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Chapter 2: Adapting global compliance standards to the unique challenges of the modern manufacturing sector

2.1. Introduction

The extraordinary growth of global supply chains and burgeoning e-commerce industry has imposed immense complexities and risks on corporations over the last few decades, which in turn has triggered the rapid development of compliance frameworks and standards. An increased awareness of the impact of manufacturing on sustainable development can be highlighted in the promotion of international principles, recommendations, and codes of conduct and implementation guidelines for responsible business. However, criticisms have increasingly emerged that these international standards are often too vague, misaligned with priorities and challenges in the manufacturing sector, and unhelpful to small and medium-sized manufacturers. As a result, many in the manufacturing sector have not seen sufficient value to engage in and devote resources to implementing such global compliance standards both domestically and abroad (Dafflon et al., 2021; Chit & Vasudevan, 2024; Ouanhlee, 2024).

In light of this criticism, our focus in this essay is to examine whether such concerns are legitimate and whether these existing global compliance standards can and ought to be better adapted to the distinctive practical challenges faced by members of the manufacturing sector to optimize their successful adoption and the improvements these corporations seek to achieve by implementing these standards. Our overarching principle throughout is that flexibility in targeting meaningful outcomes proportional to the unique challenges and issue areas confronting different corporations in the sector is the key to ensuring that manufacturers at all levels can commit to seeking at least minimal achievable compliance and gradually raise the bar in due course.

The attention to finding and focusing on this potential common ground is especially crucial at a time when the global political, economic, social, and environmental stability in which international trade and investment operates are under increasing and sustained strain. If global compliance standards cannot be seen as beneficial to corporations and

to the global community at large, then reliance on voluntary implementation will yield decreasing levels of participation and diminishing returns on the investment made by corporations as well as on the part of the international community in developing and promoting these international compliance standards (Yanamala & Suryadevara, 2023; Suprayitno et al., 2024).

2.1.1. Background and Significance

Today's globalized world has become increasingly more interdependent yet fragmented. Following decades of converging approaches to management, design, and production, advances in technology and the emergence of new operating environments have resulted in complexity and volatility, resembling a pendulum swing away from globalization toward deglobalization and despecialization. Just-in-time logistics and sole-sourcing policies sought to optimize and reduce production costs, but have proved vulnerable to long supply chains, increased demands for digital readiness and delivery flexibility, trade barriers, tariffs, and trade wars; fluctuations of value in commodities, currency, and equity markets; currency mismatches; production shortages; enterprise risk; and geopolitical strife.

Fig 2.1: Adapting Global Compliance Standards to the Unique Challenges of the Modern Manufacturing Sector.

Modern manufacturing encompasses a multitude of areas that demand growing global attention and serious consideration: manufacturing performance measurement and supply chain management; environmental sustainability and climate change; technological change, digital readiness, and Industry 4.0; trade policy frameworks; terrorism; workplace health, safety, and protection; and human rights and forced labor. These topics are vital to creating the right operating environment so that the manufacturing sector is able to innovate and invest for the long term. By bringing together experts from different research communities and industry practitioners, we hope to generate new synergies and novel insights that advance research and practice in these topics. The papers reflect the cross-functionality and multidisciplinarity that are necessary to advance theory and application of frameworks for decision-making related to manufacturing performance measurement and supply chain management; environmental sustainability, crisis response, and operational risk management; and labor issues, workforce health and safety, and the caring workplace.

2.2. Overview of Global Compliance Standards

Global compliance standards are rules developed to identify, mitigate, and prevent risks that neglecting these standards can cause to a business's activities and its stakeholders. Although there is no uniformity in the standards, from an overall perspective they usually establish requirements with regards to product quality, manufacturing processes, logistics, raw materials sourcing, health and safety, environmental responsibility, information security, information privacy, due diligence, and human rights. Such requirements may be associated with punishments and fines imposed by regulatory authorities in case of infringements, but they are chiefly linked to reputational and financial damages that may arise from negative perceptions about a business, especially those operating globally. These perceptions can undermine business viability, at a global and product/service specific level, as well as consumer confidence in a company or an industry as a whole. Some of the main global standards are the early created International Organization for Standardization and the more recently introduced International Information Security Management Standard, the ISO for sustainable development and resilient communities, and the ISO for occupational health and safety management systems.

If compliance to global standards is important to any business, it is more crucial for the manufacturing sector, due to its high involvement in global supply chains. Compliance is critical to ensure products or services meet customer–business interests and provide guarantees to stakeholders on the protection of processes that may affect human health and safety, and the environment. With stringent requirements that apply to its mainly outsourced activities, noncompliance may lead to product recalls or operational

disruptions that harm customers, irreparably damage businesses' and stakeholders' reputation, and impose fines by regulatory authorities, causing financial losses that can jeopardize businesses' financial viability.

2.2.1. Definition and Importance

During the past decades, the landscape of business operations has shifted dramatically with the globalization of markets and value chains. As the manufacturing sector, particularly, has been undergoing major changes, the need for not only economical but also responsible production processes has emerged. Thus, to govern the growing complexity of operations of transnational corporations, various global compliance standards have been developed. Responsible Corporations have to produce in conformity with global standards covering subjects from human rights over labor and corruption to the environment. Such corporate social responsibility reporting standards have been established to guarantee standardized re-usability and thereby comparability of information on the responsible conduct of corporations. However, with the low level of enforcement of adhering to and the scope of application of such guidelines and auditing standards, these global standards are of recommended nature. Their induction is up to the discretion of the Corporation and furthermore their location of operations.

Consequently, the adaptation of one of the broadly established compliance standards or the submission to several standards of international and national institutions is a sign of the quality of Corporations. Commanding a ticket to easier market access and being a requirement for lending on international financial markets, global compliance standards represent a norm to which adherence has become Obligatory for TNCs with international recognition aspirations. Thus, corporations, especially in the manufacturing sector, are increasingly adapting to external factors, urging them to disclose information on their current practices as well as the implementation of an internal organization for monitoring these measures. This chapter provides an overview of several of the most influential global standards. While the subsequent chapter elaborates on their implications for the manufacturing sector, it starts here with a theoretical introduction to corporate governance and social compliance.

2.2.2. Key Global Standards

In this Section, we wish to clarify what we mean by global compliance standards for manufacturers. These are often long and complex documents. In our overview, we particularly pick out standards that have been written or endorsed by prominent and trusted safety and compliance organizations. Others take elements from these documents, agree on minimum CSR criteria for consumer facing products or a

manufacturing process, and provide to product producers or suppliers either in the form of audits or lists of acceptable vendors. While some industries have formed industry specific organizations to produce synonyms for these standards, what they ultimately seek from providers is the same – an independently assessed recognition that all workers in a factory, from the CEO to the worker on the line, are being treated with fairness and respect. In these organizations we trust to help assure consumer protection and fairness from the many manufacturers with whom the consumer often has little contact.

These standards often go by different names; in this chapter we use the term global compliance standards, or GCS. They originated in the United States in the 1990s as companies sought to protect themselves from repercussions for malicious acts such as the dirty stories of child labor in the tea plantations. New standards quickly followed, and it did not take long for many big corporations to put in place GCS programs in response. These companies developed risk assessments to determine which factories posed the greatest risk to their business operations and reputation. Factory assessments tended toward the detailed – documents lasting multiple days covering every aspect of the factory operation. The GCS were then issued either directly or via branches in a mixture of English and the local language of the factory and translated by multi-lingual employees.

2.2.3. Impact on Manufacturing

The output of manufacturing is not classic goods. It is goods on which value has been added. The work of manufacturing adds another level to many basic goods. The basis for many manufactured goods is such products as ore, crude oil, natural gas, milk, lumber, coal, wheat, soybeans and other grains as well as other basic commodities. The transformation of these basic products makes them much more valuable. The goods produced in manufacturing are such diverse products as automobiles, aircraft, machinery, furniture, and electronic equipment. The labor work done in manufacturing continues to increase because the world cannot live without an elaborate manmade physical world.

Manufacturing is energy-intensive, not just in words. However, that is not unusual because most products and many countries have been made into wealth from the energy consumed in the past and are sold in future deals of servitude. Such energy in the Eurozone, for example, is energy-supporting welfare. Production using energy beyond local needs, surplus energy, leads to pressure on compliance costs. The incentives for excessive income growth are from the property passed down from generation to generation. Much of world energy continues to support business environments with generous legal and ethical restrictions on business behavior. For large investment-driven corporations in manufacturing that are debt-financed, careful attention and energy to

legal compliance as a cost of doing business cannot be ignored and must be planned for. While the world energy consumed decreases from the past and future dreams, the energy needs for manufacturing is temporary.

2.3. Challenges in the Modern Manufacturing Sector

The modern manufacturing sector, although it has been driven by global competitive frameworks, is complicated by various unique challenges that have arisen through this globalization process. In attempting to balance the benefits that can arise from globalized manufacturing with these considerations, compliance investors and manufacturers have often overlooked the ways in which certain compliance standards, and the means of compliance investment may have to be modified to be truly effective in these unique conditions. These challenges are numerous and deserve efforts to ensure positive outcomes for all stakeholders involved. In each of these areas, compliance investment should not be seen as simply an outside concern, but as something that can bring about returns at least equal to the investment required for adoption but can lead to negative consequences both for the company and the outer community if ignored.

This consideration has been especially acute in the present era and will only continue to grow in importance. There are numerous considerations to take into account that all can present opportunities for creating positive outcomes for both the manufacturer and the outer world while requiring consideration of locally unique situations that must be navigated. In many cases, non-compliance with evolving and developing standards as the industry continues to mature may even simply be unwise risk management, as potential buyers and government regulators are increasingly looking for compliance investment to ensure both product and labor safety. Technology has developed rapidly to provide for the risk investments required, and manufacturers should use these tools as a source of differentiation.

2.3.1. Technological Advancements

Preface The modern manufacturing sector is continually undergoing technological transformations. New technologies improve production processes and management. These tools allow fast, responsive, and customized manufacturing, although supply chain problems, environmental impact, and labor relations temper the modernization.

Technological Advancements New technologies revolutionize traditional research and innovation such that the technology introduction in the different sectors is at an unprecedented pace. Technologies improve the efficiency, effectiveness, and productive capacity of the firms. Integration and implementation of these technologies allow the

companies to supply a greater variety of products that are also custom-made and in shorter response times.

Technological advancements allow companies to respond to new trends such as business acceleration through fast and flexible production capabilities, the necessity to design innovative products, the supply of high-quality products at competitive prices, sustainability through a reduction of the carbon footprint, transparency to ensure socially responsible productions, and other business priorities. Companies develop more innovative products at lower costs, pursue more sustainable and reliable productions, customize products based on specific needs, and demand faster delivery of products. Meeting these demands implies reducing production lead time, high investment in technology, talent scarcity, supply chain responsiveness, quality and reliability of supply, and labor relations and flexibility.

2.3.2. Supply Chain Complexity

Modern manufacturing involves a much more complex supply chain than in the past due to even the most basic manufactured products requiring dozens of suppliers located all over the world. As a result, some of the strictest compliance regulations manufacturers must comply with to address the security of suppliers and ensure that due diligence is exercised across the mega supply chain. Public companies need to perform audits of outside auditors to ascertain their independence, competence, and internal control over financial reporting. Likewise, the burden is placed on banks to vet the third-party relationships to implement sufficient due diligence procedures to vet and audit those relationships.

The increased complexity of manufacturing is not limited to the addition of more suppliers but also the addition of unique manufacturing facilities that do not participate in the monitoring and approval processes mandated by compliance regulations. As well, while compliance mandates require strict vetting of suppliers, the actual security measures taken by manufacturers may not be uniform throughout the supply chain but instead may depend on the importance of the manufacturer's relationship with a given supplier versus the cost of implementing the compliance procedures mandated by compliance regulators. Given the severe penalties imposed for failure to comply with supply chain compliance regulations, including loss of credit card processing privileges, compliance sets the terms of compliance for much of manufacturing in the United States.

2.3.3. Environmental Regulations

The environmental challenges facing the manufacturing sector are of increasing prominence in today's world. Worries about energy consumption, pollution control, and proper packaging and labeling associated with product waste are salient, especially in sectors such as electronics and chemicals. Just two statistics serve to illustrate this point. Mandates on volatile organic compound (VOC) emissions from manufacturing processes aim to protect air quality. Facilities covered by these regulations emitted over 80,000 tons of VOCs in 2002, and large industrial sources account for over 10% of the total VOC emissions, with small industrial sources contributing almost 2%. Moreover, manufacturing industries generate over one-third of all industrial waste, and the chemical and petrochemical industries are largely responsible for 85% of this waste.

A recent study, however, indicates that manufacturers respond to evolving government policies favorable to the environment. The influence of regulation on eco-renovation for industries often viewed as "dirty," such as cement, paper, and steel, suggests that stricter environmental policies force low-technology manufacturers and their embeds in emerging markets to invest in eco-renovation projects and divert resources away from traditional manufacturing operations. The "pollution haven" hypothesis predicts that, as developing countries are viewed as having increasingly lax standards and policies and as a result offer lower costs for doing business, the adjustment costs incurred by low-technology firms located in developed nations will prompt their relocation to developing countries.

2.3.4. Labor and Ethical Standards

The manufacturing sector in 2023 faces immense scrutiny from regulators and consumers alike to adhere to ethical standards as they produce their goods and manage complicated global supply chains. Compliance with global labor laws is mandatory, but businesses are also increasingly burdened with the need to provide a workplace free from corruption, slavery, forced labor, and discrimination. Simply complying with local laws is not enough for the modern multi-jurisdictional manufacturer to avert public scrutiny and outrage. Scandals arise from manufacturing partnerships to cover increased costs associated with due diligence and oversight if contractors cut corners. Product recalls due to safety violations can be both costly and damaging to a manufacturer's reputation. The resources spent on compliance failure do not need to be wasted as some corporate frameworks and consultants can create efficient due diligence processes. Outsourced production and assembly are further fueled by the consumer desire for low-cost goods in a globalizing world. The temptation to hire vulnerable populations or cut corners by exploiting workers in less-regulated markets is immense and very real. Regulations assure the consumer that the environmental risks associated with products are mitigated

by holding retailers responsible for non-compliance by their suppliers. By doing their due diligence and acting on the information received, or designating a vetting service to oversee labor conditions, merchandisers can help limit the environmental impact of the products, while promoting responsible economic growth in the region where they are produced.

2.4. Case Studies of Compliance Adaptation

This section offers three of these case studies, an automotive supply chain, an electronics manufacturer, and a food producer. Some of the considerations noted are particular to a context, but many are more universally applicable. The case studies illustrate the generic approach, because it does deal with complicated issues, but doesn't require that deep degree of sectoral knowledge that is usually required to adapt standards to new circumstances. This can be an important part of adaptation. As the automotive industry comes to view the establishment of suppliers' operations in low-cost high-risk jurisdictions as an investment decision that needs to be managed appropriately, it will increasingly want to align its expectations with those of other sectors. It will also want to avoid very process-heavy requirements, particularly if they already reference the standards that it uses to assess its own differentials. The proposal is an example of that kind of collaborative approach to development that industry stakeholders often fail to take. It is particularly valuable when the longer established sectors in the host economies account for most of their exports or for a significant part of their GDP. It is in those areas that comparative advantage, and export potential, is most likely to be eroded if foreign competition that has a different set of operating incentives starts to enter the market with little warning. Electronic assembly, garment manufacture, shipbuilding and food processing, whilst relying on similarities of technology and skill, are all particularly sensitive to offshore investment policy from the West. Electronics manufacturing ranks high on any list of vulnerability factors, with its low capital cost inputs, its export orientation, and its product differentiation strategy especially sensitive to offshore investment policies. The industry has been pursuing special free trade and investment strategy initiatives in order to facilitate technological transfer. Craft industries are small and localized, focused on relatively low-wage domestic markets, and employ traditional production methods that have long been uncompetitive. Food production, on the other hand, is the epitome of compliance resilience, as adaptation to particular products and markets around the world has developed, including quality assurance, precooling provisions, and demand management techniques.

2.4.1. Case Study 1: Automotive Industry

The automotive industry is considered a leader and symbol for the modernization of manufacturing, beginning in the 1920s. It was the area in which established, low-wage labor markets were first successfully dislocated, through the adoption of assembly-line techniques, automation, and modularized supplier relationships. Manufacturing in many other sectors and regions followed the same pattern in the last decades of the 20th Century. But in recent years, particularly since the onset of the global financial crisis in 2008 and the subsequent acceleration of deindustrialization and outsourcing, the automotive sector has witnessed a dramatic decline and thinning of operations in regions of high cost manufacturing, along with a mushrooming growth of new, often non-unionized, installations in low-cost developing areas.

In contrast to almost all other areas of consumption, purchases of automobiles are still heavily skewed to the most affluent consumers, who desire luxury features and maximum performance and safety features. These excess demands are catered to in a world by a surprisingly small group of manufacturers, who control a virtual monopoly on the provision of the relevant attributes. Compliance with these excess demands is achieved through long-standing, tight-knit joint ventures and cooperative relationships between automobile assemblers and a limited number of core parts suppliers. Increasingly over the years, however, there has been criticism, from consumer organizations, governmental agencies, and suppliers outside the privileged inner circle, of safety, design, and production shortcomings on the part of both assemblers and suppliers, necessitating tight government regulation and oversight, particularly on product and workplace safety standards. These developments have prompted joint discussions between ruling industry groups and public officials on proposals for strengthening various compliance issues, as an industry attempts to grapple with the perception of an unresponsiveness to the interests of external stakeholders.

2.4.2. Case Study 2: Electronics Manufacturing

Disruption has dominated the story and repute of electronics manufacturing in recent years. Because of the ease with which products can be simultaneously marketed to people throughout the world, apparel, sports equipment, household goods, toys, and personal hygiene and healthcare products have all become subject to global brand risk. These and other "final assembly" concerns, however, appear rudimentary in comparison to the problems created for electronics brand owners by the making of complex products that marry technology and design. Electronics brands tend to be vulnerable to serious sales fluctuations triggered by changes in a single product's market. Brand owners have learned from experience that unpredicted downturns can occur - too often, with too much damage - when there is excess supply capacity. Redefining on a more demand level,

however, is complicated by the difficulty of predetermining the output levels of operations that design and build on demand. Bringing new designs online and working through problems of improving yield early in the life of a new process can prolong lead time and increase fixed costs. None of this means that ordained price conditions or the market structure within which commercial decisions are made determine the global demand for each product category. What has become apparent is the greater the volatility in demand from both sectors of the global market, the more that brand owners have demanded "dedicated fab" operational capabilities from core producers.

Where this has led is an increasing tendency for electronics brand owners to develop strategic alliances with "dedicated fab" suppliers. For large multinational electronics producers, the implications of these changes for their relationships across their supply chains are clear: the "dedicated fab" philosophy excludes a long list of local supplier categories from any possibility of entry into the supply chains of global electronics brands. These "dedicated fab" relationships, however, also represent something of a paradox. They are partnerships based on more than trust: both electronics brands and their core suppliers are working to coordinate their production plans, communicating in detail about changing demand conditions; but the relationships are built on a mutual recognition of still inherent power asymmetries. While "dedicated fab" suppliers enjoy greatly enhanced business prospects, they have also become enmeshed in more complicated webs of keiretsus and groups, within which relationships are both deeper and more complex.

2.4.3. Case Study 3: Food Production

With the availability of convenient local produce, people eat healthier, local, less processed and more sustainable diets. Demand for locally produced foods – foods from farms identified with “local” as defined by the producer, seller and buyer – is greater than supply. Global food distribution networks have shortened with an increasing number of restaurants, caterers, institutions and retail outlets investing in local foods and emphasizing local procurement. Global food distribution networks, however, remain alive and well and are increasing in complexity.

Of all the challenges facing manufacturers, none loom larger than the global competitive landscape, created by free trade agreements and newly emerging superpowers. To address these challenges, local food producers are called to adapt compliance practices to a new business reality rooted in costs; market price needs per unit to cover the cost of production and additional costs of compliance required to gain or hold a market position within the global landscape. Without adaptations, food producers are pushing on a taut rubber string; the creative energy of compliance becomes absorbed in the business of business.

The discussion above is illustrated with the excerpt of a local food production competency developed across a vertical sector country relative to the global manufacturing systems model. Food systems competency creates topics and learning through which local and closed production, demand, and support systems can be modeled in public and private sector learning collaboratives to design, test, and implement competitive vertical production, demand, and support networks. In a sense, revenue optimization strategies will be local, yet all food grown or manufactured in a new national food system will be nationally and globally marketed; global food production and distribution is not going away.

2.5. Strategies for Compliance Adaptation

The previous section introduces areas of compliance challenge and adaptation opportunity. This section deepens the discussion by providing possible strategies for systems adaptation to enhance compliance effectiveness and efficiency. The following sub-sections explore four strategies for compliance adaptation: risk assessment and management, training and development, technology integration, and stakeholder engagement.

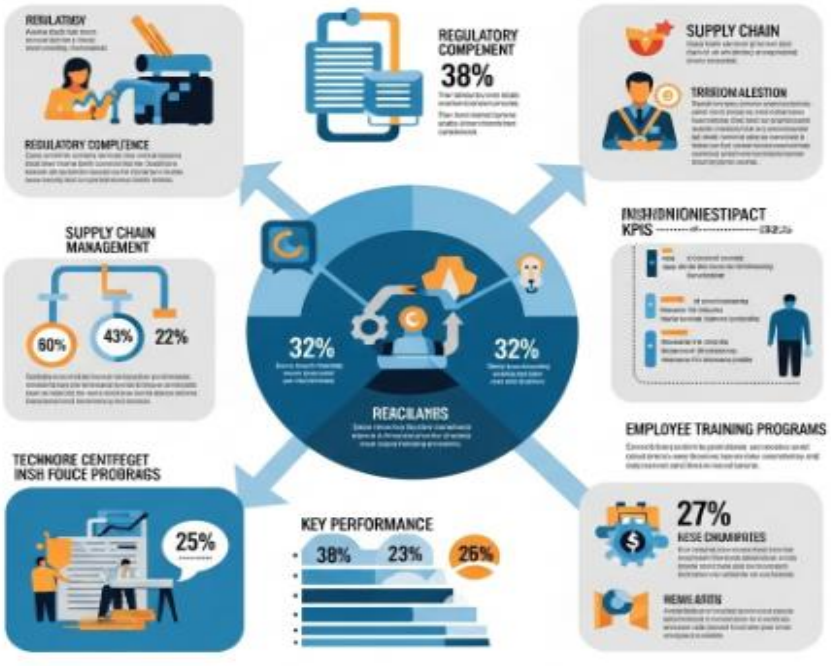

Fig 2.2 : Strategies for Compliance Adaptation of Modern Manufacturing Sector.

Manufacturing firms often juggle competing compliance demands. The answer to the question of which requirements are most important from the manufacturing perspective does not have a general answer. The solution should be tailored to the physical, organizational, social, and legal risk environments faced by that manufacturer on a day-to-day basis. It is common for manufacturers to perform an extensive due diligence effort when entering a new country, but that effort is less likely to occur if the firm has had a longer-term experience. However, these and other risks can vary widely both in time and geography.

What is good for managing compliance when entering a new region will not necessarily be cost-effective in the long-run. In dynamic situations, firms may find themselves wanting to invest resources more heavily in one area of compliance in one year, then in another area in a different year rather than pursuing a narrow focus. Models that use risk factor analysis could be helpful in guiding jurisdiction- and situation-specific adoption decisions.

2.5.1. Risk Assessment and Management

Oversight by compliance professionals has the potential to address the heightened risks of the modern manufacturing sector, allowing innovative entry into new markets around the globe. Achieving this requires evaluating an organization's supply chains laws and regulations, and then creating and assessing a risk profile – the process of how an organization approaches risk from its operations. To help compliance professionals in their efforts, a Compliance Risk Assessment Framework was developed to establish detailed, structured protocols for a risk framework. This framework is a clear plan for how an organization establishes its unique compliance risk profile, and then monitors and assesses its level regularly to adapt for changes in either the organization or its landscape.

The first step in assessing a compliance risk profile is to determine which business functions the risks would attend to, as not all business functions would require the same detailed risk profile. The compliance functions to consider would be depending upon the organization's business model and associated risks, its level of globalization, business partnerships, product/service offerings, and any other pertinent corporate attributes. Business functions or activities with the most exposure to cause or support a compliance failure and those areas most outside the organization's direct control would require the most detail within the enterprise compliance risk profile. Common corporate compliance functions include: trade/market regulation; public disclosure; anti-bribery; privacy; product safety; export control; financial/resourcing; and labor risk.

2.5.2. Training and Development

As discussed, compliance is not just an objective of checklists and inspections. Rather it influences the psyche and thinking of the stakeholders involved in the firm's operations and its processes. While the importance of training employees has been frequently highlighted, it is imperative that those at the top are also well-trained. Experts should also be included in the planning of the compliance processes and provide input for the training in order to bring in an outside perspective. For compliance issues, there is, of course, the risk that some portion of the more senior stakeholders may view compliance not as being relevant to their duties, which could lead to attempts to omit compliance from the ongoing education.

Compliance experts should also either participate in the regular planning of business operations or at least engage with those that do. By learning about where the areas of operations are that carry the largest risks, compliance can develop training and routine reviews that reduce those risks as much as possible. If compliance is engaged in the operational side of the business, there also is the opportunity for employees to come forward with suggestions for compliance, as these individuals are often the ones best-situated to see issues on the ground. If compliance becomes a part of the operation as opposed to a hurdle that operations must work to overcome, then only will employees begin to see compliance as integral. Making compliance into an integral part of business also carries a larger benefit than just avoiding penalties. By having an open discussion and willingness to learn, operations improve not just from the compliance perspective, but also enhance the potential for innovations and improvements.

2.5.3. Technology Integration

The adoption of technology is a crucial strategy for companies, whose role it is not only to reduce compliance costs – they should also seek a positive impact on business operations from compliance-related technological deployment. In today's challenging business environment, artificial intelligence paired with the Internet of Things enables organizations to analyze large amounts of data in real time. They can also facilitate automating processes and implementing checks and controls to detect anomalies or deviations from established patterns. Hence their usefulness for ensuring compliance in different areas, such as reporting and analysis, training and risk assessment, and also monitoring and auditing business operations. Further technological tools, such as Compliance as a Service offer outsourced solutions, based on having the external service provider responsible for complying with regulations in certain business areas, such as reporting.

However, compliance should not be seen only as a cost for the organization. On the contrary, an effective compliance program can also be a competitive advantage. A well-structured program can help the organization connect not only with compliance regulators, but also with stakeholders related to corporate social responsibility. Further, obtaining a clear, trustworthy, and credible message communicated to the public can help companies fortify their reputation, contributing to business development and helping avoid costs related to breaches, which would be incurred not only by the business itself, but also indirectly by stakeholders who rely on it. Finally, in addition to costs associated with purchasing systems or dealing with external service providers, companies should also weigh up internal costs, particularly in terms of human resources, of maintaining invested solutions beyond their implementation.

2.5.4. Stakeholder Engagement

Engaging with both internal and external stakeholders is crucial for the success of compliance adaptation measures, thus a more participative approach to stakeholder engagement is likely to have more benefits than downsides, thus promoting compliance adaptation. Involving employees in the decision-making processes will not only facilitate acceptance and adoption but also create the intellectual synergies to come up with novel and customized adaptation solutions. An internal communication that is timely, frequent, clear, consistent, and open to questioning is a tremendous enabler when gauging risks, capturing feedback, and fostering creative engagement while limiting frustration.

Although often forgotten, the input of employees responsible for executing the procedures and directives promulgated by compliance standards can be invaluable in devising practical adaptations of the compliance standards guiding such courses of action. Informal dialogues help to raise compliance concerns proactively so that those in charge can act before a violation occurs. Relying on all employees to act as compliance scouts is likely to lessen the burden of the few employees tasked with due diligence. Senior management also needs to be actively involved in addressing updates to the compliance standards but also providing both official communication regarding compliance mandates and informal leadership in encouraging compliance status updates and feedback to make compliance adaptation a success. If employees see how important compliance decisions are for the company leadership and their consideration paid to the employees' input, they will readily disclose compliance concerns.

Equally, external outreach is vital. Especially small suppliers may not be able to address the compliance concerns a company may have regarding their operations, and thus close cooperation to adapt or mitigate compliance adaptation is warranted. Doing so will also

allow for respect for the supplier's circumstances while enabling the complying party to successfully address their compliance.

2.6. Future Trends in Global Compliance

Ensuring the highest compliance standards today requires much more than just learning and enforcing existing laws and policies. Laws and regulatory frameworks are continuously evolving, regularly amended or even harmonized in some cases. Compliance functions must therefore keep an eye on constant worldwide legislative changes. Meanwhile, external forces and pressures also drive the creation of more and more industry-specific rules and expectations. In that context, social media and the internet accelerate the speed of information exchange, and round-the-clock news cycles mean that anything can be brought to the public eye in a matter of seconds. Regulatory scrutiny will focus on companies with the most adverse publicity, so attracting negative or adverse publicity increases risk. Furthermore, sophisticated corporate structures, enhanced by globalization and new technologies, create agencies in far-flung locations that pose supervision challenges.

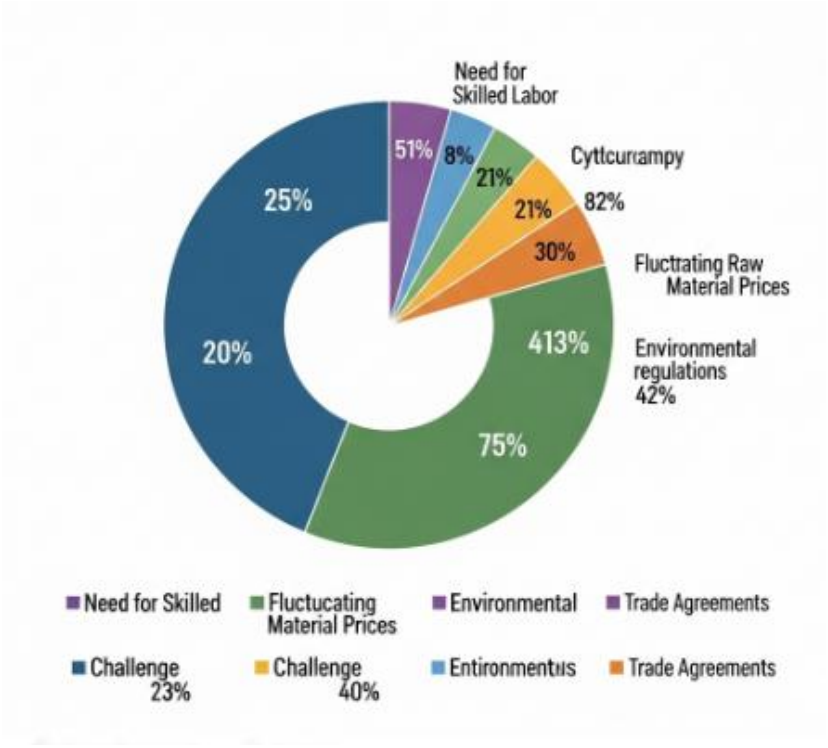

Fig : Adapting Global Compliance Standards to the Unique Challenges of the Modern Manufacturing Sector.

Lastly, investment and consumer focus on corporate environmental, social, and governance factors increase the need for companies to comply with proffered internal and external guidelines. These issues lead us to believe that future compliance focus areas will include accelerated digital transformation, additional regulatory focus on sustainability initiatives the introduction or expansion of affected industry verticals, and a heightened awareness of geopolitical issues' impact on global trade dynamics. In considering accelerated digital transformation, it is no secret that since the pandemic, much has changed in the way organizations operate. Work is performed in various settings, workers are dispersed, and robots and algorithms undertake an increasing amount of tasks previously performed by people.

2.6.1. Digital Transformation

Rapid advances in Artificial Intelligence, additive manufacturing, augmented and virtual reality, industrial IoT, big data analytics, and ubiquitous connectivity via 5G are driving the next wave of industrial transformation, dubbed Industry 4.0. Ever keen to enhance productivity, reduce costs, and raise quality standards, manufacturers are investing heavily in Industry 4.0 technologies to drive a new generation of manufacturing processes. In the first two decades of the 21st century, smart manufacturing technology mostly remained a promise, with manufacturers far more focused on quick cost reduction through lower wages in offshore places than on longer-term productivity growth through the efficient and effective use of deployed resources. However, the global value chain disruptions catalyzed by the pandemic, the ensuing supply-demand imbalances that worsened inflation, and the rising geopolitical risks led by growing tensions, including military confrontations, have forced a reckoning with global supply chains. Manufacturers have begun to use new tools to bring production back on-shore or near-shore as insurance against the risk of global supply chain disruptions.

Moreover, as lower skill levels required by newly automated production lines shrink wage differentials, digital costs will become a disproportionate chunk of total production costs. However, the rapidly rising inflation witnessed has forced action. Given the enormous installed base of manufacturing activities, this transition is taking time. Manufacturers' investments in Industry 4.0 technologies are, however, rising, and that makes manufacturer compliance with new regulations more critical as they strive to take advantage of the benefits conferred by developing the next generation of manufacturing capabilities. Various advanced manufacturing technologies, and the advanced manufacturing capabilities that rely on the seamless use of combinations of these technologies, will pose higher data integrity and security risks, at the same time as better data usage capabilities will confer better risk management and loss prevention capabilities upon manufacturers.

2.6.2. Sustainability Initiatives

While the sectors identified previously will be driven primarily by digital transformations, the push for compliance in other sectors will be increased as they adapt to sustainable practices that have always been associated with climate change. While climate change was thought to be the sole factor over the past several decades to spur the adoption of ESG policies, it has recently expanded to include inequality and poor human rights records due to the uprisings of the oppressed in many countries.

Originally, ESG policies consisted of the environmental impact of an organization and how they were withstanding the tide of climate change being a primary focus. Then, after the forced exposure of the shortcomings of the pharmaceutical and other industries during the pandemic, the flags being flown at the corporate offices of many organizations, and the diversification boards of these organizations, other parts of the operations for organizations were beginning to take charge in governance matters. The main backlash was from how countries who had the poorest human rights and labor records were being used to produce their products with no repercussions finding its way back to the corporations involved.

So, while the push to take such countries to task for their operations has been waning as these individuals have been either forced to pay off a portion of themselves for being kept oppressed or had their hands cut off to prevent them from working, Climate change has had a renewed temperature point and has once again begun to dominate the drive for ESG policies, as companies have to abide by some sort of compliance, or face draconian penalties from the governments of the countries that make the rules and laws that companies have to work under.

2.6.3. Global Trade Dynamics

There are challenges and tensions in global trade today, many stemming from trade inequalities, the imbalance of production across the globe, and the difficulties in producing an ever-increasing range of commercial products. Trade restrictions have been a key policy component of many nations for cultural, economic and historic reasons, as countries seek to protect their own interests—rightly or wrongly—to achieve balance in the local and global economy. For the manufacturing sector in particular, where many operations have moved to low-cost producers, dependencies have been created, and expansion in trade imbalances opened the door to repercussions. The pandemic highlighted the disruption that can occur when those dependencies are challenged, when demand for raw materials or specific parts for finished products are suddenly halted. Countries faced challenges from limited local production with no local source. Initiatives to stress test supply chains became common, with the suggestion that

alternate production locations, perhaps closer to home, should be reconsidered. Technology investments allowing enhanced automation, to allow for a reduced dependency on expensive and unstable local labor resources, became front of mind.

In reaction to the pandemic, and those related fears of dependency with the accompanying economic conditions, trade restrictions began to emerge again in key commodities in rising demand, such as food supply and energy. The existing barriers similarly imposed on defense industries for protection have highlighted the need for countries to have as much control as possible in this area, to avoid or prevent any interruptions. In addressing these concerns, nations are reinforcing trade relations with regional trading partners to help address potential issues, potentially at the cost of global trade activities. Concerns around climate issues also are impacting trade considerations. The need to enhance supply chain management operations to better understand dependencies, reduce risk—that these will become ground rules—along with environmental factors, will increasingly shape trade policy and compliance activity moving forward.

2.7. Conclusion

The modern manufacturing sector, which faces exceptional challenges in meeting current global environmental, labor, trade and product security compliance standards, needs much greater support from governments and the private sector, both to facilitate compliance and reduce the associated costs. Failure to comply with these standards threatens the ability of manufacturers to compete effectively in domestic and global markets and the well-being of their stakeholders, including investors, consumers, employees, and the communities in which they operate. Increased demand for the products and services of the manufacturing sector, particularly in the developing country markets that are central to the sector's growth, creates an opportunity for leveraging investment for greater participation by the sector in the effort to adapt the existing set of compliance standards to its unique challenges and needs. The domestic and foreign economic policy should create an environment conducive to sustained economic stability and opportunities for investment to facilitate compliance by the manufacturing sector with standards that might otherwise impede its efforts to compete effectively.

At the same time, adaptation of global compliance standards should not be made at the expense of their importance or the basic needs they were originally intended to meet. Genuine compliance standards should not be diluted. Public and private organizations should assist the manufacturing sector in improving its technology and manufacturing processes, as well as guiding and supporting it in meeting existing compliance standards so as to maintain its value. Now that the potential of the manufacturing sector has been brought again to the fore, efforts to adapt global compliance standards to the sector's

unique challenges and needs should keep pace with the sector's responses to this opportunity. Without such adaptation, both the manufacturing sector and the compliance standards that serve to regulate it may falter.

References

Chit, I., & Vasudevan, R. (2024). Navigating Compliance: Strategic Approaches Across Industries An Examination of Organizational Structures and Responses to Regulatory Changes.

Ouanhlee, T. (2024). The influence of the manufacturing industry environment, organizational structures, and economic trends on employee responsibilities in the manufacturing industry. Technology and Investment, 15(1), 39-76.

Ouanhlee, T. (2024). The influence of the manufacturing industry environment, organizational structures, and economic trends on employee responsibilities in the manufacturing industry. Technology and Investment, 15(1), 39-76.

Suprayitno, D., Iskandar, S., Dahurandi, K., Hendarto, T., & Rumambi, F. J. (2024). Public Policy In The Era Of Climate Change: Adapting Strategies For Sustainable Futures. Migration Letters, 21(S6), 945-958.

Yanamala, A. K. Y., & Suryadevara, S. (2023). Advances in data protection and artificial intelligence: Trends and challenges. International Journal of Advanced Engineering Technologies and Innovations, 1(01), 294-319.

Dafflon, B., Moalla, N., & Ouzrout, Y. (2021). The challenges, approaches, and used techniques of CPS for manufacturing in Industry 4.0: a literature review. The International Journal of Advanced Manufacturing Technology, 113, 2395-2412.