful for us” (Suzanne, Head of Sustainability for North America, Multinational Conglomerate).

One Managing Director of a Financial Services Company shared that in her work with companies, natural capital assessments and valuation allow companies “to normalize all the risks using a common denominator, [and] it helps them understand how to prioritize. So, for example, an impact that might be 10 times greater than another kind of impact can be put at a higher priority for risk management practices” (Lisa, Managing Director, Financial Services Company). A Senior Sustainability Director echoed this: “when we do these kinds of valuations of externalities, you’re going to understand which are the ones that you should make the prioritization. And prioritize your agenda because they are the one there that has higher negative impact” (Kyle, Senior Sustainability Director, Cosmetics Company).

2. Scenario planning

Another way in which valuations were used was in “what-if” type analysis. One consultant shared that “being able to do predictive modeling and being able to ask “what if” scenarios around different decisions” (Dennis, Scientist/Researcher, NGO). This was echoed by other respondents: “What you can easily do with these kinds of methods is to make scenarios, [to] compare different options. What would happen if [we] would replace oil and gas as key raw materials with renewables? What would happen if we build up a new site in China compared to Brazil, for example? These are scenarios we can easily run with this methodology” (Carl, Vice President, Chemical Company). And Melanie, Finance Director at a Food and Agribusiness Company, said: “But it is our next goal to really be able to quantify the different risks, and opportunities related to climate change. And with different climate scenarios, to evaluate how different scenarios could impact the financial performance of the company. Because it is really giving some critical information to the top management, because to build the prospective vision of the business model, it is more valuable than just getting a number for your E P&L which is more static.”

3. Integrated Capitals

Leaders in this space emphasized that natural capital valuations are increasingly integrated with valuations of other “capitals.” In fact, the movement towards integrated reporting (Eccles and Saltzman 2011), or impact-weighted financial accounting (Serafeim, Zochowski, and Downing 2019), is well established and our experts are already participating in global initiatives to incorporate financial impacts across multiple dimensions beyond economic profit. “Multi-capital assessments ... allow us to really understand what is the value generation of a business unit or a brand, and how does that brand contribute to having a purpose in society. And how could we reorient the strategy of a brand, so that the value generation for society and also the business is maximized” (Ulrich, Senior Sustainability Manager, Dairy/Food Conglomerate). “Whether we’re talking about intellectual capital, manufactured capital, and the natural... social, human, all of these have the same fundamental basis. You look at them as a resource, that if you invest in you get a return. You don’t invest in them, you lose the capital, and it stops providing you the benefits that it was before. So, fundamentally underpinning it all [natural capital valuations] is a very simple concept really, that we should invest in the things that we value” (Miles, Executive Director, NGO).

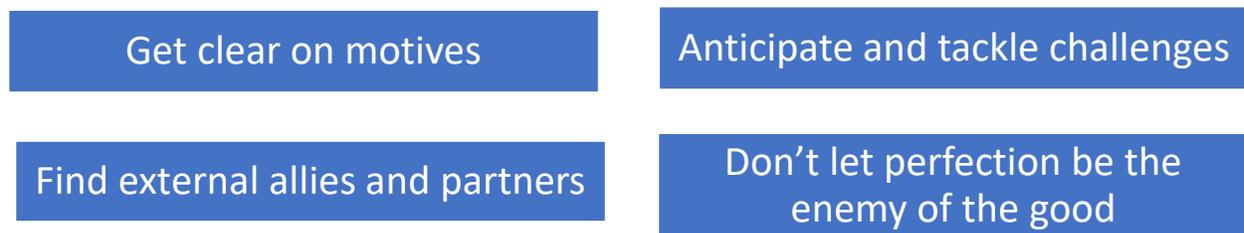
4. Biodiversity Impacts.

Leaders in natural capital impacts consistently said the next frontier of valuations will focus on biodiversity impacts, particularly given the “direct correlation of [our production of raw materials] and biodiversity.” However, “understanding business impacts on biodiversity is really complex, and it is probably one of the less developed in terms of quantifying natural capital impacts. And so ... [my company] wants to work with other partners to contribute, to develop those methodologies” (Melanie, Finance Director, Food and Agribusiness Company). This future-thinking focus on biodiversity is consistent with the efforts coming out of the United Nations Environmental Program, the International Union for the Conservation of Nature, and the World Economic Forum.

LESSONS & IMPLICATIONS

For companies looking to provide quantitative assessments of impacts and dependencies on nature, our study offers the following lessons and insights, summarized in Figure 3.

Figure 3. Lessons for Quantifying Natural Capital Impacts and Dependencies



1. Get clear on motives. Clarity of motives is key to communicating with others (e.g., why the effort is worthwhile) and securing buy-in. Companies’ motives to quantify natural capital impacts include traditional economic motives (e.g., to improve the business: manage/mitigate risk, save on costs, and respond to market demands/customer expectations) as well as a motives related to the moral responsibility of business-- for planetary survival as well as the very survival of the business that depends on natural resources. Ultimately, the ability to assess natural capital impacts using the same metric as all business decision are made, dollars and cents (or euros, as the case may be), allows clearer line of sight into these issues. Being clear on motives also helps articulate the value that natural capital assessments can offer and tell the story. Being ready with compelling use cases that clearly demonstrate the quantitative benefits of natural capital valuations provides compelling evidence to decision makers.

2. Anticipate and tackle challenges. Anticipating the known challenges brings a level of predictability to what can be difficult process and equips people with key tools to overcome the challenges. These known challenges include a) developing a meaningful lexicon, b) understanding data requirements, c) prioritizing areas to focus on, and d) anticipating pushback.

- a. Develop lexicon that works for each company. Given that many of respondents highlighted the unfamiliar lexicon of natural capital valuations, it is important to anticipate the need to customize and tailor the language of natural capital to each company's context. This might include developing their own terminology; for example, one company referred to the use of nature (a wetlands) to help with water maintenance "engineered natural technologies." Another company couching the idea in existing business methods (as so and so did), creating a lexicon that works for each company's unique business will help with internal communication.
- b. Understand the data requirements. Like most new organizational undertakings, data is the underpinning for analysis and natural capital valuations are no exception. Because companies already are using data analytics to prepare sustainability reports and to follow disclosure guidelines, natural capital valuations can be positioned as extensions of those efforts.
- c. Develop a road-map. Companies should identify where the payoff from natural capital valuations are likely to yield important insights. As our data suggest, using a materiality screen (such as that offered by Deloitte 2017) can be a useful tool to identify these areas. Recall the section above under using such assessments in prioritizing environmental risks. Moreover, the road-map might focus on using natural capital valuations for internal decision making only, without the pressure that companies may feel from publicly disclosing the effort. Again, our experts noted that getting comfortable internally can help alleviate potential concerns about external disclosures.
- d. Anticipate push-back. Knowing in advance that there will be nay-sayers can help alleviate the potential fatigue that may be experienced in light of organizational pushback. Our respondents emphasized the need to "socialize" or "diffuse" the effort. For example, Tanner, a Sustainability Leader at a Chemical Company, presented workshops to many units in his company with the idea of diffusing this way of thinking across the organization. In a similar fashion, Suzanne, Head of Sustainability for North America at a Multinational Conglomerate, emphasized that "socializing the idea" was a key part of generating wider acceptance and use.

In addition to preparing for and delivering proactive internal communication, our study highlights the importance of ensuring a diversity of engagement across supply chain, procurement, corporate strategy, and finance areas. Our study cautions that housing the valuation effort in only the sustainability department does not yield optimal outcomes. Likewise, undertaking natural capital valuations for communications/PR value is likely to back-fire.

3. Find external allies and partners. All of our respondents noted the value of guidance from outside experts in the process of developing natural capital valuations. Whether this guidance comes from consultants, NGO partners, or one of the many organizations working to standardize methodologies for natural capital valuations, these experts' experience in working with other companies and clients can help overcome potential challenges with data, valuations, etc. In

addition, collaborative approaches can surface what is working well and help refine efforts to be more successful. In this regard, many of our respondents were very active in attending (and presenting at) conferences and seminars to learn and share best practices.

4. Don't let perfection be the enemy of the good. Another key lesson arising from our study is to anticipate imperfect data, imperfect valuations, and related concerns. Despite the imperfections, leaders in natural capital valuations pushed forward, noting that even if a specific numerical value might be questioned, the comparative insights about natural capital impacts and dependencies offered valuable additional information for decision making. Recall the earlier example from the Director of Sustainability, Marcus, at a Luxury Conglomerate: “So we don't know how accurate our measure [of financial value of natural capital] is. In fact, we know it's gonna be pretty inaccurate. But, it's the best measure we have.”

Related to this, our respondents did not let worry of potential negatives impacts negate the benefits of the information gathered. They did not let concerns over possible backlash from internal units, investors, environmental NGOs or the public prevent them from doing what they knew would be critical to business success and longevity.

In this sense, our experts demonstrated courage and persistence in the face of challenges, to help their companies and organizations navigate this complex space and benefit from the knowledge gleaned in the process. The leaders who have the courage to set up this initiative are paving the way for the fundamental transformation that monetary assessments of natural capital impacts and dependencies can have business. We urge companies to join with others in these efforts, as collective action is key to driving change.

Author Bios

Jakki Mohr. Dr. Jakki Mohr is the Regents Professor of Marketing & Innovation, the Poe Family Distinguished Faculty Fellow, and Fellow, Institute on Ecosystems, at the University of Montana. She received her Ph.D. in from the University of Wisconsin-Madison. Prior to joining the University of Montana, Mohr was an assistant professor at the University of Colorado, Boulder. Before that, she worked in Silicon Valley at Hewlett-Packard (before it became known as hp).

Jakki studies challenges companies face in developing and commercializing break-through innovations, including a broad range of technologies ranging from scientific innovations to innovations in restoration and ecology. She served on the National Academies of Sciences Committee to overcome barriers to electric vehicle deployment in the United States (2012-2015).

Her recent research is situated at the intersection of the natural world and business. For example, she studies innovations (such as pioneering genomics tools) in the field of ecological restoration (restoring degraded landscapes), how companies use biomimicry (innovations inspired by nature, based on underlying biological mechanisms) to solve technical and engineering challenges, business valuations of natural capital, business strategies to engage in restorative/regenerative practices, and technologies used to gain supply chain transparency. Her early research focused

on organizational communication between partners in strategic alliances/ partnerships in distribution channels.

Mohr's research has received national awards, and has appeared in *Nature Reviews Genomics*, *Restoration Ecology*, the *Journal of Marketing*, the *Strategic Management Journal*, the *Journal of the Academy of Marketing Science*, the *Journal of Product and Innovation Management*, the *Journal of Public Policy and Marketing*, among others. She has also received numerous teaching awards.

Carmen Thissen. Carmen Thissen is an undergraduate research associate from the Davidson Honors College at the University of Montana. Thissen recently graduated Summa Cum Laude with a B.S. in Ecology and Organismal Biology and minor in Climate Change Studies, and has completed coursework in Sustainable Agriculture at the University of Hawaii at Hilo as fully-funded Annie's Sustainable Agriculture Scholar. In addition to her research on natural capital, Thissen has conducted research on climate resiliency in ranching, and co-authored the paper "Ranch resilience conversations: Themes from interactive drought workshops with Montana ranchers."

Following conclusion of this project, Thissen accepted a position with *Business for Nature*, an organization which seeks to both encourage business action for nature and amplify the unified business voice calling for policymakers to enact ambitious policy for nature. She considers her natural capital research foundational to her pursuit of a career on the cutting edge of Corporate Social Responsibility.

REFERENCES

Bernick, Libby (2017) "Valuing Natural Capital," Chapter 6, pp. 173-192, in *Greener Products: The making and marketing of sustainable brands*, by A. Iannuzzi, 2nd edition, Boca Raton, FL: CRC Press.

Costanza, Robert, et al. "The value of the world's ecosystem services and natural capital." *Nature*, 387.6630 (1997): 253-260.

Deloitte (2017), "Seek and you may find: How CFOs can manage sustainability risks and find long-term value," <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/risk/us-sustainability-reporting-pov.pdf>

DiMuro, J. L., Guertin, F. M., Helling, R. K., Perkins, J. L., & Romer, S. (2014). A financial and environmental analysis of constructed wetlands for industrial wastewater treatment. *Journal of Industrial Ecology*, 18(5), 631-640.

Eccles, Robert and Daniela Saltzman (2011), "Achieving Sustainability through Integrated Reporting," *Stanford Social Innovation Review*, (Summer), pp. 56-61.

Glaser, B. G., & Strauss, A. L. (2017). *Discovery of grounded theory: Strategies for qualitative research*. Routledge.

Harmon, Marcel (2016), "If we say that nature is priceless, do we end up in effect treating it as valueless?" *Economics*, July 18, <https://economics.com/if-we-say-nature-is-priceless/>

Hawken, Paul (2010), *The Ecology of Commerce*, (revised edition), New York: Harper Business.

IUCN (2012), IUCN Business Engagement Strategy (April), https://www.iucn.org/sites/dev/files/import/downloads/iucn_business_engagement_strategy_final.pdf

Keating, Cecilia (2020), "Nature is the beating heart of a green recovery': Corporates step up calls for nature restoration policies," <https://www.businessgreen.com/news/4016473/nature-beating-heart-green-recovery-corporates-step-calls-nature-restoration-policies>

Kering (2018), "Environmental Profit & Loss (EP&L) 2018 Group Results."

KPMG International (2014), "A New Vision of Value: Connecting corporate and societal value creation," <https://assets.kpmg/content/dam/kpmg/pdf/2014/10/a-new-vision-of-value-v1.pdf>

Lindlof, T.T. and Taylor, B., R., (2002), *Qualitative Communication Research Methods*, Thousand Oaks, CA: Sage.

McCormick, Nadine (2020), "The Natural Capital Journey," at <https://wevaluenature.eu/article/natural-capital-journey>

McCracken, G. (1988). *The long interview* (Vol. 13). Newbury Park, CA: Sage.

Mehta, Angela (2018), "Nestlé is paying a premium to UK farmers to try out interventions such as planting hedgerows," *Ethicalcorp.com*, March 18, <http://www.ethicalcorp.com/nestle-takes-natural-capital-approach-make-uk-dairy-farming-more-sustainable>.

Mohr, Jakki (2020), "Nature for Business, Business for Nature," June 11, *Marketing News*, <https://www.ama.org/marketing-news/nature-for-business-business-for-nature/>

Monbiot, George (2012), "Putting a price on the rivers and rain diminishes us all," *The Guardian*, August 6, <https://www.theguardian.com/commentisfree/2012/aug/06/price-rivers-rain-greatest-privatisation>

Nidumolu, Ram, C. K. Prahalad, and M. R. Rangaswami (2009), "Why Sustainability is Now the Key Driver of Innovation," *Harvard Business Review*, (September), 57-64.

Serafeim, George, T. Robert Zochowski, and Jen Downing (2019), "Impact-Weighted Financial Accounts: The Missing Piece for an Impact Economy," Working Paper, Harvard Business School, <https://www.hbs.edu/impact-weighted-accounts/Documents/Impact-Weighted-Accounts-Report-2019.pdf>

Timperley, Jocelyn (2016), "The pitfalls of putting a price on nature: What's next for natural capital?" *GreenBiz*, https://www.greenbiz.com/article/pitfalls-putting-price-nature-whats-next-natural-capital?utm_source=newsletter&utm_medium=email&utm_term=newsletter-type-greenbuzz-daily&utm_content=2016-07-13&utm_campaign=newsletter-type-greenbuzz-daily-105399&mkt_tok=eyJpIjoiTTJRNFPXVXhZMk14Tm9JMiIsInQiOiJseGN0OUUzM2tDxc9FVXM0SIB0YzVcLzd1Q210SGtCY0VSd1FMdjNLaXFUZIZjQlQrUFpFS0IyMUJHVDJYMXRU

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UNEP FI (2018), Exploring Natural Capital Opportunities, Risks and Exposure: A practical guide for financial institutions, https://www.unepfi.org/wordpress/wp-content/uploads/2018/11/NCFA_Exploring-Natural-Capital-Opportunities-Risks-and-Exposure_Nov-2018.pdf

World Economic Forum (2020, "Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy," http://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf

Appendix 1: Overview of various natural capital methodologies*

Name	Description	URL
Natural Capital Protocol (NCP)	<p>Created by the Natural Capital Coalition in 2014 to “generate trusted, credible and actionable information for business managers to inform decisions” in an attempt to “harmonize approaches to natural capital” and create an easily-applicable standard, the protocol outlines an iterative four-step process.</p> <p>Coalition members are widely varied and include the Economics of Ecosystems and Biodiversity (TEEB), The Institute of Chartered Accountants in England and Wales (ICAEW), Trucost, Conservation International, and the World Business Council for Sustainable Development (WBCSD).</p> <p>Over 50 companies have piloted the NCP, assisting in integrating natural capital into decision-making.</p>	<p>https://naturalcapitalcoalition.org/natural-capital-protocol/</p>
Natural Capital Project (NatCap)	<p>The Natural Capital Project (NatCap) has created a software tool, InVEST, to map and value goods and services from nature (natural capital). The goal is to incorporate natural capital into business and policy decisions.</p> <p>Centered at Stanford University, the NatCap Project operates as a partnership between the Chinese Academy of Sciences, the University of Minnesota, the Stockholm Resilience Centre, The Nature Conservancy, and the World Wildlife Fund “working to make valuing natural capital easier and more accessible to everyone.”</p>	<p>https://naturalcapitalproject.stanford.edu/</p>

(Continued on next page)

<p>ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)</p>	<p>Launched by the Natural Capital Finance Alliance (NCFA), the web-based tool helps global banks, investors and insurance firms assess the risks that environmental degradation (such as the pollution of oceans or destruction of forests) causes for financial institutions.</p> <p>ENCORE is part of the 'Advancing Environmental Risk Management' project which builds upon NCFA's previous work to provide a comprehensive view of the ways in which degradation or destruction of natural capital constitute risk to financial institutions.</p>	<p>https://www.unepfi.org/publications/ecosystems-publications/exploring-natural-capital-opportunities-risks-and-exposure-a-practical-guide-for-financial-institutions/</p>
<p>Impact-Weighted Accounting</p>	<p>The Impact-Weighted Accounts Project is designed to create accounting statements that reflect a company's financial, social, and environmental performance to transparently capture external impacts for investor and managerial decision making.</p> <p>The Project at Harvard Business School is part of a broader Impact-Weighted Accounts Initiative (IWAI), which is a joint effort by the Global Steering Group (GSG) and the Impact Management Project (IMP).</p>	<p>https://www.hbs.edu/impact-weighted-accounts/Pages/default.aspx</p>
<p>Natural Capital Management System (NCMS)</p>	<p>Developed by Climate Earth, the NCMS allows organizations to quantify and measure in financial terms the real cost of business operations by placing a dollar value on resource consumption such a water use or land use change. It is designed to enable companies to know which natural assets they depend on most, where they are being consumed, and most importantly, help communicate this internally, and externally to facilitate collaboration with a company's value chain partners</p>	<p>https://www.climateearth.com/solutions-ncms/</p>
<p>Environmental Profit and Loss (EP&L)</p>	<p>Developed by Kering, the E P&L approach assesses a company's monetary valuation and analysis of its environmental impacts from cradle-to-grave. Allows managers and other stakeholders to see where in the supply chain major impacts occur.</p>	<p>https://www.kering.com/en/sustainability/environmental-profit-loss/methodology/</p>

Value Balancing Alliance e.V.	The alliance is a non-profit organization formed to change the way company performance is measured and valued. The alliance purpose is to create a global impact measurement standard for disclosing positive and negative impacts of corporate activity and to provide guidance on integrating these impacts into business decisions.	https://www.value-balancing.com/
Integrated Reporting (Integrated Capitals)	An integrated report explains how the forms of capital (stocks of value) are affected by an organization's activities, including financial, manufactured, intellectual, human, social and relationship, and natural. Integrating all capitals into one report allows decision makers to understand where and how an organization creates (or destroys) value over time.	https://integratedreporting.org/what-the-tool-for-better-reporting/get-to-grips-with-the-six-capitals/

* The government sector has its own protocols and initiatives that are being used at a national scale; for example, the Wealth Accounting and the Valuation of Ecosystem Services (WAVES) is part of the broader World Bank umbrella initiative, the Global Program for Sustainability (GPS), a global partnership that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts. We do not review these government-oriented approaches to natural capital valuations.

Appendix 2. Additional Data in Support of Key Themes.

Verbatim responses regarding motivations
<i>Business Survival/ Long-Term Business Viability</i>
What natural resources does it take for the companies [under our corporate umbrella] to be able to operate? In some cases, there's things that we're dependent on to operate as a business that... if they don't exist, then we don't exist. And so the value of that [resource] means then that is the value of our company. – Suzanne, Head of Sustainability for North America, Multinational Conglomerate
So to some extent, naturally the topic [natural capital valuations] are embedded in the financial strategy. Why? Because [my company] is convinced that it is actually key for business continuity. – Melanie, Finance Director, Food and Agribusiness Company
<i>Risk Management</i>
Where [the results of our natural capital assessment] is used as an input to define that risk and share that with executives, and know that we can explain that we've done this thorough study and the different aspects of things that we included. – Suzanne, Head of Sustainability for North America, Multinational Conglomerate
[Our effort to value natural capital] is basically based on the resilience of the agricultural systems that produce our goods. And basically if you manage well your supply chain, if you work, for example, with the herders of sheep to get the finest wool, if tomorrow there is a lack of water, if tomorrow there's the climatic problem, let's say, will you still be able to source high quality wool? ... So you have examples of resilience and building resilience in the supply chain that are directly linked to the business case for [natural capital]. – Bastien, Sustainability Manager, Luxury Conglomerate
So we began by looking at [our clients] and their environmental performance, and in particular looking at their environmental impacts. And we began by putting a monetary value on those impacts and dependencies to natural capital. And our point of view was that this was a proxy for environmental risk. And it represented a different way of thinking at the time. Instead of just talking about the company's footprint, so to speak, or how much water they used, or their carbon efficiency, we actually put a monetary value on their impacts and dependencies. – Lisa, Managing Director, Financial Services Company
One of the things that we've pioneered has been some work around revenue at risk. So, not so much because of damage to the environment or the like, but that there's a certain amount of revenue that would be at risk, simply because natural capital, the flows would not be available to continue production at the rate and quantity required to continue to generate revenue. So we find when we start talking about revenue at risk, or increased operating costs, in other words implications on a P&L or balance sheet or cash flow statement, that it does change the conversation and a, a bit of a culture shift in the way we talk about things. – Lisa, Managing Director, Financial Services Company
So [dependencies on nature] is making it, I would say, compulsory to take into account climate change in your business strategy. Because you need to protect your sourcing strategy. For instance, at [my company], we have a big business impact in water, so we need to protect the things in watershed at risk. - Melanie, Finance Director, Food and Agribusiness Company
<i>Cost savings</i>
So, what we're looking at, instead of just looking for ways to increase the value of our ecosystem services and our impacts in ecosystem services, we can ... say with confidence that

the cost savings associated with it - the, you know, reduction in operations and maintenance costs associated with that project - those are hard numbers, hard financial numbers. – Tanner, Sustainability Leader, Chemical Company
Market drivers
And, one of the reasons these large companies are getting [the importance of considering natural capital impacts in sourcing raw materials], is that an important part of their market, the EU and US markets are saying “we want you to pay attention to this.” – Harry, Environmental Business Director, International NGO
What I know now is that marketing are looking at those issues more and more, since you have now a lot of consumers that are looking at buying organic products, with less packaging, and so you have a lot of alternatives, and from the goods that are now emerging. - Melanie, Finance Director, Food and Agribusiness Company
Historically for food companies, you pick ingredients based on consumer wants, and, you know, price and availability on the procurement side. But now, because the consumer wants sustainability, we are building in sustainable ingredients into our ingredient strategies. – Katherine, Senior Sustainability Director, Food and Agribusiness Company
Why not? - motivations for not valuing natural capital
Companies know the answer [to their natural capital impacts]. They know what it’s [a monetary assessment of those impacts] gonna show. It’s gonna show that there’s big environmental impacts associated with their production of revenue. – Lisa, Managing Director, Financial Services Company

Verbatim responses regarding challenges
1. Confusion in Process
<i>Terminology as barrier</i>
When we say “natural capital,” it’s a little bit of a misnomer. Well, not a misnomer, but most companies don’t measure this for their balance sheet. Like what we [our company] measure, it’s our use of ecosystem services. And even, by the way, to use a profit and loss metaphor [for natural capital] is a little tortured. – Marcus, Director of Sustainability, Luxury Conglomerate
[We need] thoughts on how you might bridge this natural capital language barrier that exists between business people and I think the natural capital advocates. ... If somebody could create a lexicon that puts natural capital squarely as part of risk management, that’s the easier - that’s where it fits in our planning. – Katherine, Senior Sustainability Director, Food and Agribusiness Company
[Regarding lexicon], our term for natural infrastructure internally is engineered natural technologies. – Tanner, Sustainability Leader, Chemical Company
<i>Various (inconsistent) methodologies</i>
I mean the challenge that we [companies interested in valuing natural capital] have is agreeing on which practice to use and making sure that the methodologies are transparent, are prevalent, are shared between companies. – Ulrich, Senior Sustainability Manager, Dairy/Food Conglomerate

<p>The results are quite interesting, but we can't compare company by company. And we at [my company] have been approached by several mainstream investors with the request, please work on something that we can compare results. – Carl, Vice President, Chemical Company</p>
<p>As long as we can't compare the results of companies for our stakeholders, but also within the companies, it has no convening power. It [the valuation of natural capital] might be interesting, but as long as you can't compare it, it will never make its way into the market completely. – Carl, Vice President, Chemical Company</p>
<p><i>Why standardizing methodologies is tough - Companies have their own ways of doing things</i></p>
<p>Yes, the Natural Capital Protocol is very valuable; we support that. We're doing something else internally that is more in tune to how we do work; you know, our projects, how we look at economics, and how we're organized as a corporation. – Tanner, Sustainability Leader, Chemical Company</p>
<p>And every company will be different in terms of the way they themselves think about their business model. Even if they do exactly the same thing. They'll probably have different preconceptions of what that is and what particular things are important, and what are not important [in their valuations of natural capital]. – Isaac, Consultant, Consulting Firm</p>
<p>Because normally what companies do is that they want to just to develop their own methodology [for their natural capital valuations]. – Kyle, Senior Sustainability Director, Cosmetics Company</p>
<p>So, in every sense, you know, I think the approach of valuation is completely variable and we actively encourage businesses to design their natural capital assessments around exactly what their objective is, what is it they need to achieve. And, you know, what level of information do they need to make a smart decision. And the answer to that is always going to be different. Some companies want to look at the impact of a product, so they will go diligently along the product lifecycle and collect data. Others want to look at the impact of the site. So for them, the process is completely different. They're not interested in a product, they're looking at impacts over time or impacts over different seasons. So the methodologies are different.” – Hailey, Head of Relationships, NGO</p>
<p>And so I think because – (a specific protocol) encourages experimentation and, you know, it is something companies could play around with and get familiar with and adjust to their own level of comfort and expertise as well. ... And it's interesting now that they are the ones coming back to us and saying, “We've experimented and, you know, now we want to we want to work towards standardization.” – Hailey, Head of Relationships, NGO</p>
<p>Something that was very important for us, which is the issue of flexibility, right? Understanding that companies have different needs, and want to do different types of interventions that are informed by the assessments or associated with natural capital, that is, you know, precludes this standardization. So perhaps just understanding methodological approaches that are encouraged or acceptable is the way to go. – Rebecca, Senior Director and Scientist, Nonprofit</p>
<p>I think that the challenge is that when it comes to allocating capital within a business, each business has... I don't wanna say its own way of doing things, but they all have their own way of doing things. – Lisa, Managing Director, Financial Services Company</p>

Choice of valuation coefficients
In a couple of external evaluations we are trying to promote harmonization of valuation factors, and promote reasoning why you would go with a specific valuation technique for a given context. But as you probably know, those initiatives have not concluded yet, and there's generally not yet a consensus on how exactly one should do a valuation in all possible contexts. – Ulrich, Senior Sustainability Manager, Dairy/Food Conglomerate
On the other hand, there will be endless discussions about what are the right valuation coefficients... x. y. z euros. And this is a large debate. So you when you look into the, you know, market [for the social cost of carbon], you see figures coming up from five U. S. dollars up to 140 U.S. dollars. So you have a wide spread, which is quite a challenge, because, in the end you can't compare any results from company to company. But this is stuff they're strongly working on currently to get an alignment here. – Carl, Vice President, Chemical Company
We are defining a standardized valuation coefficient which enables to calculate a valid amount of natural capital. – Catie, Senior Sustainability Consultant, Consulting Firm
Or, having somebody develop a currency that is standardized, you know, that can be used. Like, a hectare of clean soil, healthy soil, is worth x amount of dollars. – Katherine, Senior Sustainability Director, Food and Agribusiness Company
And I would always strongly advocate that the valuation coefficient. So, the currency, or let's say the price that you put behind a certain indicator should be the same. It does not make any sense that, let's say, the CO2 emissions in one part of this world are differently accounted for from company to company. – Carl, Vice President, Chemical Company
2. Difficulties in data collection
Data are imperfect
[Unlike real financial and accounting data], with natural capital valuations, we have nothing to reconcile to. So we don't know how accurate our measure is. In fact we know it's gonna be pretty inaccurate. But, it's, it's the best measure we have. – Marcus, Director of Sustainability, Luxury Conglomerate
And so it, it can be a challenge for some companies to have the right kind of data. ... So again, understanding what data is available and what is fit for purpose, and to what extent we actually need primary data. So that's one of the big barriers. – Lisa, Managing Director, Financial Services Company
... for a lot of these things, there are no data points available. And so, it can definitely be a very subjective discussion. And somewhat... similar to doing like a Life Cycle Assessment, where sometimes there's data missing. You have to use proxies, and maybe find studies from other regions, or take samples and extrapolate, etcetera. – Suzanne, Head of Sustainability for North America, Multinational Conglomerate
Data are geographically dependent
[Some] environmental aspects are heavily local specific. So it makes a total difference if you're polluting the air in a city or in a desert. So you have local, and you should have localized figures for that, or indicators for that. – Carl, Vice President, Chemical Company

Data are expensive
So, I would say, [my company] did not decide to go in this direction because [a particular valuation methodology] is very long to put in place, very costly. – Melanie, Finance Director, Food and Agribusiness Company
To enable my work, I need to have databases, tools, whatever, that I can rely on. Otherwise all the research – it just takes too much time and nobody is willing to pay for that. – Isaac, Consultant, Consulting Firm
Data sometimes don't exist; leaving out impacts not easily quantified
As you can see, it [our assessment] is not including the use phase, because we are lacking the data. And, I have no clue, if you would calculate the complete use phase, if the picture is still positive or not. – Carl, Vice President, Chemical Company
We happened to pick probably the worst business to try to do something like this. We don't control the supply chain. We have some fairly good traceability, but it's just at the country level at this point. We don't know all the impacts because it's not always scientifically available data. – Marcus, Director of Sustainability, Luxury Conglomerate
Beyond that, if we are looking at resilience, if we are looking at flooding or water provisioning it's a little bit tougher because it's indirect. That's one of the challenges we are addressing with our [specific name] goal, and with our continuing collaboration with [NGO Partner]. To date, ecosystem services have really not been valued in ecological or economic models. - Tanner, Sustainability Leader, Chemical Company
The challenge of scaling [our efforts to value natural capital] was getting data. So [we] weren't used to simply collecting that kind of data. – Marcus, Director of Sustainability, Luxury Conglomerate

3. Difficult to integrate valuations into decision making
<i>Incompatible with existing logic of business</i>
[It's hard to use natural capital valuations because] we're still running our businesses like we have 10, 15 years ago. – Carl, Vice President, Chemical Company
[Using natural capital valuations is at odds with] the business models we rely on, and the forced thinking of a publicly-traded company. It's that short-term result that is prioritized. The fact that our leadership have to go on the phone every single quarter, talk with investors about the results.– Tanner, Sustainability Leader, Chemical Company
And then the, the second barrier beyond data, is simply the challenge that every company has in integrating any kind of sustainability-related data into its decision making. So, many times I've been asked, to what extent have businesses incorporated natural capital valuations into their decision making, and my response is “about the same rate as companies have incorporated sustainability data into their decision making.” So, I think the challenge for many companies, because our financial accounting system is not set up to accommodate natural and social and human capital accounting, businesses in general simply do not have standard ways incorporated into standard business methods like P&L's, to incorporate this kind of information. So while a finance team may want to use natural capital valuations, the existing

accounting procedures simply have no extra column to add environmental capital. So is one of the other barriers is that our traditional methods of financial and business accounting, simply don't have a, a space I'll call it, in the systems to account for this information, in an easy and simple way that finance teams can understand. Or procurement teams, or facility managers, whoever they may be. (Pause) So it's not, it's not a barrier to natural capital accounting, it's a barrier to anything that isn't financial accounting. – Lisa, Managing Director, Financial Services Company

How many people really have understood the complexity, if you want to steer your company along different indicators on the same level? ... And just to make you aware, it's not just greenhouse gases, there are more or less 10 more indicators next to greenhouse gases and profits. How do you steer this complexity? – Carl, Vice President, Chemical Company

Internal push-back/ Lack of buy-in

There's businesses, there's the site, there's the engineering, there's the environmental folks, there's the regulatory, all these different stakeholders are involved in [building new plants]. And while the main decision, it goes up to our Chief Operations Officer, the specifics we have to get there, really, you need buy-in from all these different folks. And if you're coming late to the process, if you're proposing something that sort of goes against that grain [e.g., including natural capital valuations], it can be very difficult. – Tanner, Sustainability Leader, Chemical Company

So yeah, I think definitely having a buy-in from somebody that's actually involved in day-to-day business is... I don't know if it's a guarantee, but it definitely gives you a higher confidence that... they're actually doing something with the results in the end, rather than just disclose them once and forget about them. – Isaac, Consultant, Consulting Firm

So, there's a lot of barriers getting up to that point [where a client commits to getting a monetary assessment of natural capital impacts], to getting the key people within the decision-making teams on board with the concept. – Lisa, Managing Director, Financial Services Company

Verbatim responses regarding partnerships

Role of consultants

It is also very important to be driven by experts. And when we're working with a consultancy, they know whether they have some benchmark in mind, they have their own methodologies, so they are providing some expertise as well. - Melanie, Finance Director, Food and Agribusiness Company

We understand that in the past, we have two main external consultants that could give support to us. And actually [another leader in natural capital, Company X] has worked together with both of them. So then we analyzed and learned what they have. And then we decided to choose one of them to start to this process. - Kyle, Senior Sustainability Director, Cosmetics Company

When we started back in 2011, techniques were not sufficient to reflect what a corporate contribution to a sustainable future means. And so we developed together, mainly with [XX Consultancy] this methodology which we are using. - Carl, Vice President, Chemical Company

Examples of collaboration

So [another coalition] it's a group a businesses, it's a group of government officials, it's a group of NGOs, and group of communities that are really thinking about you know, how do we maintain natural capital at the landscape level, where there's a mix of commodities. - - Harry, Environmental Business Director, International NGO

So it's this idea of okay, we gotta go back and get policy to join with this. So, really, what we're using is a combination of market forces, policy forces. and like, cooperating with local people, that leads to better thinking of natural capital preservation at a landscape level. - - Harry, Environmental Business Director, International NGO

Role of NGOs

So we've been in this collaboration with (large NGO) since 2011, so we've been collaborators for a long time. We knew early on as we were scoping out where it made sense to work together, as we're scoping out what this valuing nature goal could look like. - Tanner, Sustainability Leader, Chemical Company

So there are some initiatives that we joined forces with other companies, together with the municipality, together with some local NGOs, trying to sum up the force and then to deliver better results. - Kyle, Senior Sustainability Director, Cosmetics Company

It's [NGO ranking of corporate performances] a very strong way of putting pressure and convincing the executives first. And then it's going further. I mean some of them have good knowledge, so there are some good experts, so let's use their, their resources too. - Sustainability Manager, Luxury Conglomerate

Engagement with development of specific methodologies

So we were very involved in the development of (a specific methodology). So we were kind of basing our science on their science. And I think it probably was a lot more uncertain when we did it, but it has probably greatly increased in certainty since that time, and since the development of the [method]. But as with any new metric, there's always uncertainty. - Calista, Global Environmental Manager, Industrial Textiles Company

But yeah I think it's been a great sort of network to be a part of, and really it's this huge coalition of lots of different groups and, and types of organizations around the world who are learning from each other. So in that sense, we see a lot a value in staying engaged. - Sean, Sustainability Manager, Forest Products Company

I think honestly, a lot of why we did it initially was, as I mentioned, to help with the piloting of the protocol. And so now it's kind of moving that from pilot to business decision making as a tool. - Suzanne, Head of Sustainability for North America, Multinational Conglomerate

We were part of the consortium that was involved in developing the (XX) protocol. And we also led, led the pilot testing of the protocol in the food and beverage sector, as well as the apparel sector. - Lisa, Managing Director, Financial Services Company

(in reference to an industry coalition) In the end, the main target is that hopefully within the three years timeline, we are coming up with a consistent model how you assess your impact on dependencies in a monetized way, as well as in a disclosure framework, so that our stakeholders can easily compare the performance of companies. And this will be highly linked to the financial disclosures. So we're talking about figures something like an environmental profit and loss, on integrated balance sheets. - Carl, Vice President, Chemical Company