Working Paper:
A Sustainability-weighted Procurement Portfolio Model (PPM)

Mapping of sustainability risk in procurement portfolios and strategies for market engagement.

April 2021

CONTENTS

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Acknowledgements: The authors would like to acknowledge the substantial contributions from Lukas Von Schuckmann (UNEP Consultant) on the HLCM Sustainability Indicators, and Qi Li (UNDP Consultant) for support on data analysis and visualizations.

A Sustainability-weighted Procurement Portfolio Management (PPM) Approach

By: Carsten Hansen (UNDP) & Farid Yaker (UNEP)

ABSTRACT: This paper proposes a modified procurement portfolio model for managing sustainability risk and develops a set of propositions for procurement strategies to enhance sustainable public procurement (SPP). The model follows the design principles of (Krajlic's, 1983) portfolio model and introduces segmentation thinking from PPMs into the sustainable public procurement practice. The approach supports organizations in identifying procurement categories that represent the highest sustainability risk exposure, and where interventions will yield the highest relative sustainability impact. It can also be used by governments, or sub-national entities, to align with national sustainable development priorities, and develop more robust SPP action plans in line with SDG 12.7 requirements. The model is presented in a two-step approach, firstly developing a segmentation model reflecting category-specific sustainability risk profiles, and secondly development of segment-based procurement strategies and formulation of guidance for management decisions. The approach informs organizational sustainable procurement strategies and develops a framework for aligning sustainability integration across the procurement portfolio with corporate sustainability targets and strategies. The model aims at accelerating sustainable public procurement implementation and better position public procurement policy makers and practitioners to strategically guide organizational and national efforts towards SDG 12.7.

Keywords: Sustainable Procurement, Procurement Portfolio Models, Transaction Cost Economics (TCE).

Introduction

As we enter the last decade in a bid to meet the 2030 Sustainable Development Goals (SDGs), we see the role of procurement shift from cost management to becoming a critical partner and enabler of organizational sustainability, resilience, and innovation. Building on normative frameworks like the UN Guiding Principles, the UN Global Compact, and the global SDG Agenda 2030, a growing body of national and international legislation is being introduced to drive net-zero targets and sustainable corporate sourcing practices. On this background, sustainable procurement has evolved from a "nice-to-have" feature to a "need-to-have" necessity, and now considered a strategic requirement for meeting organizational objectives.

In the context of the UN procurement function, overall sustainable procurement initiatives are driven by the SDG 2030 Agenda, and goal 12.7 on promoting sustainable public procurement practices. Other recent policy drivers include the Quadrennial Comprehensive Policy Review (Art. 29, 2020), tasking UN agencies "*to reduce their climate and environmental footprint",* and Security Council Resolution 2388 Art. 31, 2017) tasking the UN *"to enhance transparency in their procurement and supply chains and step up their efforts to strengthen protections against trafficking in persons in all United Nations procurement"*. Given that procurement represents a major part of UN organizational activities, it is critical to ensure alignment between organizational objectives and sustainability integration across the procurement function.

This paper introduces a Sustainability-weighted Procurement Portfolio Model (PPM) applying a category-specific classification system for mapping and prioritizing sustainability exposure in procurement portfolios. The approach aims to inform UN organizational sustainable procurement strategies, supplier due diligence reviews, and develops a framework for aligning sustainability

integration across the procurement portfolio with organizational sustainability targets. The model is designed to accelerate sustainable public procurement implementation and better position public procurement practitioners to proactively pursue SDG 12.7.

The sustainability-weighted model can also be used by governments, or sub-national entities, to align with national sustainable development priorities, and develop more robust SPP action plans in line with the SDG 12.7 requirement. The approach can support countries in prioritizing key categories to be included in their action plans, and for which they will develop specific sustainable procurement guidelines.

Sustainable Public Procurement (SPP)

Sustainable procurement (SP) can be defined as *"a process whereby organizations meet their needs for goods, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst minimizing damage to the environment"* (UK Sustainable Procurement Task Force, 2006). In extension, sustainable public procurement (SPP) can be referred to as the act of integrating a concern for broader social and environmental impacts within procurement undertaken by governments, public sector bodies, and international organizations (Brammer & Walker, 2011). Sustainable public procurement is closely associated with the concept of sustainable development, based on a combined consideration of *economic aspects* (economic growth, employment, innovation), *environmental aspects* (climate change, water use, energy, waste), and *social aspects* (basic rights, fair wages, accessibility, social inclusion), also known as the triple bottom line (Elkington, 1998), (Da Costa & Da Motta, 2019).

In line with the concept of SPP, the EU Public Procurement Directive (2014), the OECD Working Party on Leading Practitioners on Public Procurement (LPP) and the World Bank New Procurement Framework (2015), among others, have extended the meaning of value for money away from lowest price at the point of purchase to the overall value for money across the life cycle of items, including total cost of ownership and quality aspects to support more environmentally and socially sustainable outcomes. The stated objective of procurement in the World Bank's Procurement Framework is "*to achieve value for money with integrity to deliver sustainable development*".

SPP Implementation Challenges

While SPP is recognized as a powerful agent of change, there is an absence of research-based strategies for SPP implementation, and comparatively limited research done on SP practices in the public sector (Walker & Brammer, 2009), (Grandia & Meehan, 2017). Furthermore, it has been highlighted that SPP literature tends to suffer from an overly optimistic bias, portraying SPP as an almost guaranteed win-win, while reality is often less progressive (Roman, 2017). Also, while there has been an increased awareness of sustainable procurement and sustainable supply chains, actual *sustainability integration* is limited in practice and implemented only piecemeal with often inconsequential impact at the category level (Da Ponte, Foley, & Cho, 2020).

One of the likely reasons is that sustainable procurement as a practice, is a diverse and multi-functional space, which can be overwhelming in terms of complexity, with implementation barriers distributed across legislative frameworks, organizational buy-in, practitioner capacity, and supply market readiness (Hansen, 2020). As procurement portfolios include a vast diversity of categories, each with specific sustainability and category knowledge requirements, a methodology is needed to guide and establish

priorities for developing sustainable procurement strategies and optimize the impact of sustainability efforts.

A key criteria for implementing any form of strategic procurement is to differentiate between category classifications and relationships with suppliers (Gelderman & Van Weele, 2005). As procurement portfolio models (PPMs) provide the basis for developing differentiated strategies for category segmentation (Zolkiewski & Turnbull, 2002), this paper will explore the usage of PPMs in the context of implementing sustainable procurement, acknowledging that PPM frameworks need to be tailored to the domain-specific content (Luzzini, Caniato, Ronchi, & Spina, 2012).

Introducing a Sustainability-Weighted Procurement Portfolio Model (PPM)

This paper provides a two-step approach to developing a Sustainability-weighted Procurement Portfolio Model (PPM) to identify and manage sustainability exposure in procurement portfolios. The model follows the design principles of (Krajlic's, 1983) portfolio model and introduces segmentation thinking from PPMs into the sustainable public procurement practice. The approach supports organizations in identifying procurement categories that represent the highest sustainability risk exposure, and where interventions will yield the highest relative sustainability impact. The approach further informs the development of organization-specific sustainable procurement strategies and supplier due diligence reviews.

The public and private sector has differed in the view and positioning of the procurement function, where the public sector tends to perceive procurement as a support function, while in the private sector the function has evolved into a more strategic function (Ekström, Hilletofth, & Skoglund, 2021). This paper is intended to further support the re-positioning of procurement into a strategic function in public organizations and guide a strategic application of sustainable public procurement to further goal 12.7 of the 2030 SDG Agenda.This paper is organised as follows.

- Section 1 reviews the literature on Procurement Portfolio Models (PPMs) and integrates Transaction Cost Economics (TCE) as the underlying theory for developing procurement strategies based on sustainability risk.
- Section 2 re-defines the concept of risk in the context of sustainability exposure and develops a segmentation model reflecting category-specific sustainability risk profiles.
- Section 3 adopts and operationalizes the PPM approach to develop distinctive strategies for supplier engagement, with the objective of informing market entry opportunities and optimize purchasing power in the context of sustainability risk management and market transformation.
- Section 4 provides a conclusion on the utility of the model and proposals for further research.

Procurement Portfolio Model (PPM) Approaches

Portfolio theory has its origins in the financial investment literature focusing on managing equity investments, Markowitz (1952) (Zolkiewski & Turnbull, 2002), and has been applied for account portfolio analysis and customer classification (Fiocca, 1982). Portfolio models have also been used across the supply chain function for developing optimal replenishment policies (Martínez-De-Albéniz & Simchi-Levi, 2004), enhancing procurement decisions measured as conditional for value-at-risk (Shi, Wu, Chu, Sculli, & Xu, 2011), managing price volatilities (Yuan Shi, Qu, & Chu, 2016), optimizing risk and profit considerations. Overall, portfolio theory enables the optimal allocation of resources among

alternative objects (such as securities, markets, products, projects, and suppliers), depending on the level of risk and the expected return associated with each object (Turnbull, 1989).

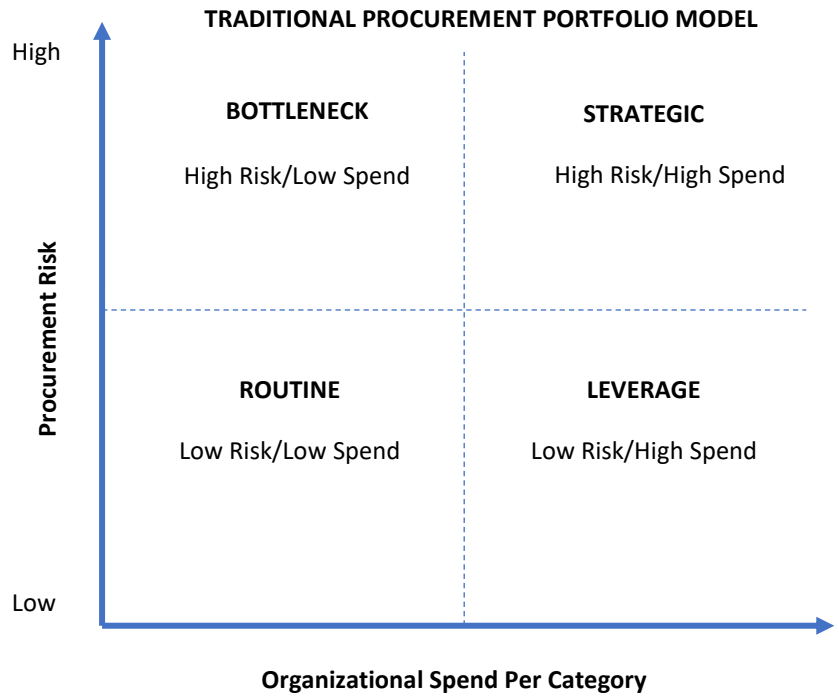
In the context of procurement, portfolio models have been applied to classify purchases of goods and services to determine the most suitable approach to manage procurement transactions, meaning identifying the appropriate suppliers, the contractual form, supplier evaluations, and the appropriate level of price, quality, and delivery (Monczka et al., 2008). In general, portfolio models aim at developing and implementing differentiated procurement strategies and used as a tool to create a classification framework for identifying groups of products, suppliers, or relationships requiring greater attention than others (Olsen & Ellram, 1997).

Kraljic (1983) introduced a purchasing portfolio approach classifying procurement categories according to their specific profit and supply risk profile. The approach distinguished categories as either non-critical, bottleneck, leverage, and strategic items, each requiring a distinctive strategy for supplier management with the objective of minimizing supply chain risk and optimize purchasing power (Kraljic, 1983). Research findings has since confirmed the utility of this portfolio approach as a means for developing effective procurement and supplier strategies, and as a useful tool for the procurement function to take on a more strategic role in organizations (Gelderman & van Weele, 2002). The (Kraljic 1983) portfolio approach has since become the standard for strategic planning across the procurement profession and considered a sign of organizational maturity (Gelderman & Van Weele, 2005).

Different variations of the approach have since been applied introducing other classification dimensions. Procurement portfolio models have been used with various classification dimensions including purchasing complexity and strategic importance (Olsen & Ellram, 1997), the need for supplier control (Stekelenborg, van, & Kornelius, 1994), or to select the right balance of supplier relationships when engaging the market (Bensaou, 1999). Latest, a purchasing portfolio model (PPM) was used to design a segmentation model for defense procurement (Ekström, Hilletofth, & Skoglund, 2021).

Across the United Nations procurement function organizations use a portfolio management approach variation plotting relative expenditure against procurement risk associated with each category. In this way, an organization can complete a comprehensive risk analysis of its procurement portfolio and identify the goods, services and works that represent a particular supply risk to the organization in its specific context and operating environment (United Nations (HLCM-PN), 2020). The model is built on the design principles of the Kraljic (1983) PPM approach, while modified to reflect traditional procurement risk associated with UN procurement.

FIGURE 1: PROCUREMENT PORTFOLIO MODEL (PPM)



Latest, portfolio analysis has been applied in support of sustainable procurement strategies (Pagell, Wu, & Wasserman, 2010). Using the Kraljic model, PPMs have been used for including green attributes in supplier selection (Garzon, Enjolras, Camargo, & Morel, 2019), and for prioritizing risk management in sustainable supply chains (Rius-Sorolla, Estelles-Miguel, & Rueda-Armengot, 2020).

Overcoming PPM Critique and Transaction Cost Theory integration

While procurement portfolio models have been widely applied, they have also been criticized for lacking underlying theoretical basis (Gelderman and van Weele, 2005), (Cox, Sadiraj, & Schmidt, 2015). Attempts have been made to address this critique by integrating transaction cost economics (TCE) (Williamson, 2010) as a conceptual framework for PPM application (Luzzini et al., 2012). The TCE framework extends support to the linkage between uncertainty and strategic procurement decisions, also in the context of sustainability risk. TCE suggests minimising transaction costs and distribute resources according to the level of risk/reward typical of portfolio models. This implies that organizations will direct focus and resources towards high-risk segments of the portfolio and promote a strategic approach when procurement risk and spend is high. Also, TCE easily adapts to the use of the procurement category as a unit of analysis, as the category itself is the object of the buyer-supplier transaction (Luzzini et al., 2012).

The notion of sustainability risk and uncertainty is further closely linked to the concept of bounded rationality used in TCE, suggesting that procurement organizations take rational business decisions, but have limited information about actual risks associated with specific categories (Luzzini et al., 2012). This relates directly to the concept of supply chain transparency, and the challenge of monitoring sustainability considerations across multi-tier suppliers in various geo-locations. The integration of TCE concepts into PPM strategic decision-making logic, strengthens the credibility of the model, and conceptually elevates supply chain visibility and sustainability risk into PPM decision strategies.

The PPM approach has also been criticized for the generic nature of its strategic recommendations, providing only high-level indications for the most appropriate supplier strategies. (Gelderman & van Weele, 2002). Others have criticized the two-dimensional model for being too simplistic, and too static, rather than allowing for dynamic decision-making (Hesping, 2016). In responds, recent research on PPM application across defense supply chains suggests that, at practitioner level, PPM can be both prescriptive and serve as a catalyst for in-depth discussions, and that PPM models with more than four segments would become too complex for practical use (Ekström et al., 2021).

The literature review suggest that PPMs remain an effective and practical tool for category differentiation and for developing procurement strategies. The portfolio model approach is also a powerful tool for communicating procurement strategy designs to executive management. On this basis, the paper proposes the development of a modified sustainable procurement portfolio model for managing sustainability risk and develops a set of propositions for sustainable procurement strategies to enhance sustainable public procurement (SPP). The model is presented in a two-step approach, firstly developing a segmentation model reflecting category-specific sustainability risk profiles, and secondly development of segment-based procurement strategies and formulation of guidance for management decisions.

STEP 1: DEVELOPING A SEGMENTATION MODEL FOR CATEGORY-SPECIFIC SUSTAINABILITY RISK

The initial step in developing a segmentation model is the definition of procurement categories and assigning weights to each of the categories in accordance with risk exposure.

REDEFINING CATEGORY-SPECIFIC SUSTAINABILITY RISK

The SDG 2030 Agenda calls for a change of perspective on the definition and application of the term risk in procurement management and highlights the need to better reflect the concepts of sustainability into organizational procurement strategies. For this purpose, the traditional supply risk factors can be modified into a sustainability-focused procurement risk framework. As procurement categories are not equal in terms of sustainability exposure, a risk determination needs to be category-based i.e., vehicles, construction, ICT, or stationary. Applying a category-specific risk classification allows organizations to differentiate categories in accordance with individual sustainability risk profiles and develop unique guidelines for each category. On this basis a segmentation model reflecting category-specific sustainability risk profiles is developed by re-defining the procurement risk definitions applied against each procurement category.

SUSTAINABILITY RISK RATING SCOPE & METHODOLOGY

The determination of appropriate sustainability risk indicators, and associated category-specific risk ratings is potentially subjective, and procurement organizations must come to agreement on the relative importance of each factor (Olsen & Ellram, 1997).

For the purposes of this paper the category-specific sustainability risk rating is determined across a series of sustainability indicators incorporating a wide scope of Environmental, Social, and Governance (ESG) related factors (Table 1).

SCOPE OF SUSTAINABILITY RATING

- The *sustainability indicators* are extracted from the High-Level Committee for Management (HLCM) framework, defining sustainability risks relevant for procurement activities across UN organizations (See full scope of sub-indicators in Annex 1).

- The *procurement categories* are defined as per the UNSPSC coding system applied by most UN organizations. The model applies ratings at the H2 category level, which is in line with current spend analysis practices. The model currently rates approximately 100 commonly used H2 level categories.

Table 1: UNSPSC Sustainability Ratings across HLCM Sustainability Indicators.

Example: Category-specific Sustainability Risk Rating		Sustainability (ESG) Indicators * (See Annex 1 for complete scope)										
		Environmental				Social					Governance	
		Hazardous Products	Climate Change	Resource Use	Biodiversity & Habitats	Indigenous Rights	Labor Rights	Gender Rights	Product Issue	SME	Corruption	Fraud
Procurement Categories	Goods											
	Level H0: Construction, Transportation & Facility Equipment & Supplies	-	-	-	-	-	-	-	-	-	-	-
	Level H1: 25000000 - Commercial and Military and Private Vehicles and their Accessories and Component	-	-	-	-	-	-	-	-	-	-	-
	Level H2: Motor Vehicle	33.3%	50.0%	50.0%	25.0%	25.0%	81.2%	75.0%	37.50%	62.50%	15.00%	33.3%
	Services											
	Level H0: Services	-	-	-	-	-	-	-	-	-	-	-
	Level H1: 90000000 - Travel and Food and Lodging and Entertainment Services	-	-	-	-	-	-	-	-	-	-	-
	Level H2: Hotels & Lodging	41.6%	50.0%	68.7%	25.0%	75.0%	81.2%	79.1%	62.50%	37.50%	50.00%	41.67%

- *Complete overview UNSPSC codes available at https://www.unspsc.org/*

DEPTH OF SUSTAINABILITY RATING

The depth of the category sustainability risk analysis is defined by the A-Z life cycle of the product or service from the stage raw material extraction, material production, manufacturing, packaging, transportation & storage, retail, consumer usage and final disposal. The rating considered life cycle impacts across the environmental indicators using a hot spot approach, and the scientific knowledge developed in life cycle analysis databases will be integrated into the category ratings. The scope of sustainability risk manifestations is determined by the *sustainability indicators* as defined by the UN-HLCM (Table 2).

Table 2: Sustainability Risk & Product/Service Lifecycle

Example: Sustainability Risk & Product/Service Lifecycle		Product/Service Life Cycle Risk Analysis							
		Raw Materials	Material Production	Manufacturing	Packaging	Transportation & Storage	Retail	Use	Disposal
Sustainability (ESG) Indicators	Hazardous Products								
	Climate Change								
	Resource Use								
	Biodiversity & Habitats								
	Indigenous Rights								
	Labor Rights								
	Gender Rights								
	Product Issue								
	Market Structure								
	Corruption								

The sustainable procurement risk associated with a given procurement action can be determined as the combination of the *likelihood* that a certain sustainability risk may materialize, combined with the *consequences* or *materiality* of the sustainability risk event to the organization. Some risk events may have direct financial implications for an organization, while other events may carry a reputational implication for the organizational brand. Also, some sustainability considerations like emission rates, may still allow for some trade-offs, while others, like the risk of child labor in organizational supply chains are ethical red lines. To ensure a consistent understanding of risk reflected in the rating, a common risk rating matrix was applied determining *Likelihood* of sustainability risk ranging from Rare to Almost Certain, and *Consequence* ranging from Insignificant to Critical (See Table 3 below). The scoring ranges from 1-4, with (1) Low Risk, (2) Medium Low Risk, (3) Medium High Risk, and (4) High Risk.

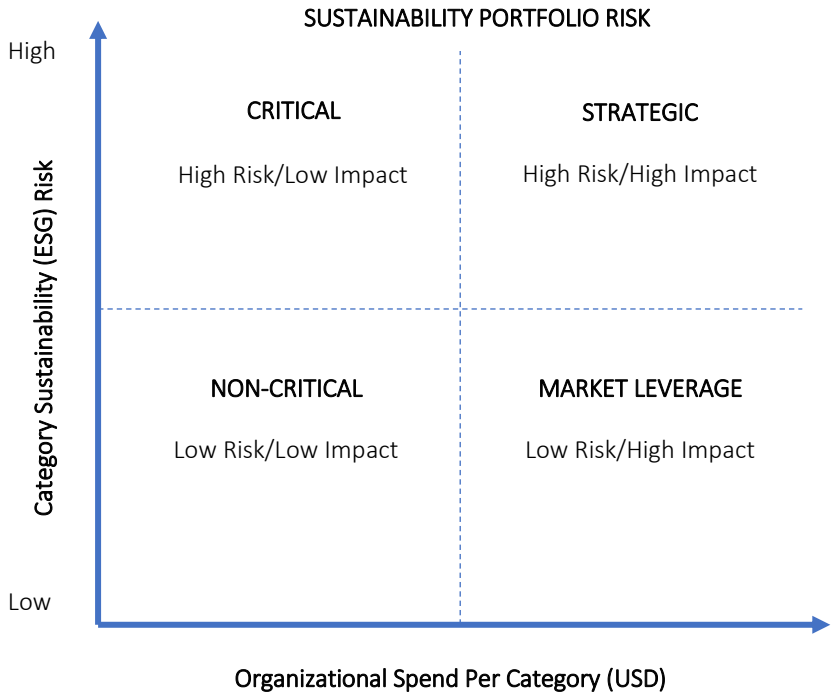
Table 3: Risk Rating Scale

		Consequence				
		Insignificant	Minor	Moderate	Major	Critical
Likelihood	Rare	1	1	1	2	3
	Unlikely	1	1	2	2	3
	Possible	1	2	2	3	3
	Likely	2	2	3	3	4
	Almost Certain	2	2	3	4	4

A Sustainability-weighted Procurement Portfolio Model

By plotting relative expenditure against ESG risk associated with each category, an organization can map the goods, services, and works categories that represent sustainability exposure to the specific organization in its context and operating environment. As expenditure distribution in the portfolio will differ, the model allows for a unique mapping process, which can inform prioritization of sustainability efforts within each organization.

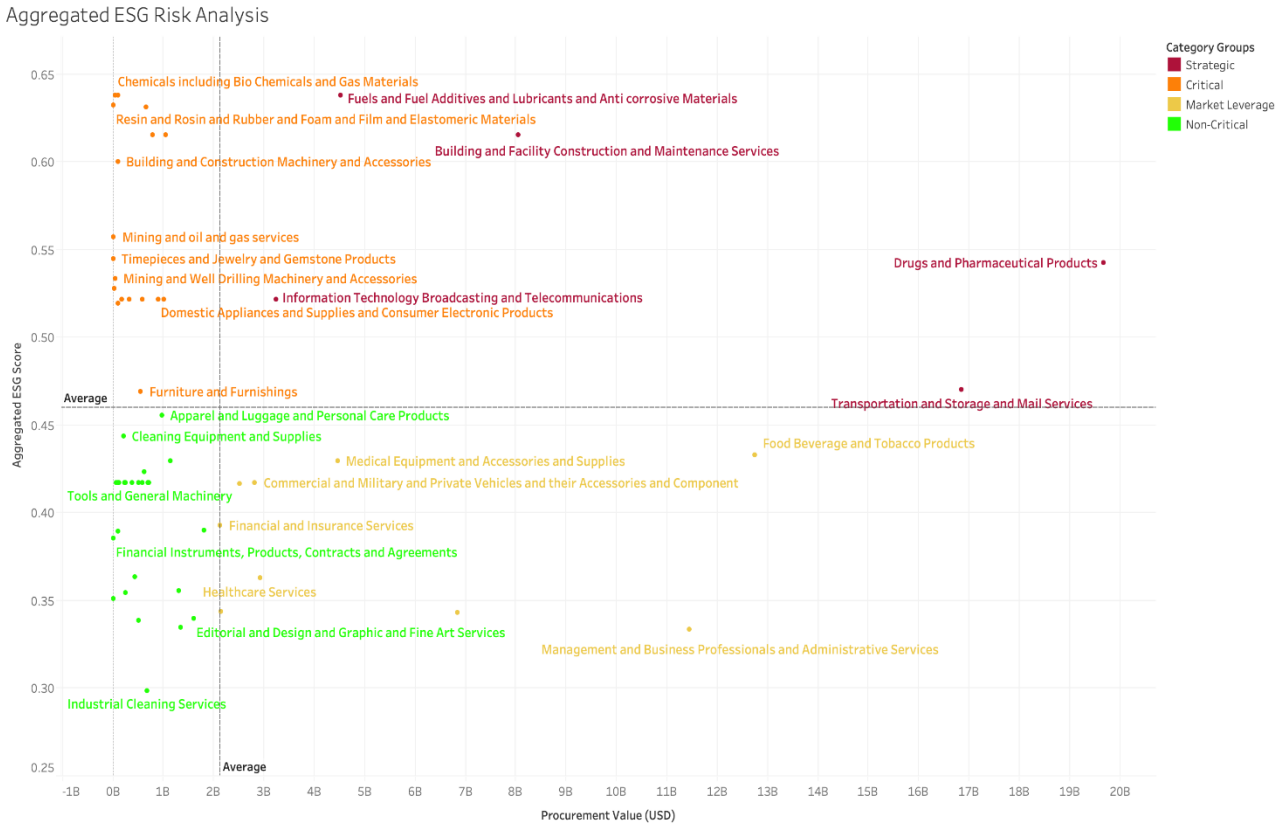
FIGURE 2: SUSTAINABILITY RISK PROCUREMENT PORTFOLIO MODEL (PPM)



The modified Sustainability-weighted Procurement Portfolio Model allows for a sustainability risk classification across any organizational procurement portfolio. The dynamic classification system further allows for various representations of sustainability exposures, which may require specific attention by the procurement organization. In Figure 3-6, the model is applied against the United Nations Annual Statistical Report (ASR)[1]. In Figure 3, the model presents the segmentation of aggregated sustainability risk across the *HLCM sustainability indicators,* capturing all associated risk at equal weighting. This visualization represents a footprint of an organization's overall procurement portfolio sustainability exposure points. The model also can be applied for various deep dives into specific risk indicators and sub-indicators. For example, in Figure 4, the model captures the category risk ratings across the *Environmental sustainability indicators* only, meaning exposure to *(*Hazardous Products, Climate Change, Resource Use, Biodiversity & Habitats). In Figure 5, the model captures the category risk ratings across the *Social Responsibility* indicators only, meaning exposure to sub-indicators on Forced Labor, Child/Youth Labor risk, Working Conditions, and Health & Safety issues. In Figure 6, the model captures Governance risk like corruption and fraud associated with each category.

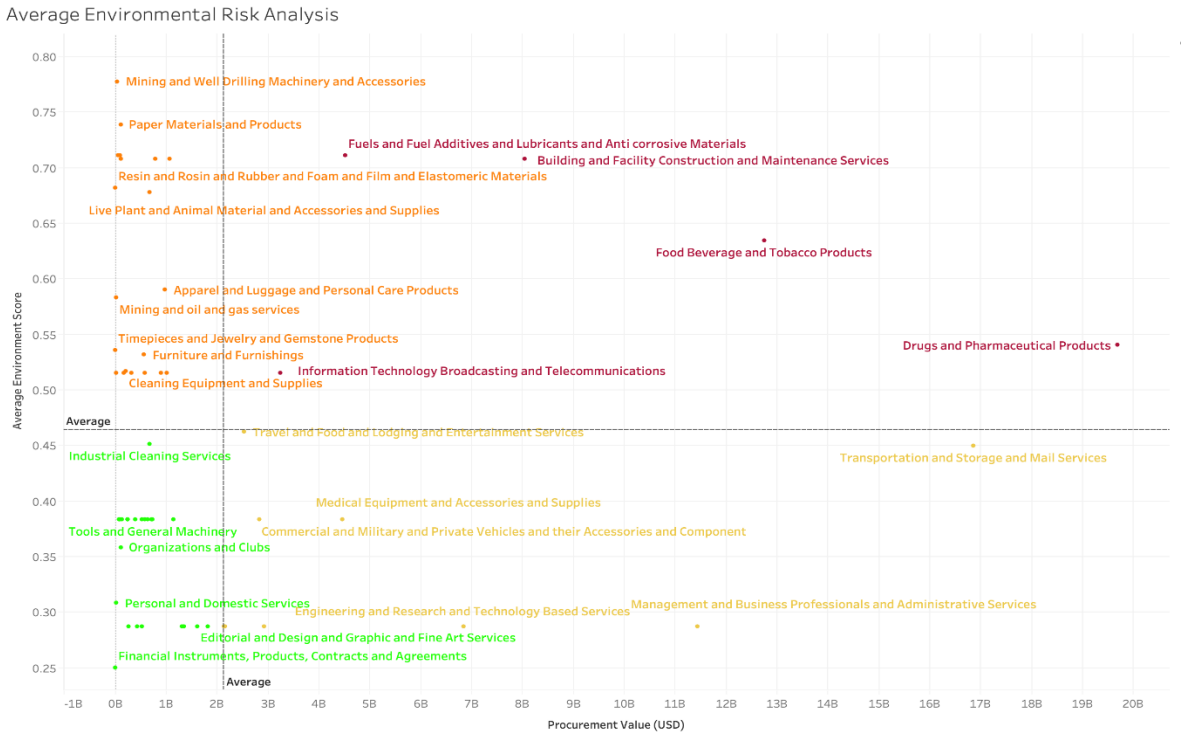
[1] Annual Statistical Report (ASR): https://www.ungm.org/Shared/KnowledgeCenter/Pages/asr_data_category

FIGURE 3: AGGREGATED SUSTAINABILITY (ESG) PORTFOLIO



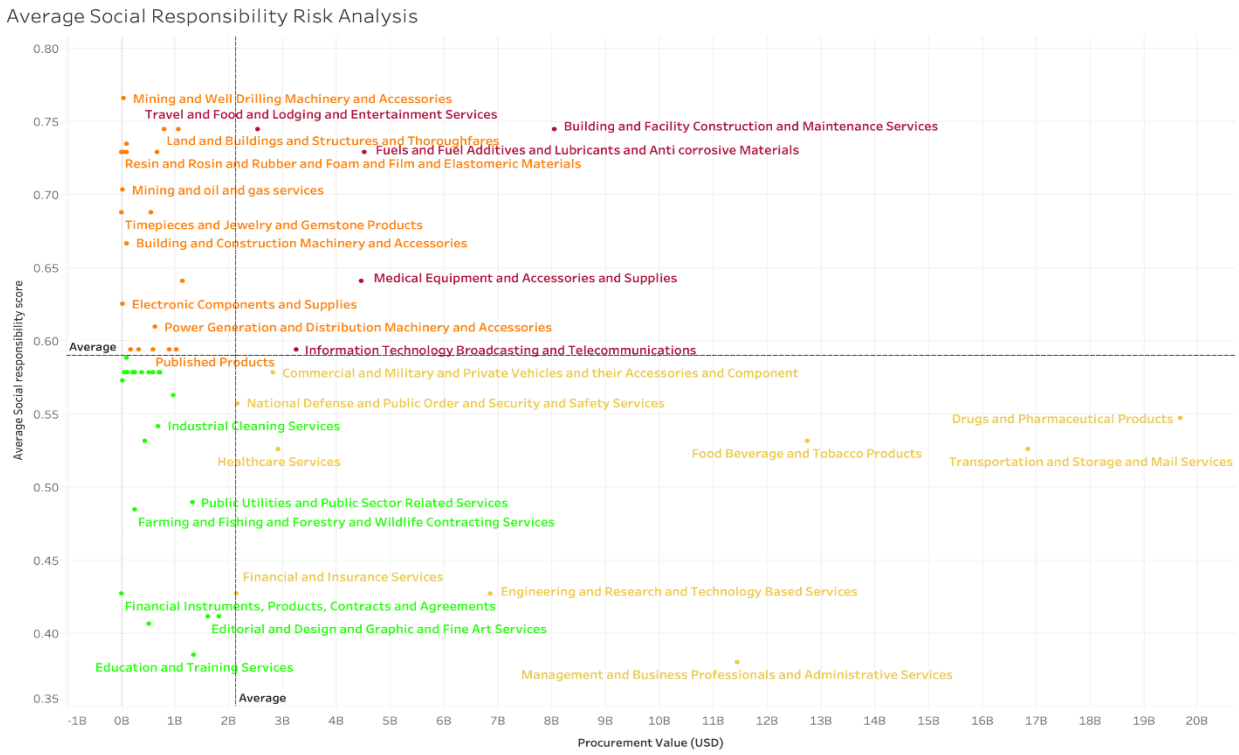
Sum of Procurement Value (USD) vs. sum of Average ESG Score. Color shows details about Category Name (group). The marks are labeled by Category Name.

FIGURE 4: ENVIRONMENTAL (E) PORTFOLIO RISK



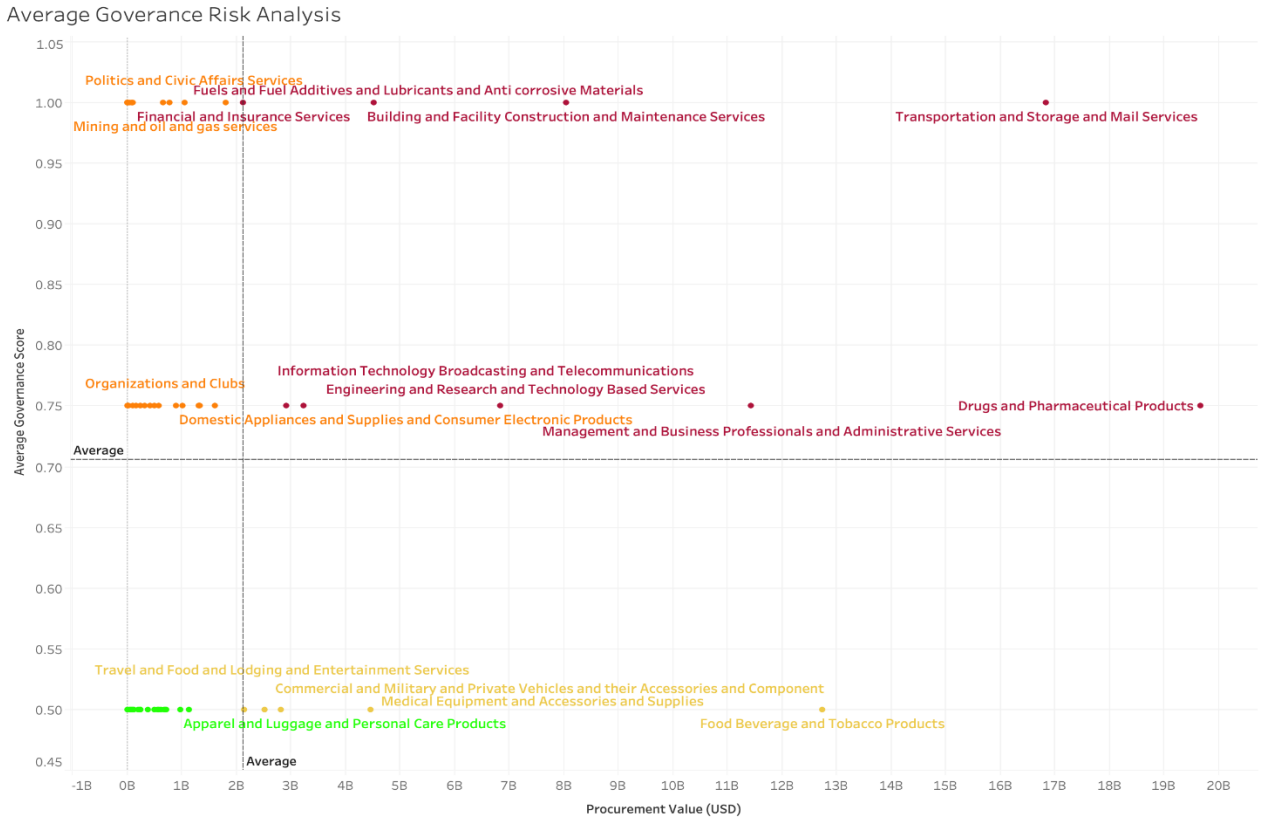
Sum of Procurement Value (USD) vs. sum of Average Environment Score. Color shows details about Category Name (group) 1. The marks are labeled by Category Name.

FIGURE 5: SOCIAL RESPONSIBILITY (S) PORTFOLIO RISK



Sum of Procurement Value (USD) vs. sum of Average Social responsibility score. Color shows details about Category Name (group) 2. The marks are labeled by Category Name.

FIGURE 6: Governance (G) PORTFOLIO RISK



Sum of Procurement Value (USD) vs. sum of Average Governance Score. Color shows details about Category Name (group) 3. The marks are labeled by Category Name.

STEP 2: DEVELOPING MARKET AND SUPPLIER ENGAGEMENT STRATEGIES

The category-level sustainability rating framework developed in Step 1, allows for a sustainability risk mapping across any organizational procurement portfolio. By further adopting and modifying the (Kraljic, 1983) approach of distinguished categories as either non-critical, bottleneck (critical), leverage, and strategic items, it is possible to *develop distinctive strategies for supplier engagement* with the objective of informing market entry opportunities and optimize purchasing power.

The approach allows for developing subsequent risk-informed sustainable procurement strategies, based on organization-specific sustainability exposure in the procurement portfolio, for optimal prioritization and resource allocation. The model proposes four distinct market approaches based on the segmentation of categories in Step 1.

STRATEGIC SEGMENT: The segment of High Risk/High Impact categories represent the highest exposure of sustainability risk for the organization, capturing types of procurement activities which are likely to manifest themselves in the supply chain, and with significant consequences. The segment also represents the procurement activities where the organization is most invested, which is both a liability and a strategic opportunity for influencing change in the marketplace.

- In this space the organization would seek to manage sustainability risk through instigating *market innovation and transformation* to reduce risk exposure.

CRITICAL SEGMENT: The segment of High Risk/Low Impact categories also represent significant sustainability risk to the organization, but without the spend volume to influence the market. The segment is critical as even minor volumes of spend with any suppliers associated with ESG violations can have detrimental implications for the organization in terms of reputational damage and liabilities.

- In this situation the preferred strategy for the organization may be to pursue a *Follow-the-Leader Approach*, identifying market sustainability leaders and follow their lead. The organization may also consider combining procurement volume with other organizations to build more leverage to influence the sector.

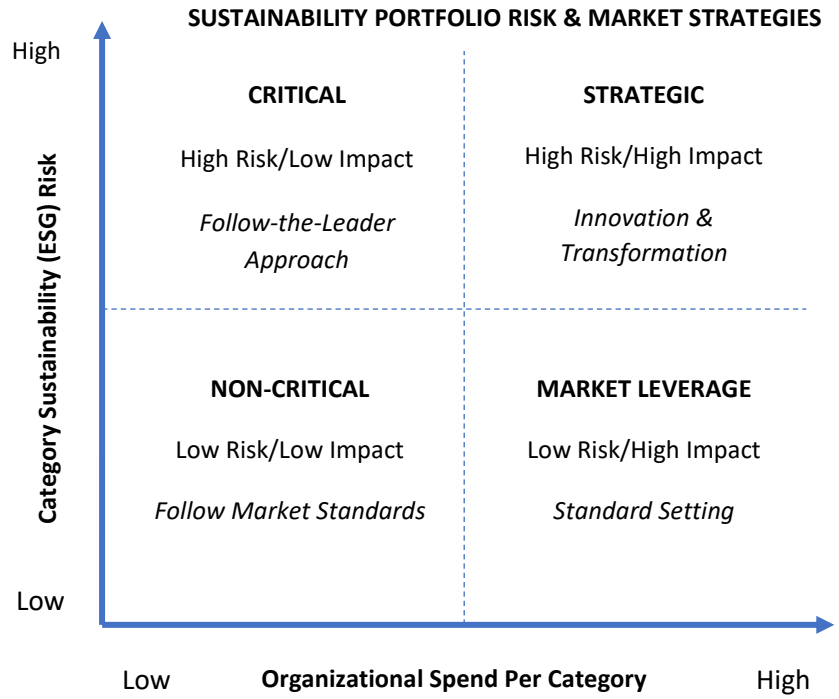
MARKET LEVERAGE SEGMENT*:* The segment of Low Risk/High Impact categories represent procurement activities that do not constitute a major sustainability exposure for the organization, however in which the organization wields potential influence due to market share.

- In this field the organization can *"raise the bar" and set higher standards* for the sector. Through a gradual increase in the sustainability requirements the organization can systematically develop a demand for products/services with, for example, higher recyclable content, less emissions, higher degree of traceability etc.

NON-CRITICAL SEGMENT*:* The segment of Low Risk/Low Impact categories represents procurement activities that constitutes only a minor sustainability exposure for the organization and limited spend volume.

- In line with traditional procurement strategy practice, the objective would be to reduce the transaction cost of applying sustainability measures. This can be achieved by *following market standards* already established, including use of eco-labels and social responsibility certifications.

FIGURE 7: SUSTAINABILITY RISK PROCUREMENT PORTFOLIO MODEL (PPM)



CONCLUSION & NEXT STEPS

This paper has introduced a Sustainability-weighted Procurement Portfolio Model (PPM) applying a category-specific classification system for mapping and prioritizing sustainability exposure in procurement portfolios. The aim of the model is to establish sustainability risk visibility in organizational procurement portfolios and allow development of differentiated procurement strategies to optimize sustainability outcomes. The model is built on classical procurement portfolio model design principles applied across the procurement function to determine the most suitable approach to managing suppliers and market entry. The model can be used both in isolation to determine specific sustainability exposure, or in combination with traditional procurement risk, as an integrated component of portfolio risk management.

Moving forward, future research and operationalization of the model could focus on:

IMPROVE QUALITY OF CATEGORY RISK RATINGS: Enhance quality and address subjectivity in the sustainability ratings through a consistent and quality-assured review protocol and explore opportunities for automating the category scoring mechanism. Further leverage expert reviews and integration of life cycle databases information or knowledge in the ratings.

ENHANCE AGILITY OF THE METHODOLOGY: Incorporate dynamic factors around capacity building and market maturity for moving categories and/or suppliers around the different portfolio-segments, including delivery of real-time risk alerts on changing category risk exposures to continuously re-index risk factors.

BUILD AGILE RISK WEIGHTINGS: Build agile risk ratings that can be modified subject to the specific sustainability concerns of an organization.

ENHANCE PORTFOLIO OF MARKET ENGAGEMENT STRATEGIES: Strengthen management utility by conducting further research on market engagement strategies and best practices for market transformation and innovation uptake e.g., eco-technologies, social innovation models etc.

MECHANISM FOR MANAGING QAULITY-ASSURANCE OF CATEGORY RATINGS: Strengthen mechanism for channeling specialized inputs into the rating process to enhance the credibility of the category ratings. Given the wide scope of categories and subsequent specialization needed, an open source or wiki model could be considered to mobilize inputs and expertise from a broad range of stakeholders and knowledge sources.

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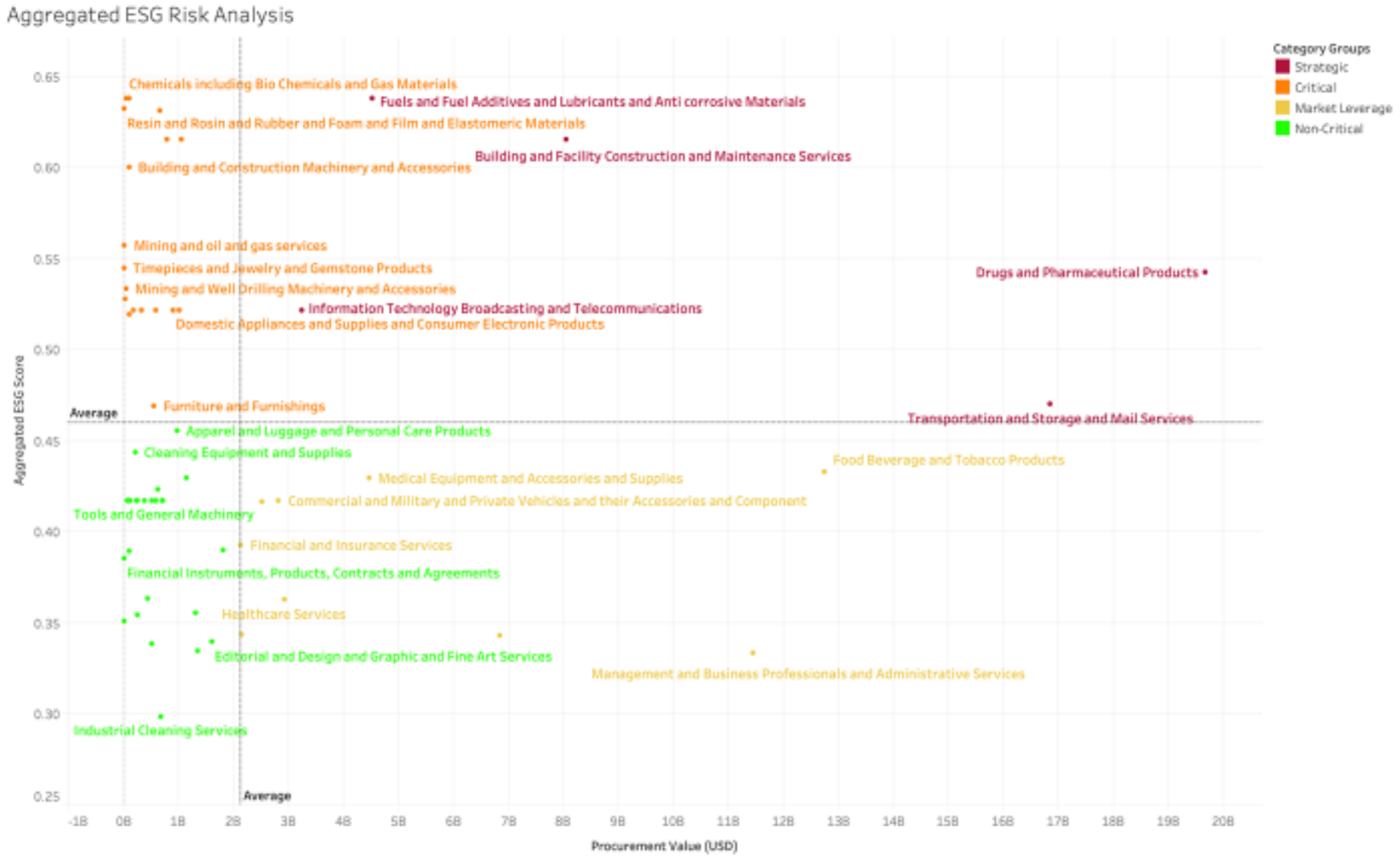
ANNEX 1: SCOPE OF SUSTAINABILITY (ESG) INDICATORS

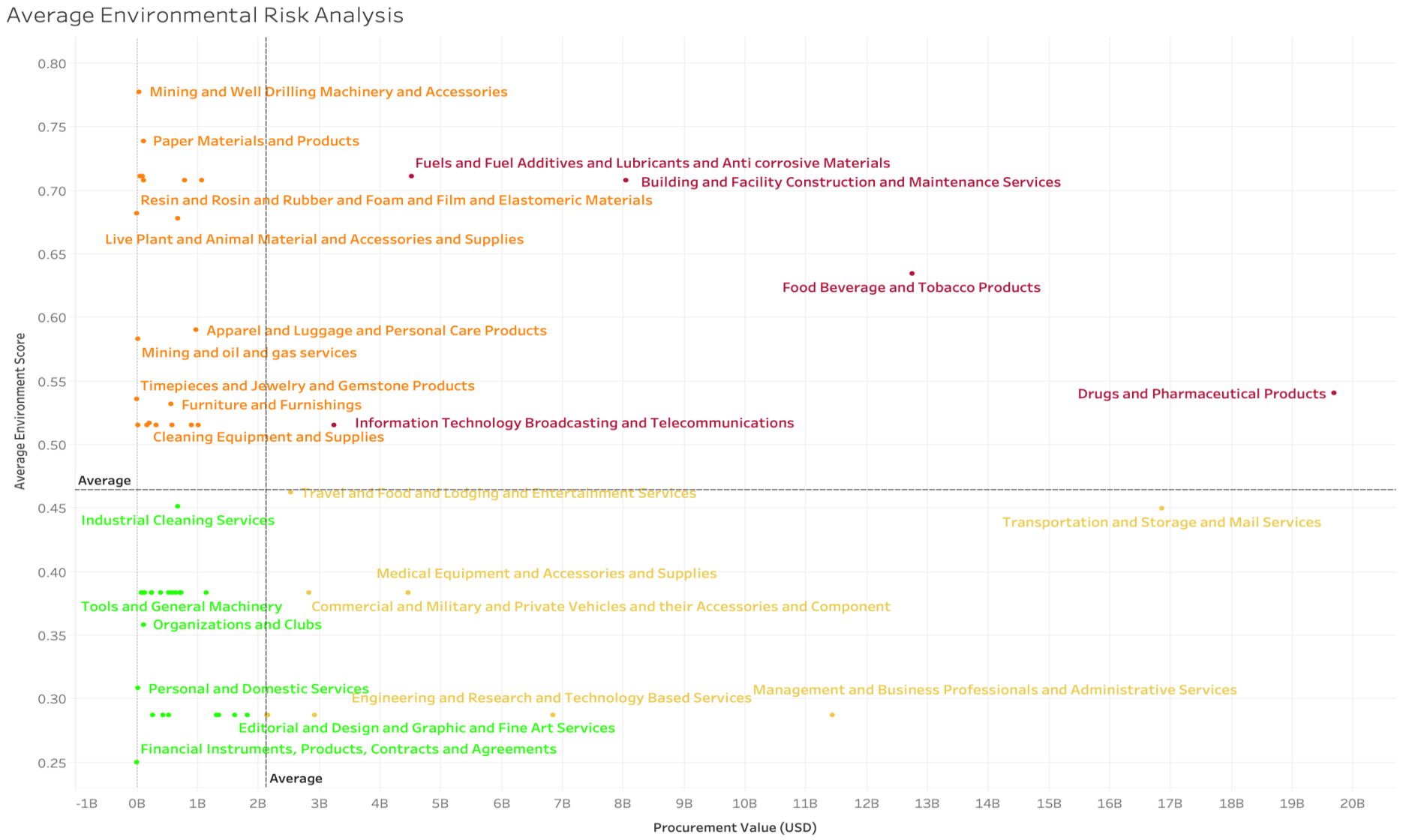
ENVIRONMENTAL INDICATORS:		
Potential for Environmental Mismanagement:		
	Hazardous products:	
		Effluents reaching water bodies including ground water
		Air emissions generated from operations
		Usage, storage, movement, disposal of hazardous materials/chemicals
	Climate change:	
		Level of CO2 gas emissions throughout the life cycle
		Emissions levels of gazes with high life cycle global warming potential
	Resource use:	
		Potential waste generated
		Potential high level of finite materials uses throughout the life cycle
		Use of water
		Use of land
	Biodiversity and natural habitats:	
		Use of land
		Impacts on biodiversity
		Impacts on forests
		Impacts on other natural habitats
SOCIAL RESPONSIBILITY INDICATORS:		
Potential Indigenous Peoples Rights Issues:		
	Indigenous Peoples Rights:	
		Risks of violating indigenous people's rights (e.g., land grabbing)
Potential Labor Rights Issues:		
	Forced Labor Risk:	
		Risk of working practices that include abuse of vulnerability, deception, restriction of movement, isolation, intimidation and threats, retention of identity documents, withholding of wages, debt bondage, abusive working and living conditions, or excessive overtime.
	Child/Youth Labor risk:	
		Risk of work that deprives children of their childhood, their potential, and their dignity, and that is harmful to physical and mental development.
	Working Conditions related risks:	
		Risk of working conditions in supply chains which is not in accordance with national regulations, or minimum international standards.
	Health & Safety Risks:	
		Risk of health and safety violations in the production/delivery of services.
Gender Rights and Discrimination Issues:		
	Potential Discrimination Risks:	
		Unequal treatment and contracting terms for women
		Unequal treatment and contracting terms for different religion
		Unequal treatment and contracting terms for LGBTQ+

		Unequal treatment and contracting terms based on race
	Sexual Harassment and Exploitation Risks:	
		Sexual harassment and exploitation risk
Product/Service Implications for Social Health and Well-being (Societal) Issues:		
	Privacy:	
		Potential data privacy risk
	Product Development, Advertising, and Use:	
		Potential risks concerning product quality assurance/service testing
		Potential risks related to Intellectual Property (IP)
		Potential unlawful or harmful use of product/service
ECONOMICS:		
	Market Structure:	
		Risk of SME exclusion in the market structure
	Supply Chain:	
		Risk of low transparency in complex global supply chains
GOVERNANCE:		
	Corruption:	
		Potential category-specific corruption risks

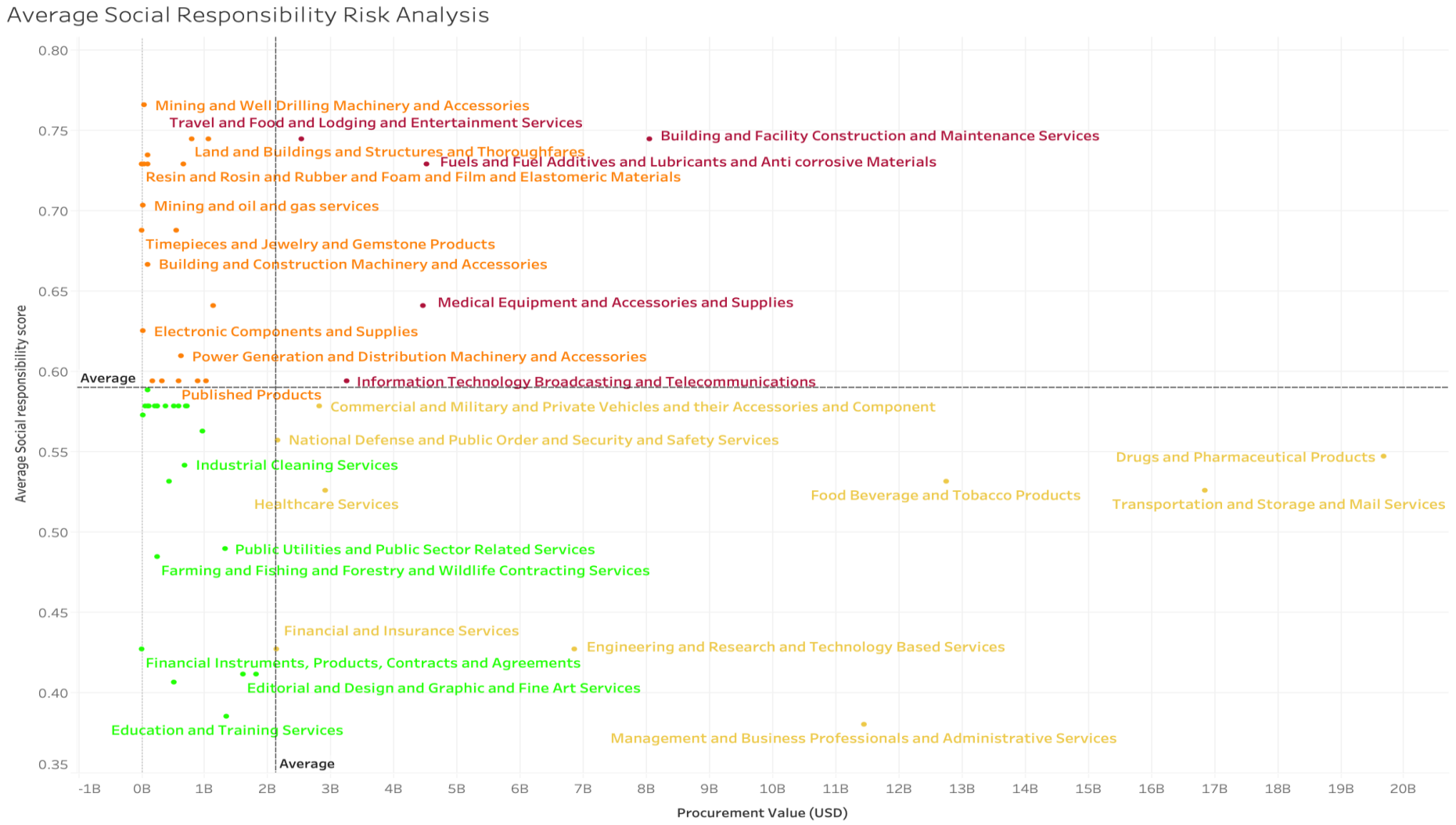
ANNEX 2: ANNUAL STATISTICAL REPORT VISUALIZATIONS



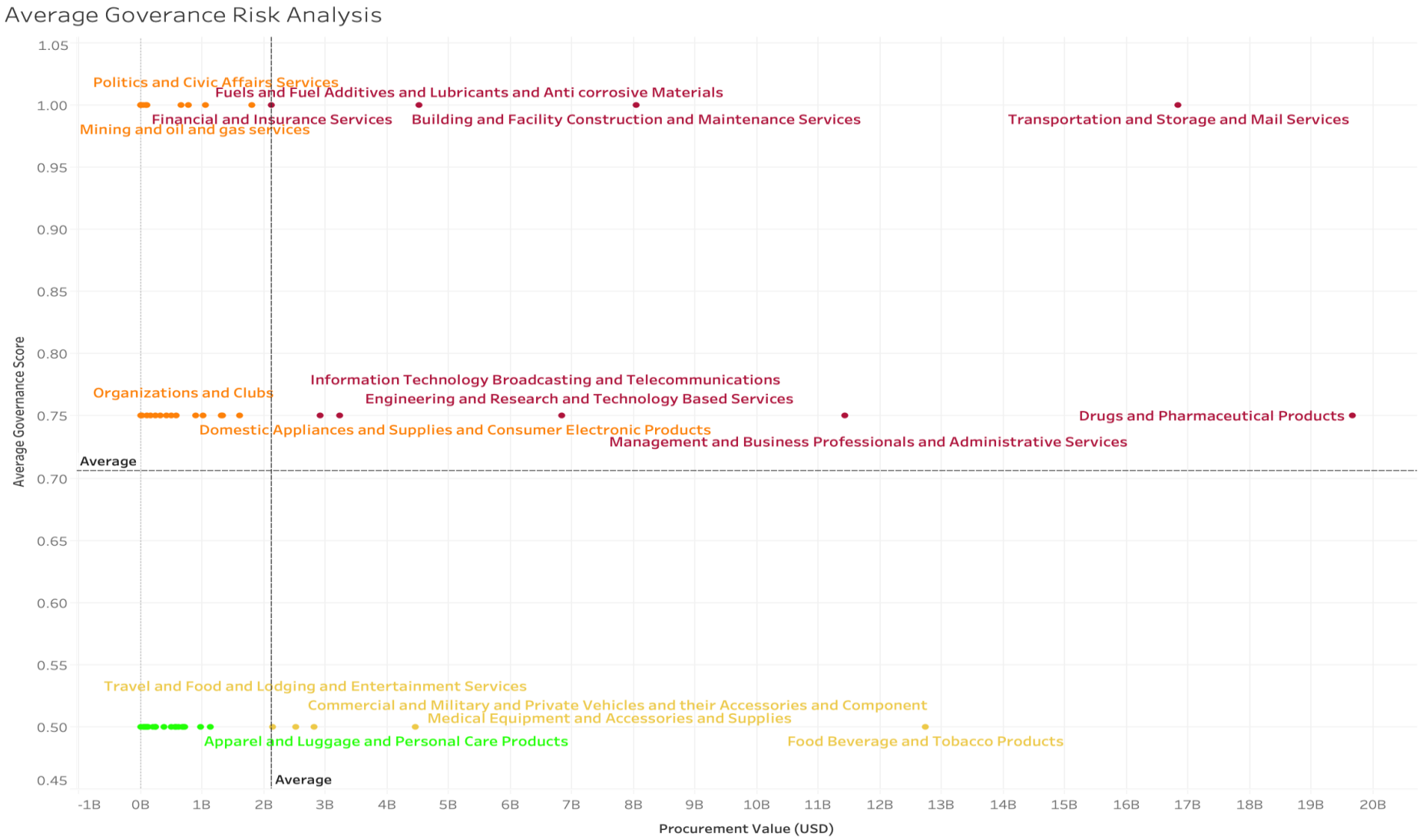
Sum of Procurement Value (USD) vs. sum of Average ESG Score. Color shows details about Category Name (group). The marks are labeled by Category Name.



Sum of Procurement Value (USD) vs. sum of Average Environment Score. Color shows details about Category Name (group) 1. The marks are labeled by Category Name.



Sum of Procurement Value (USD) vs. sum of Average Social responsibility score. Color shows details about Category Name (group) 2. The marks are labeled by Category Name.



Sum of Procurement Value (USD) vs. sum of Average Governance Score. Color shows details about Category Name (group) 3. The marks are labeled by Category Name.