



 RESEARCH SPOTLIGHT

Next-Generation Sustainability: Risk, Opportunity, and Competitive Advantage



Executive Summary

For industrial organizations, the topic of Sustainability is receiving unprecedented attention, both internally and externally. Certainly, industrials have implemented sustainable practices as a business necessity since the start of the industrial revolution. But the approach taken by industry to the topic of Sustainability has changed dramatically in recent decades and even more so in the past few years.

Sustainability and its close cousin, Environmental, Social and Governance (ESG), have gone from being “nice to have” to a dominant strategic focus of forward-thinking industrial enterprises. Moreover, it has become a critical, if not existential, concern of many diverse stakeholders in the global business ecosystem, including governments, NGOs, consumers, employees, and investors.

This LNS Research report will explore the paradigm shift that’s occurred, how Sustainability has evolved as a business topic, and introduce the concept of Next Generation Sustainability as a transformational business initiative. We will also provide strategic guidance on how to operationalize Sustainability (i.e., make it real) for organizations seeking to manage new risks and seize the opportunities of the new paradigm.



FIGURE 1 - Business Drivers of Enterprise Sustainability



A New Paradigm of Risk and Opportunity

Sustainability as a business theme has undergone a major and rather rapid shift. The new paradigm has been in large part driven by massive attention to global climate change and the resulting risks to the planet, economies, people, and businesses. The impact on corporate board agendas is clear: in 2021, Sustainability and ESG topics were the most mentioned and highest trending topics discussed by C-suite executives on corporate earnings calls, among all business topics, including digital transformation. (Source: “Sustainability and ESG in the C-Suite in 2021,” AlphaSense, 2022).

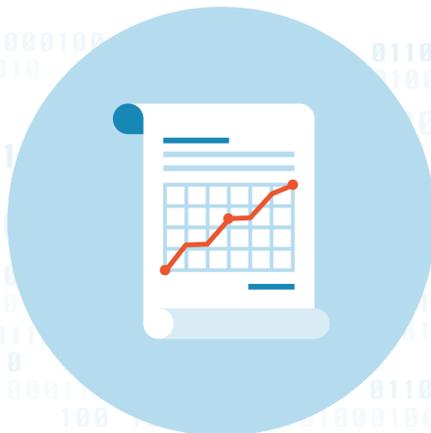
When it comes to Sustainability, the world is transitioning to a new “operating model.” The systems and approaches of the past have been found lacking and new modes of thinking and action are needed. Incremental improvement is good, but true step-change improvement is better (and perhaps necessary). Business leaders face critical decisions on how to best mitigate the downside while leveraging the upside. It’s about managing Sustainability risks and opportunities to build competitive advantage while contributing to a sustainable world.

Much of the discussion around Sustainability relates to risk, especially climate risk. This often takes the form of “net zero carbon by 20xx” goal. Although climate is a key if not dominant component, it can be myopic to overly focus on this. What about other Sustainability risks? The impact of energy supply and cost; adequate water for production operations; workforce turnover due to low engagement and inclusiveness; lack of access to capital based on ESG performance; and supply chain disruption are examples of risks not directly related to climate that should be addressed.



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– Peter Bussey
Principal Analyst





Business and Sustainability leaders face many thorny challenges in navigating the new paradigm, any of which could derail progress. Some major pitfalls we've seen are: a weak business case that doesn't focus on tangible value and quantifiable ROI; overly focusing on reporting rather than operational improvement and transformation; not embedding Sustainability into Operations; inadequate identification and prioritization of the issues most relevant and material to an organization; and failure to align and integrate Sustainability/ESG with overall Industrial Transformation (IX). Such pitfalls can be avoided by following basic best practice guidelines for IX.

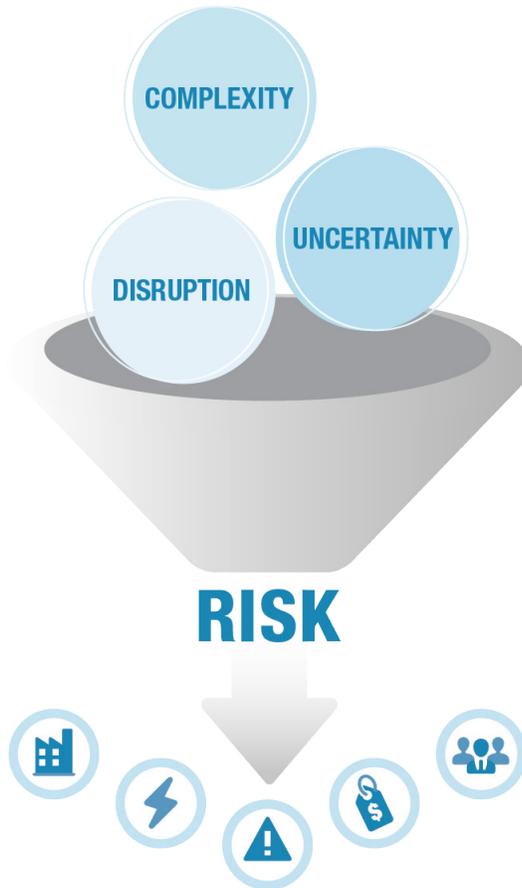


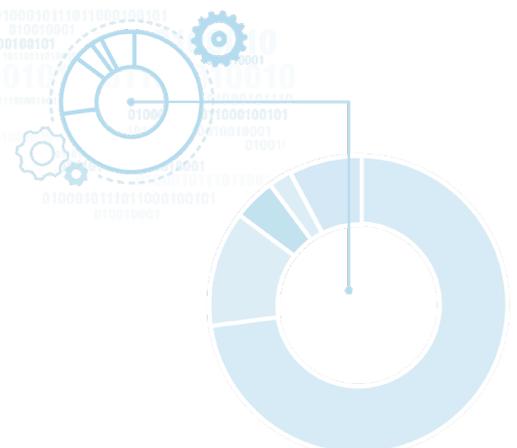
FIGURE 2 - Risk Factors



The Many Lenses of Sustainability

What is Sustainability? The answers depend on whom you ask and are likely to vary widely. There are many vantage points from which to view Sustainability and many possible definitions. Any definition will depend on the perspective of the involved stakeholder(s). Here are four views we think are directly relevant to framing discussions about Sustainability as it relates to industrial enterprises:

- **Global** – A common definition of Sustainability from a global perspective is: “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” (Reference: “Report of the World Commission on Environment and Development: Our Common Future, United Nations, 1987)
- **Industry** – At the level of industry sectors and verticals, a definition of Sustainability is: “meeting stakeholder expectations related to Sustainability and ESG so as to maintain license to operate.” To what degree is the industry operating responsibly overall relative to expectations, requirements, and obligations?
- **Enterprise** – From an enterprise perspective, a definition of Sustainability is “effectively managing Environmental, Social and Governance (ESG) risks and opportunities across the extended value chain for long term growth and stakeholder value creation.” The shift here is the emphasis on creating value for multiple stakeholders, not only shareholder value.
- **Individual** – Making decisions and life choices that are consistent with personal values regarding Sustainability. Of course, this aspect can influence a variety of lifestyle choices, such as food, travel, consumer goods, transportation, etc. And, of great relevance to the enterprise perspective, the choices people make in choosing career paths, jobs, and what type of employer to work for.





Given the diversity of the above perspectives, the main frame of this discussion and LNS Research’s coverage of Sustainability is the industrial enterprise, with a focus on impacts on internal operations and on their impact on the broader value chain, society, and the planet.

Industrials need to make decisions regarding their role in global Sustainability.

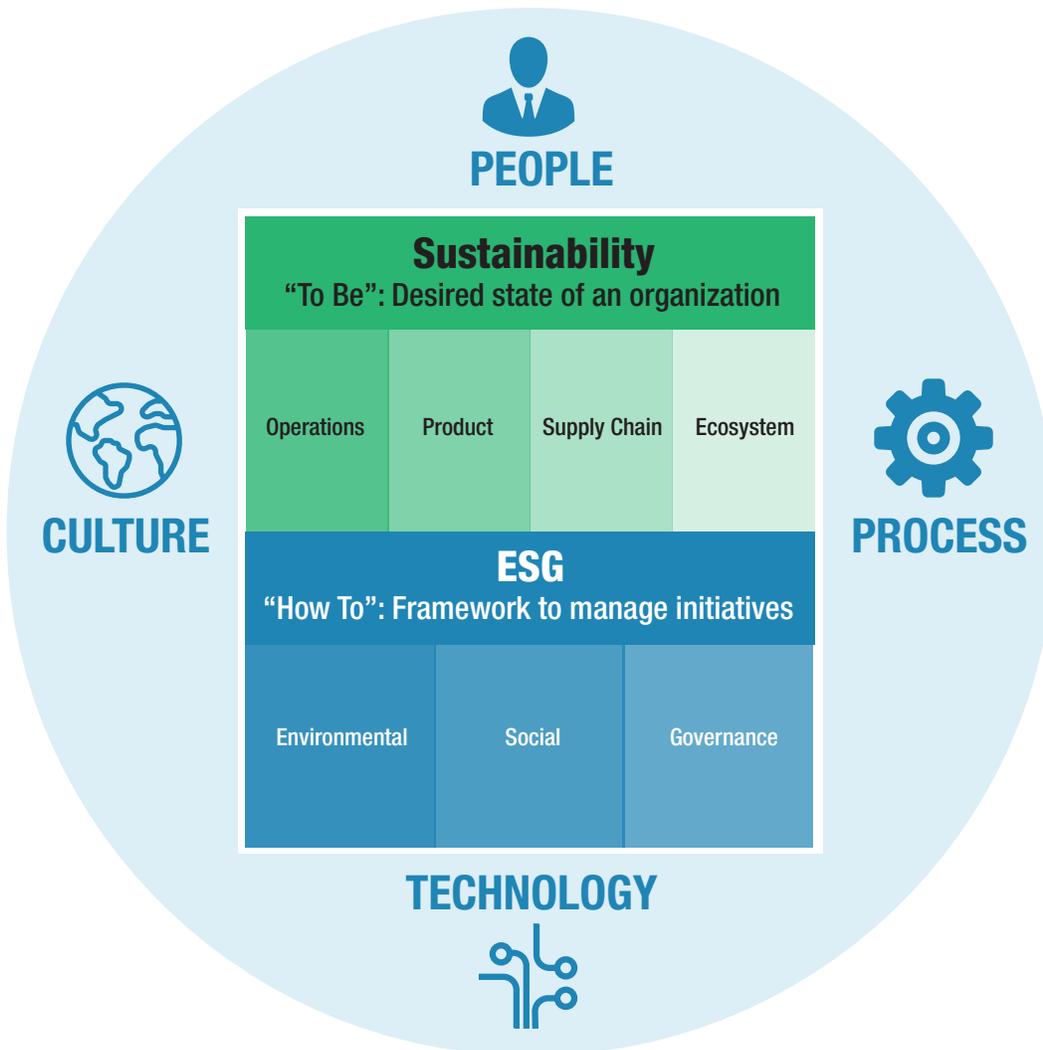


FIGURE 3 - Sustainability vs. ESG



The Evolution of Enterprise Sustainability

The main objective of this report is to introduce the current concept of enterprise Sustainability: Next Gen Sustainability. Before getting to that, let's review how we got to this point. Over time, we see industry as having approached Sustainability in three main ways, each one building on previous generations.

- 1. Productivity – Stay in business, run profitably.** Keeping the plant running, getting the product out the door, paying attention to basic plant safety and security. Basically, doing what's needed to stay in business and to be profitable. This phase started at the beginning of the Industrial Revolution and generally kept on going in that mode through the 1960s and 1970s.
- 2. Efficiency – Doing things right.** The second phase involved taking a broader view of the impact of the company's operations across the value chain, taking more of a holistic lifecycle view in terms of the resources that are used in operations and managing inputs and outputs effectively. This phase brought in the concept of "Design for X," particularly Design for the Environment relative to products, processes, and supply chains. This phase also included putting much focus on things like waste minimization, recycling, reuse, etc.



Sustainability and ESG: Two Sides of the Same Coin

The term "Environmental, Social and Governance" (ESG) became popular in the past few years and is often used interchangeably with "Sustainability." Although we see a distinction, in practical terms, either can be used depending on the context.

Sustainability: "To be"

A desired state of an organization:

- Reflected in an organization's: Purpose, Mission, Vision, Values
- Inherent in the business model
- Balances risks and opportunities
- Defined by inward and outward impacts

Environment, Social, Governance (ESG): "How to" A conceptual framework of Sustainability aspects:

- Help organize Sustainability initiatives
- Set of key capabilities needed to realize Sustainability goals
- Metrics framework for reporting and performance management
- Criteria to screen investments, decisions, and partnerships



3. Responsibility – Do the right thing. The third phase added the major element of Corporate Social Responsibility (CSR) and responsible operations. This included the introduction of the adoption of the triple bottom-line concept of focusing on people, planet, and profit; the idea that doing this could increase shareholder value, while protecting or even enhancing reputation and brand value. This approach to Sustainability, which is still prevalent today, tends to focus on incremental improvements in Sustainability metrics and issuing an attractive CSR or Sustainability report touting accomplishments.



FIGURE 4 - Enterprise Sustainability’s Evolution



Next-Generation Sustainability

This brings us to the on-going transition to Next Generation Sustainability. Next Gen Sustainability is characterized by a strategic approach to managing Sustainability risks and opportunities, not just to create value for shareholders but for multiple stakeholders, including customers, employees, business partners, regulators, and investors. The key difference in the new paradigm is having Sustainability initiatives directed at achieving transformational change, as opposed to incremental change.

What's driving this transition? Two of the larger macro drivers at work here are global climate change and the exponential increase in the influence of many stakeholders/constituencies on Sustainability issues, including customers, employees, and investors. Next Gen Sustainability presents new and more impactful risks and opportunities, and a new set of ground rules for dealing with them. How an industrial organization responds to the new set of expectations regarding Sustainability will have a material impact on not only license to operate and short-term financial performance, but ultimately on its competitive position within its industry ecosystem.

Next Gen Sustainability is focused on transformational, step-change performance improvement, as opposed to narrowly focused incremental improvements. For example, it has been common for companies to target incremental reductions of carbon emissions of, say, 15% off a chosen off a chosen baseline year. Now, more companies are committing to transformative goals, e.g., achieving net zero emissions by 2050 and committing to interim science-based targets.



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Another key characteristic of Next Gen Sustainability is that it's incorporated into corporate business strategy; it's built-in, not bolted on as a siloed, standalone initiative. The scope and focus of an organization's Sustainability initiatives should be determined by a systematic process to identify and prioritize risks and opportunities and align resources and investments accordingly. This includes potentially impacting the basic business model of an organization or industry. For example, consider how Oil and Gas companies, such as ExxonMobil and BP, have committed to become renewable energy companies with net zero carbon emissions.

Next Gen Sustainability is executed as an organization-wide effort, with an emphasis on the role of people from two perspectives. First, the engagement of individuals in developing and implementing plans and programs as part of daily work; this requires careful attention to organizational change management. Second, initiatives designed to improve people-related aspects of ESG, such as workforce engagement, occupational health and safety, diversity and inclusion, and fair labor practices. All these people-related initiatives are key to helping organizations become an employer-of-choice and a respectable business partner, while also addressing critical frontline workforce shortages, skills gaps, and high turnover rates.



A key element of Next Gen Sustainability is focus on people-related aspects of ESG, such as workforce engagement, occupational safety and health, diversity and inclusion, and fair labor practices.

– Peter Bussey
Principal Analyst





Objectives and Challenges

Now that we've introduced the concept Next Generation Sustainability and its implications for industrial organizations, let's look at the current situation across industry in terms of business objectives for Sustainability initiatives, and the most common challenges companies face in meeting them. Our research shows that the top three stated business objectives for Sustainability initiatives are:

1. Improve operational efficiency
2. Meet customer requirements and expectations
3. Ensure business continuity

We see these three objectives as inter-related and complementary. Increasing efficiency in core operations is at the heart of Sustainability: energy management, resource conservation, emissions reduction, and waste minimization (among others) continue to be the "low hanging fruit" of sustainable operations. Increased scrutiny and pressure from customers regarding Sustainability performance is a key driver of Next Gen Sustainability, as is board-level recognition that effective management of Sustainability risks is vital to enterprise risk management and business continuity.

WHAT ARE THE TOP BUSINESS OBJECTIVES FOR YOUR ORGANIZATION'S SUSTAINABILITY INITIATIVES THIS YEAR?



FIGURE 5 - Top Business Objectives for Sustainability Initiatives



What are the top barriers to companies achieving their Sustainability objectives? A major challenge at the outset is establishing the business case for making Sustainability investments. Other typical pain points are insufficient cross-organization collaboration, fragmented technology systems and disparate data sources, and lack of standard ways of driving improvement. The list spans people, process, and technology, and is like what we've consistently seen as the main obstacles to any major improvement or transformation initiative.

WHAT ARE THE TOP CHALLENGES YOUR ORGANIZATION FACES IN ACHIEVING ITS SUSTAINABILITY BUSINESS OBJECTIVES?

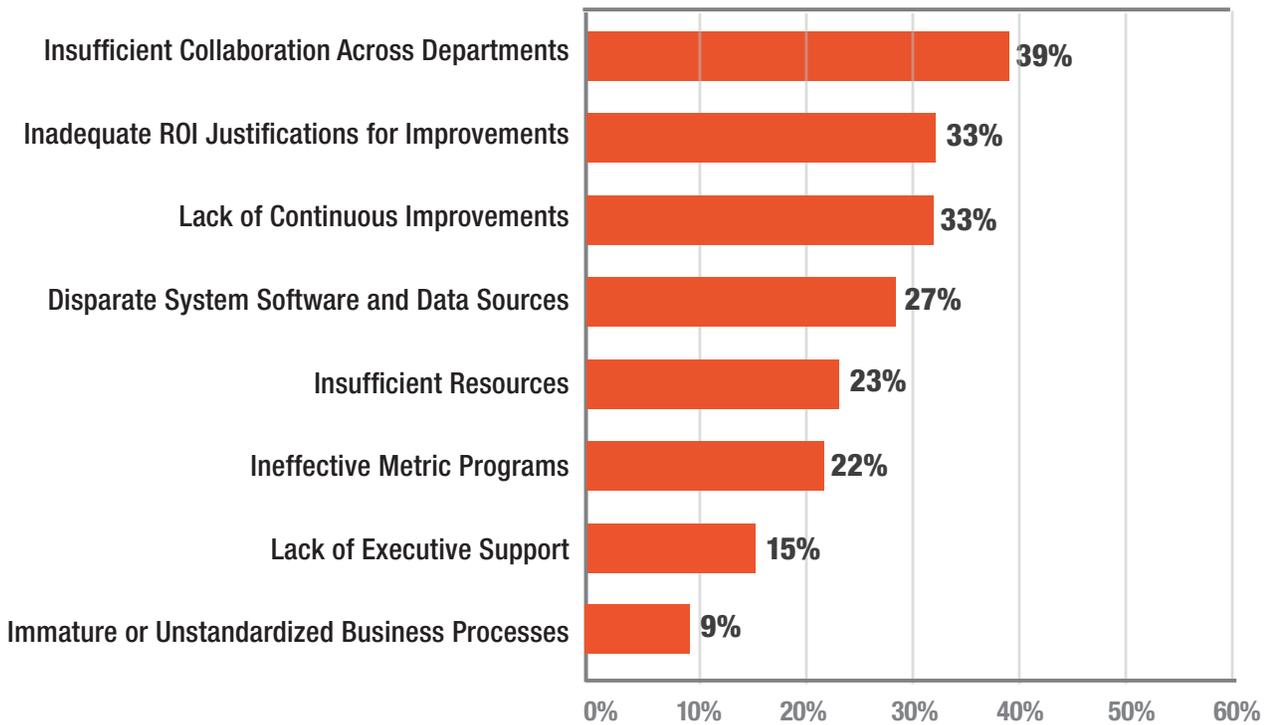


FIGURE 6 - Top Challenges in Achieving Sustainability Business



Leaders Focus on Integrating Sustainability into Operations

Our research also reveals what approaches and initiatives companies are implementing to achieve their Sustainability objectives. Figure 7 below shows the most implemented initiatives, with a comparison between Sustainability Leaders – the top 28% of companies that have achieved superior results from their Sustainability investments - versus all others, the Followers.

Sustainability Leaders are more likely to implement all types of projects across the board. This is analogous to the “Power of More” effect we have seen with our **IX Readiness research**. Exceptions are Energy Management and Operational Risk Management; these are core capabilities for Operational Excellence and we would expect to see little separation between Leaders and Followers.

Most notably, Sustainability Leaders clearly stand out in their focus on embedding Sustainability into core operations. Leaders are 2.3 times more likely to proactively integrate their Sustainability initiatives into operations (52% vs. 23%). Further demonstrating this, Leaders are significantly more likely (25%) to modify production processes to advance Sustainability goals. Leaders clearly recognize that achieving sustainable operations goes far beyond reporting on Sustainability metrics – it requires substantive operational changes.



Sustainability Leaders are 2.3 times more likely to proactively integrate Sustainability initiatives into core operations.

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WHAT APPROACHES HAS YOUR ORGANIZATION IMPLEMENTED OR IS IMPLEMENTING TO HELP ACHIEVE ITS SUSTAINABILITY AND ESG OBJECTIVES?

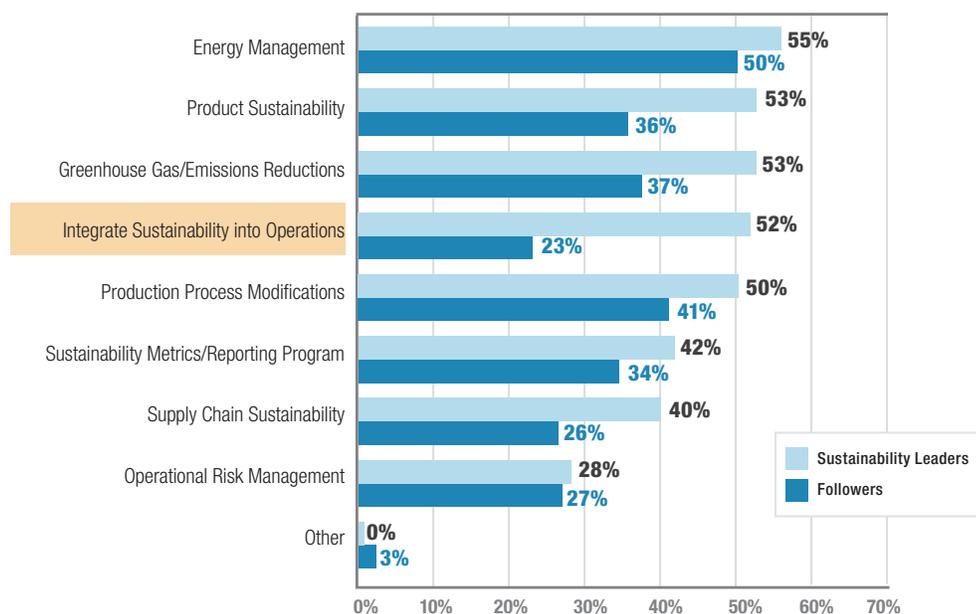


FIGURE 7 - Approaches/Solutions to Help Achieve Sustainability/ESG Objectives



Operationalizing Sustainability: Strategic Alignment

A major challenge in implementing Next Gen Sustainability is deciding the desired future state, and what to do to achieve it. As with any transformation initiative, the even harder part is execution, that is operationalizing Sustainability. The key to operationalizing Sustainability is to recognize that it’s a core transformation initiative and success will depend on how well it’s integrated with other transformation initiatives.

The context here is that, starting about five years ago, companies began leveraging the digital innovations of Industry 4.0 to improve operations. Typically, these technology-led digital transformation initiatives focused on a rather narrow set of use cases, such as optimizing manufacturing asset performance.

Over time, these tech-centric projects were replaced by more strategic, business-led Industrial Transformation (IX) initiatives directed at improving not only core production operations, but also major portions of the extended value chain, such as Product and Customer transformation. More recently, two more essential business-led transformation initiatives have been added to the mix: Sustainability/ESG, and the Future of Industrial Work. Both initiatives are highly interconnected with each other and with IX in terms of people, processes and enabling technology. This offers the opportunity to leverage synergies, as well as the downside risk of creating even more disconnected silos and complexity.

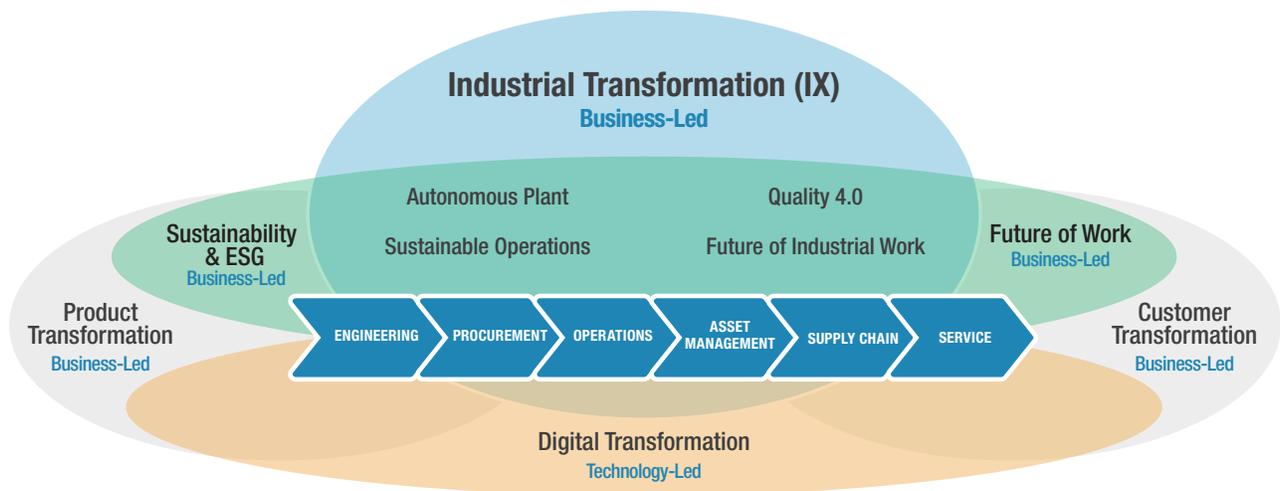


FIGURE 8 - The Industrial Transformation (IX) Evolution



Based on our body of IX Readiness research and the LNS Research IX Framework, we see the following as essential considerations to successfully operationalizing Sustainability as a transformation initiative.

- **Business Objectives** – Strategic alignment of Sustainability/ ESG initiatives with enterprise business objectives.
- **Strategic Initiatives** – Identifying specific Sustainability priorities for investment based on a systematic materiality assessment process; align and integrate with other transformation initiatives, such as Factory of the Future and Workforce of the Future.
- **Operational Architecture** – Integrate Sustainability with core business operations, including:
 - Operational Architecture of IT, OT, and IIoT systems
 - Engaging and empowering the frontline workforce
 - Leverage Big Data and advanced analytics for a data-drive approach to gain insights needed for step-change improvement
- **Solution Selection** – Careful evaluation and selection of technology solutions based on sound business cases to include use cases with direct impact on operational performance and measurable ROI.
- **Implementation and Change Management** – Applying well-orchestrated organizational change management principles (as needed for any transformation initiative); drive progress on Sustainability maturity.





Sustainability Drives Business Value

Sustainability initiatives offer much in the way of potential business value. Gains can take the form of operational, financial, and strategic value. Much of the focus on Sustainability initiatives during the past 15 years has been on achieving basic operational efficiency gains (e.g., energy use, resource conservation, reduced waste, etc.) and building an image of Corporate Social Responsibility (CSR). While admirable, these areas barely scratch the surface of the potential benefits of Next Gen Sustainability, both internally and for the world at large.

Aside from direct operational improvements, many of the potential benefits of Sustainability initiatives are more strategic and it may be harder to quantify their impacts. These include greater resilience through more effective risk management, contributing to business continuity; creating brand equity and building customer preference and loyalty; access to new markets and revenue streams; becoming an employer-of-choice and reducing workforce turnover; and increased access to capital. These benefits, among many others, can help a company build competitive advantage while creating short- and long-term value for multiple stakeholders, and while contributing to a sustainable world.

A research report, published in 2021, by the NYU Center for Sustainable Business illustrates the potential for business value at the enterprise level. The research consisted of a meta-analysis of over 1,100 studies published between 2015 and 2020 on the topic of the relationship between Sustainability/ESG activities at corporations and their financial performance. The analysis found a positive relationship between Sustainability/ESG activities and corporate financial performance with more impact over longer time horizons. Key conclusions were that positive impacts resulted from mediating factors, such as improved risk management and better innovation processes that came along with effective Sustainability/ESG programs. It also found that disclosure alone doesn't drive financial performance, rather it's the underlying capabilities enabled by Sustainability initiatives. (Source: *"ESG and Financial Performance: Uncovering the Relationship by Aggregating Evidence from 1,000 Plus Studies Published between 2015 – 2020"*, NYU Center for Sustainable Business, 2021).





Bringing things down to a more granular operational level, LNS Research data shows a positive correlation between the implementation of Sustainability capabilities and better operational performance. Industrial organizations that implemented standardized capabilities, such as energy management, environmental emissions management, and Sustainability performance management, reported better performance on key operations metrics, such as Overall Equipment Effectiveness (OEE), Capacity Utilization, First Pass Yield, and Uptime. The correlation was stronger as the number of standardized process capabilities implemented increased.

As with any transformation initiative, Next Gen Sustainability will be a journey unique to each organization based on their starting point, business priorities, current capabilities and resources, and cultural readiness. The selection and prioritization of initiatives and use cases will depend in large part on the overall capability maturity of the organization and its ability to embrace and sustain change. Projects designed to show measurable ROI and operational improvement relatively quickly can be a springboard to a portfolio of more strategic value, such as better risk management, improved workforce engagement, customer loyalty, etc.

Number of Environmental Sustainability Capabilities Standardized Across the Enterprise	4 or 5	3 or Less	None
On Time Delivery	91	82	75
Overall Equipment Effectiveness	86	78	65
On Time New Product Introduction (NPI)	87	75	65
Capacity Utilization	82	74	64
First Pass Yield	81.5	75	71
Uptime	85	76	80

Capabilities:

- Sustainability Performance Management
- Product Compliance
- Process Safety Management
- Environmental/Emissions Management
- Energy Management

FIGURE 9 - Impact of Environmental Sustainability Process Standardization on Operational Performance Metrics



Recommendations

Next Generation Sustainability presents industrial organizations with a new set of risks and opportunities. It can be viewed as an administrative nuisance, or a transformational opportunity to create competitive advantage, or anywhere in between. Regardless of the approach taken, it should be well-defined, fact-based, and clearly communicated to a wide variety of stakeholders including customers, employees, business partners and investors.

In the new paradigm, Sustainability/ESG is much more than a communications and PR function to burnish corporate image. It's a strategic imperative, an integral part of Industrial Transformation and the basis for long term profitable growth.

TO WHAT EXTENT ARE YOUR COMPANY'S SUSTAINABILITY OR ESG PROGRAMS INTEGRATED INTO THE OVERALL IX INITIATIVE ?

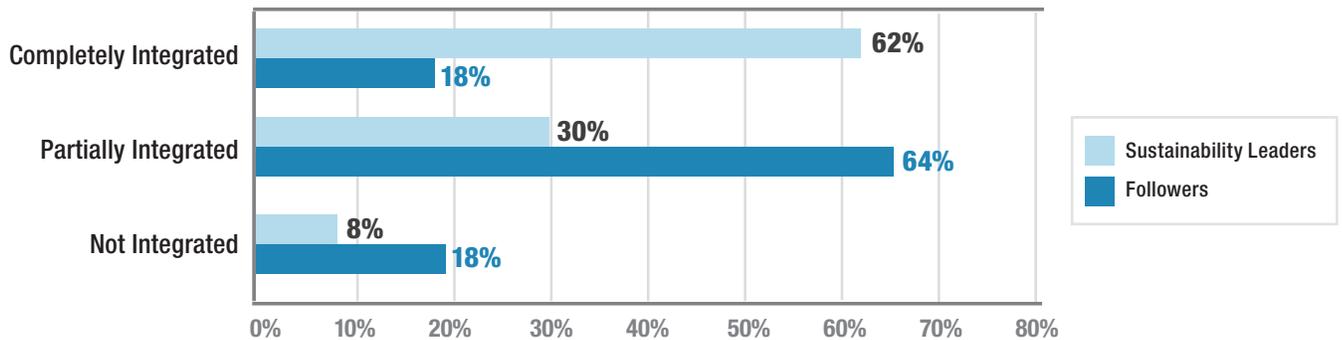


FIGURE 10 -Sustainability/ESG Programs integrated into overall IX



- 1. View Next Generation Sustainability as a strategic imperative.** Given the risks and opportunities at stake, industrial organizations need a well-defined Sustainability/ESG strategy to meet diverse stakeholder expectations and compliance requirements. There are many options on how to approach Sustainability, but having and communicating a clear approach is mandatory.
- 2. Take a business transformation approach.** Next Gen Sustainability sets ambitious goals with the potential to deliver step-change performance improvement. Achieving this requires significant, ongoing changes to processes, people, and technology systems in operations and throughout the enterprise. Alignment and integration with the overall Industrial Transformation (IX) initiative is necessary to capture synergies and avoid duplication of effort.
- 3. Shift from Scorekeeping to Scoring.** Sound Sustainability and ESG reporting, along with disclosure processes, are table stakes. Operationalizing Sustainability means getting tangible value from operational performance improvements. This requires embedding Sustainability into daily Operations, including active engagement of the frontline workforce, as this is where the gains will occur or not.
- 4. Manage a diverse portfolio of initiatives and projects.** Incremental operational efficiency gains in areas such as energy management, resource conservation, and emissions reduction, are mainstays. Next Gen Sustainability has the potential to go far beyond with step-change improvement and organizational transformation. A balanced approach that addresses risks and opportunities, both tactical and strategic, can produce some quick wins to build momentum, as well as some home runs over time.



Key Point/Value:
Industrial Transformation Leaders are more likely to integrate Sustainability/ESG into Operations.

– Peter Bussey
Principal Analyst



- 5. Avoid Climate Tunnel Vision.** A key driver of the recent, greatly increased attention on Sustainability/ESG is environmental Sustainability, including climate risk. Although critical, there are many other aspects of Sustainability to be considered in the Social and Governance pillars of ESG. Industrials should systematically and continually evaluate and prioritize the entire range of Sustainability risks and opportunities relevant to their organization.
- 6. Give Data Intelligence its Due.** Without the right data and the analytics tools to leverage it, IX or any transformation initiative is unlikely to be successful. In the case of Sustainability/ESG, quality data is important for accurate reporting and disclosure. But, this is only the beginning of Next Gen Sustainability value. Operationalizing Sustainability and step-change performance improvement requires the insights only possible with advanced analytics applied to diverse IT and OT data, including sensor-generated Big Data. Successful Sustainability initiatives require a proactive data intelligence strategy.





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