# Applying Corporate Social Responsibility Principles in the Space Sector

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## I.      INTRODUCTION

The commercial space sector is currently undergoing rapid expansion. New and innovative business approaches are bringing new services and applications to market, and disrupting traditional industry approaches. This is leading to increased complexity in the operating environment, and in how operators interact with each other and with the regulatory system. Maintaining a space environment that is accessible to all actors, and supports continued economic development of, and return from, space activities, requires collaborative action from all of those involved in the space industry, including companies, regulators, and investors (Christensen 2016).

Recognizing this, government and industry leadership have called for the space industry to take the lead in self-identification of norms for safe and responsible space operations. In December of 2015, the Satellite Industry Association (a leading U.S.-based trade association of satellite operators) stated in a white paper that "The satellite industry is committed to conducting its operations in the most responsible possible manner in order to ensure the safety of its satellite platforms and the security and resilience (high availability) of its services and infrastructure" (Satellite Industry Association 2015). Speaking in March 2016, Winston Beauchamp, the U.S. Deputy Under Secretary of the Air Force for Space, suggested that "We already know what irresponsible behavior in space looks like... [when] you talk about these things in public, everybody claims they want to be responsible in space. So that's great, that's a good thing. All we have to do now is define our terms," and further argued that industry should take the lead in developing norms for responsible behavior (SpaceWatch Middle East 2016).

In order to be successful, efforts to develop industry norms must be appropriately linked to an effective corporate strategy context. This paper evaluates Corporate Social Responsibility (CSR) principles, and related concepts, as a potential thematic underpinning for industry-led development of principles.

## II.      CORPORATE SOCIAL RESPONSBILITY AS A FORMAL STRATEGY

The World Business Council for Sustainable Development (WBCSD) has defined CSR as "the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large" (Asongu 2007, 3). CSR is a business strategy involving initiatives to benefit society, and can involve a range of activities including environmental impact reduction, supply chain management actions, philanthropy and community service; and employee engagement efforts. Sometimes referred to as "corporate citizenship," the goal of CSR is to assess and take responsibility for a company's impacts on the environmental and social context in which the business operates. To demonstrate, a key component of CSR is sustainable development that extends the responsibilities of businesses past profit maximization to considering long-term social and environmental consequences of business activities.

The emergence of CSR as formal business strategy has been driven by both positive and negative factors. Tenants of the strategy were first seen in the late 1800s and gained significant momentum and legitimacy in the mid-1900s as a response to the aftermath of World War II. The phrase "Corporate Social Responsibility" itself was coined in 1953 by Howard Bowen, the author of *Social Responsibilities of the Businessman.*

The early roots of CSR can be found in successful companies like Cadbury in the late 19th century and Johnson & Johnson in the 1940s. Cadbury, the chocolate makers, heralded the beginnings of employee

welfare while also promoting community prosperity. Johnson & Johnson ranked customers, employees, and community members, in order of importance, ahead of its stockholders (Katsoulakos, et al. 2004, 5-7). Neither Cadbury nor Johnson & Johnson should be credited with pioneering CSR in business management; rather, they are notable examples of companies seeing the merit in adopting socially responsible practices from the onset. In the mid-1900s, the idea that corporations had more responsibilities than just profit maximization gained momentum on an international scale. Companies and governments across the world began to recognize the growing need to protect the liberties of all people and to foster global trade and cooperation. Scandals within organizations like Shell in 1995 and Enron in 2001 spurred discussions surrounding the importance of public image, reputation, accountability and transparency in the business model – contributing to grow in visible CSR strategies.

## III.    CHALLENGES RAISED BY CHANGING BUSINESS CONTEXT IN THE SPACE SECTOR

The expansion in the commercial sector brings with it a number of operational challenges, and potential threats to the space environment (Christensen 2016). These include:

- The introduction of operations concepts involving large constellations of satellites (numbering in the 100s or greater), operating in a coordinated network, and possibly operating in similar orbital configurations as competitor constellations.
- Increased numbers of smallsat and cubesats in operation, including often launching via multi-manifest launches, many without propulsion or active tracking capabilities.
- The emergence of new applications (e.g. space resources development, on-orbit servicing, commercial space stations) that do not fit existing regulatory frameworks.
- A growing number of new actors (both commercial and governmental) in the space sector.
- An influx of investment and human capital from outside the space sector, which might not be as familiar with the traditional operational practices in the field.
- Increasing pressure on maintaining environmental factors such as space debris remediation and electromagnetic spectrum coordination

A number of organizations and actors in the commercial space sector have publically recognized the need for responsible operations principles to address these challenges. For example:

- In a statement at UNCOPUOS STSC: "OneWeb understands space is a shared, natural resource that must be protected like any other. We are passionate about preventing debris creation, respecting existing space assets, and ensuring a safe and sustainable space (and Earth!) environment for the future (OneWeb 2016)."
- The U.S.-based Satellite Industry Association (SIA) has issued a white paper covering "Responsible Space Operations" which focuses primarily on space situational awareness (Satellite Industry Association 2015).
- ASTM International has initiated a process to develop "voluntary consensus standards for commercial spaceflight", in part as a response to the U.S. Commercial Space Launch Competitiveness Act of 2015.
- In the U.S. the Commercial Smallsat Spectrum Management Association has been established as an informal group to pre-coordinate spectrum matters amongst smallsat operators.

These activities generally represent ad-hoc activities – and some firm-level commitments often in a context of social entrepreneurship – but do not present a sustained industry-level commitment to

norms. Addressing the challenges posed by changing dynamics in commercial space requires a combination of regulatory action and industry self-governance. Other industries outside of the space sector (as well as some space sector companies), have adopted CSR as an accepted element of business practices, that may contribute to self-governance initiatives.

## IV.    INDUSTRY EXAMPLES CASES OF CSR IMPLEMENTATION AND DRIVERS

Traditionally, companies have adopted CSR policies and strategies on the grounds of four main rationales: ethical, legal, sustainability, and reputational. In the available literature, it is clear that CSR is primarily concerned with an organization's responsibility to consider the interests of not only their shareholders, but also, their employees, customers and the communities and environments in which they operate.  In order to understand the drivers that cause companies to adopt CSR strategies, and the practices by which those strategies are implemented, three industry cases were examined:  the mining, technology and shipping/packaging industry segments.  The examples display different motivations for adopting a CSR strategy and the tactics through which that strategy is used to positively impact the business environment. In practice, companies have established CSR strategies for similar reasons: public pressure, government regulations, brand image marketing, and strengthening the bottom line.

*Table 1: Summary of Examples*

|  | Drivers | Rationales | Strategies | Results |
|---|---|---|---|---|
| **Technology** | Reputation and Branding | Public Concern and Disapproval – Reputational Awareness | • Philanthropy and community service<br>• Utilizing data analysis to emphasize social impact<br>• Employee flexibility | Increased employee efficiency and loyalty as well as a positive reputation with consumers |
| **Shipping and Packing** | Bottom Line — (CSR in response to standards and policies instituted by client companies and governments.) | Environmental – Supply chain and transportation emissions | • Innovation in the supply chain<br>• Development of common interests with client companies<br>• Adoption of reducing, reusing, and recycling policies | Innovation in the supply chain and operations, development of common interests with client companies and adoption of reducing, reusing and recycling policies |
| **Mining** | Regulatory and Public Pressure | Decreased financial investment, regulatory and public pressure | • Integration of environmental performance targets and safety metrics into business objectives<br>• Improve employee working conditions | Cost reduction, competitive advantage and reputation enhancement |

### A.  Technology Industry

Technology companies, representing one of the fastest growing industries in recent times, have been a leader in quickly adopting and normalizing CSR strategies into business plans. Technology companies are those that revolve around the manufacturing of electronics, creation of software,

computers or products and services relating to information technology (Investopedia 2016). CSR adoption was driven as companies recognized the importance of reputation in the industry, as a factor in consumer purchasing decisions. As public visibility and impact increased in communities where technology companies were seeing market success, many companies saw CSR as not only a strategy that could attract and appease stakeholders, but also serve as a buffer in times of instability and uncertainty. For example, known for being exceptional at capturing, analyzing, and sharing data, technology companies utilize data analytics to provide benefits to the community and the social sector.

Externally, CSR serves to drive customer satisfaction and loyalty, corporate involvement in the community, and greater access to capital. Internally, it drives employee loyalty, efficiency, and overall financial success. Additionally, a positive reputation acts as a catalyst in driving consumer behavior and employee efficiency, bolstering a healthy bottom line, driving a higher level of work and production and increasing interest from consumers. The CSR RepTrak® 100 study results show that 73% of the 55,000 consumers surveyed are willing to recommend companies perceived to be delivering on CSR (Reputation Institute 2013). Further, the Reputation Institute reports that 56% of companies say that reputation is a high priority to executive management and board of directors and 60% of companies believe reputation has a high financial impact on their company mainly influencing customer retention, sales and revenue, market share and employee hiring and retention (Reputation Institute 2013). Overall, CSR in the technology industry was driven by reputational awareness, implemented to support and sustain a reputation and applied to be a driver of the bottom line.

### B. Shipping and Packing Industry

Technology companies primarily adopted CSR strategies due to public pressure and reputational awareness, whereas shipping and packing companies were influenced by an increased number of CSR-related standards and policies instituted by client companies and governments. At the legislative level, regulators have been unable to come to international consensus on extensive and detailed packing, labeling and shipping regulations surrounding health, environmental and safety concerns. For example, many countries and intergovernmental organizations have all reported on the transportation of hazardous substances and other materials with little success to establish widespread support from multiple governments for common statutory limits. The lack of consensus has led shipping and packing companies to follow already established, rudimentary international guidelines, set forth by the United Nations through units like the International Maritime Organization and the International Labor Organization, and considered to be the least common denominator. Private corporations also applied pressure to shipping and packing companies to adopt CSR policies that would satisfy their own CSR agenda. The combination of new regulations and corporate pressure drove shipping and packing companies to invest in CSR, most commonly in the area of sustainability and environmental safety and health.

Shipping and packing companies aimed to innovate their fuel consumption by integrating more renewable and environmentally friendly fuels and materials into the operations process. Utilizing reduce, reuse and recycle policies, profits are increased by using less energy and supplies and meeting the requirements of current and potential cliental. Additionally, operations efficiency increased due to superior resource management, leading to better economic performance and decreasing overall costs. Early adopters of CSR gained a competitive advantage if they were able to meet the CSR requirements of client companies and were later rewarded for going beyond international regulations in terms of brand strength and employee loyalty consequently, strengthening the bottom line. Companies desired fuel consumption alternatives, shifting to a more innovative approach operationally and benefitting supply

chain management. Initially, implementing a CSR campaign was seen as a substantial investment, however, the return seen on the bottom line, by means of decreased cost and amplified reputation, has been generally positive.

### C. Mining Industry

In the late 1970s, US mining companies, notorious for impacting communities and the environment, started to adopt CSR policies. New regulations drew more attention to the environmental effects of mining activity and the long-term economic impacts of abandoned mines. Currently, the United States mining community operates on more than three dozen laws and regulations at the federal level in addition to unique state level regulations (The National Mining Association 2015). Simultaneously, the financial sector shifted its focus on the mining companies from profitable gains and consumer demand to risk management and social responsibility. This shift spurred the integration of environmental performance targets and safety metrics into business objectives. In 2003 (and since refined in 2015), the International Council and Mining and Minerals published 10 industry-consensus principles for sustainable development in the mining industry (International Council on Mining and Metals 2015). The principles address environmental stewardship in mining operations, the role of mining companies in local communities, and human well-being; and are meant to be a set of standards that mining companies integrate into core business activities. "For mining companies, CSR is the manifestation of a move towards greater sustainability in the industry (Sharma and Bhatnagar 2014, 4)."

The tactics utilized by mining companies mostly focus externally on the environment and the community in which they operate, utilizing community health initiatives, infrastructure improvements and sustainable livelihood projects. Internally, mining companies have worked to improve the harsh working conditions for employees and investing in 'clean technologies' to reduce emissions and waste. These tactics aimed at "sustainability-related initiatives center on three main arguments… namely cost reduction, competitive advantage, and reputation enhancement," driving a healthier bottom line and increased financial investment (Walker and Howard 2002, 9-15). Additionally, the investment in community-based social services manages overall risk, improving relations, and reducing the risk of compensation and damage suits.

### D. Case Example Summary

The industry example cases discussed above demonstrate some of business, social and environmental benefits that might arise from adoption of CSR-driven practices, including:

| Business | Environmental | Social |
|---|---|---|
| • Lower operating costs | • Greater material reuse and recycling | • Corporate charitable and philanthropic efforts |
| • Enhanced brand reputation | • Improved durability and reliability of products | • Employee community volunteering |
| • Increased customer loyalty | • Reduced consumption | • Business involvement in community affairs |
| • Reduced regulatory oversight | • Greater use of renewables | |
| • Enhanced employee satisfaction | | |
| • Increased product and supplier quality | | |
| • Enhanced risk management culture | | |

CSR can provide increased operational efficiency, lower costs by increasing efficiency in consumption materials and supplies and increase loyalty from employees and consumers. However, there are also weaknesses to a standard CSR implementation

First, CSR is commonly implemented out of a policy or strategy office within a company, or within a department of a company, and may not be clearly integrated in the core business practices of all units within a firm. Additionally, other employees and decision makers may not be responsible or empowered to identify opportunities for CSR within their realm of responsibility, instead, that responsibility falls directly on one department that is required to understand the operations and dynamics of all other departments.

While implementing CSR policies can lead to an increase in operational efficiency within the supply chain and a stronger bottom line, it is not without investment costs that do not always display a strong return on investment in the short term, it part because it is sometimes implemented in isolation from operational business units. Firms may makes investments in corporate social responsibility "that impact their primary fiduciary duty of profit maximization (Husted and Salazar 2006, 80-87)." More detrimental is implementing CSR policies that do not match the purpose, mission or values of the company, leading to poor decision making, increased setbacks, and a result known as greenwashing. Greenwashing is the promotion of green-based environmental initiatives to make a company's operations, services or products appear as environmentally conscious but instead the initiatives are pursued frivolously or without real impact on practices. Larger companies are better prepared to absorb these setbacks and initial costs, whereas small and medium sized businesses cannot and have to make a stronger commitment financially (relatively speaking) to implement CSR policies. Lastly, operational efficiency is often touted as a benefit of CSR policies, however, only this is typically only delivered within supply chain management activities. Outside of the supply chain, the connection of CSR to more efficient practices is often not readily apparent.

## V. CSR APPLIED TO THE SPACE SECTOR

In generally, the space industry has been slow to adopt CSR. The SIA suggests that the community should "proceed cautiously when seeking to encourage space operators to conduct their activities responsibly," (Satellite Industry Association 2015) recognizing the need for any such initiatives to be properly cognizant of business and technical realities. Many of the factors that have contributed to the adoption of CSR in other industries are not as prevalent in the space sector. History has shown that industry sectors which are driven by business to consumer sales are more likely to adopt CSR related principles as core to the business model; than are industries in which sales are driven by business to enterprise or business to government, as has been characteristic in the space sector. The environmental impact motivations, with the associated supply chain actions in response, have not been a key concern for many space-sector companies, for whom the operating environment has not been related to Earth-based environmental impact considerations (Mendes 2010). Table 1, below, uses a Strengths, Weakness, Opportunities and Threats analysis framework to further describe the potential relevancy of CSR principles in the space sector.

*Table 2: SWOT Analysis of Applying CSR to Space Industry Challenges*

| Strengths | Weaknesses |
|---|---|
| • Long term planning perspective that complements space industry timelines<br>• In a traditionally risk adverse industry, CSR may enhance a risk mitigation approach<br>• Increased public facing transparency | • Relationship to supply chain is clear but links to operations challenges is not<br>• Short-term resource drain/diversion with potentially unclear operational impacts<br>• Disconnect between large corporate CSR policies and space unit practices/issues |
| **Opportunities** | **Threats** |
| • In some geographic regions, CSR can be a vehicle for attracting and sustaining talent<br>• Sets the stage for dialogue on new regulatory issues<br>• Links between CSR, Sustainable Development Goals and the benefit of space development to society<br>• Relatively small size of space industry may ease widespread adoption of CSR | • Culturally, structural and maturity differences in space companies complicate industry wide adaptation of CSR principles<br>• Limited competition means brand differentiation is not as impactful<br>• The space environment is not [yet] linked to environmental sustainability, challenging the connection to CSR |

In general, the link between CSR policies and efforts to address operational challenges, rather than reputational and corporate well-being challenges, is indirect. CSR polices can contribute to overall risk management postures within corporations. For example, efforts to mitigate orbital risks to satellites can be considered within a CSR policy (Mendes 2010). The CSR policy of satellite operator Inmarsat references both the mitigation of orbital debris and industry action to coordination activity through the Space Data Association. However, the majority of the policy focuses on environmental impact, supply chain, employee ethics, and corporate philanthropy activities, rather than operating challenges faced by the satellite industry (Inmarsat 2014).

## VI.     THE ONGOING EVOLUTION OF CSR

As companies have adopted CSR strategies, adaptations have become specific to business models causing CSR to evolve into different forms. Each form of CSR focuses on being socially responsible but uses different tools that, subsequently, provide different outcomes. As a company, deciding on which evolution of CSR is specific to each business model and desired results, is important to engaging a effective strategy. Evolutions in the general CSR philosophy have occurred in response to various market and social contexts:

- The first evolution of CSR took place in 1994 when John Elkington coined the phrase 'the triple bottom line' and argued that companies should be responsible for three bottom lines; profit, as the traditional bottom line, people, referencing the wellbeing of society, internally and externally, and the planet, measuring how environmentally responsible an organization is. Aiming to create a balanced scorecard, the goal of the three P's strategy (profit, people, and

planet), is to encourage companies to measure their impacts in society and the environment in order to be socially and environmentally responsible.

- In the early 2000s, the concept of good corporate citizenship, which developed and utilized new partnerships with development finance institutions, was developed in order to involve more community stakeholders. Member companies contributed money and advised on activities and initiatives that the institutions launched in an effort to be more socially conscious and responsible.

- Next, the concept of shared value surfaced in 2011, primarily focusing on making societal and economic impacts equal and integral to the company's strategy. The argument is that not all profit is equal. "Profit involving shared value enables society to advance and companies to grow faster (Moore 2014, 3)."

- Finally, as CSR initiatives have encouraged looking at the business practices through various lenses, new approaches to human resource management and supply chain efficiency has serendipitously made companies more innovative, leading to the concept of Corporate Social Innovation (CSI).

## VII.    CORPORATE SOCIAL INNOVATION

In 2014, CSI gained international recognition when the World Economic Forum launched the Global Agenda Council on Social Innovation. CSI, as defined by the World Economic Forum, is "the application of innovative, practical sustainable, market-based approaches to benefit society in general, and low-income or underserved populations in particular. Social innovation means being more strategic, more ambitious and more collaborative in how access and opportunity can be provided for billions of low-income people to participate in the global economy" (World Economic Forum 2016). In this context innovation includes identifying "more efficient methods of doing business or new types of products or services that may not have occurred to a business if it has no CSR initiatives in the first place" (Asongu 2007, 3-5).

Corporate Social Innovation is an evolution of CSR in which sustainability-driven innovations are pursued across the business model. CSI driven strategy results in change in business' operations aiming to achieve social and environment impact along with profitability (KPMG, Social Innovation Generation, Volans 2014).

- Corporate social innovation driven business typically takes the form of a business approach or culture; rather a formal strategy or policy as is commonly found with CSR.

- CSI encourages consideration of market factors when developing sustainability initiatives. It encourages product innovations driven by customer needs,

- CSI emphasizes a collaborative approach – including within the firm; between firms; and with other external stakeholders.

CSI is "directly aligned with the company's business and innovation agenda and can generate a number of measurable business benefits—access to new markets or consumers, additional revenues, strengthened supply chains, reduced costs or managed risks" (Milligan, et al. 2016). CSI is an emerging strategy with little track record of understood impact that can be difficult to integrate into an already established business plan, however, there are many strengths and opportunities to capitalize on that yield stronger business practices. CSI creates a collaborative environment where unexpected findings can be taken advantage of

and structured to span the entire range of a company's operations. It also focuses on executing a sustainability strategy that attempts to boost the company's balance sheet and financial status through innovation rather than philanthropic or community based efforts.

For example, Kraft Foods (which changed its name to Mondelez International in October 2012), realized multiple business benefits by creating value-chain innovations. By increasing its sustainably sourcing of agricultural products, such as coffee, Kraft obtained environmental certifications that proved to be important to consumers and customers because it generating double-digit revenue growth. Further, through supply chain innovations, the company was able to reduce its packaging costs - making larger containers at a cheaper cost – giving Kraft a competitive advantage (Diepenhorst, et al. 2013, 7). CSI strengthened the supply chain, increased revenues, reduced costs and gave Kraft a competitive advantage in consumer markets.

Collaboration is a primary focal point of social innovation and since CSI is expected to be fully integrated into the business plan, unlike most CSR strategies, innovative collaboration penetrates at all levels. A CSI-driven philosophy breaks down barriers between departments and finds inventive approaches and solutions to a variety of complex problems. Collaboration is not only stressed internally but also externally. "Innovations that bring together the expertise of multiple stakeholders, in particular from outside the business, can yield powerful results. The benefits include broader perspectives, consideration of the opportunities and risks and obtaining buy-in throughout the development process" (KPMG, Social Innovation Generation, Volans 2014, 14). Bringing together the knowledge and understanding from various stakeholders increases the legitimacy and credibility of the company and its products and helps generate new and unique ideas and opportunities for the company. Furthermore, CSI does not place as much value on external validation from individual consumers, which is unlike other CSR strategies. Plus, collaboration within the industry strengthens the position of any company and their pursuits. In new space ventures, where bounds of technology and markets are being tested, uninformed pressure or overbearing distractions can delay success while increased collaboration can not only increase the chances of success but also speed the development of innovative and critical technologies.

CSI sets the stage for innovative, collaborative and sustainable benefits across the company, however, the measurability of these benefits, in some areas, can be challenging. A CSI policy encourages innovations within the supply chain as well as in the products and services that are offered. The effects of a CSI policy in these areas are easily measured on a balance sheet, calculating total cost differentials, and data collected on customer demand and satisfaction or products and services. The benefits from increased company collaboration and social value is more difficult to measure. Collaboration between companies produces, most often, intangible benefits from idea and resource sharing, utilizing specialty skills and higher capacity to achieve more ambitious ideas while taking on less risk. The social value from CSI is also difficult to measure. Under a CSI policy, products and services that are developed create business and social value. The often intangible 'soft benefits' from CSI are drivers of success that are hard to measure but are important for growth and development.

## IX.     CSI APPLIED TO THE SPACE SECTOR

CSI is an evolution of CSR strategy that places an emphasis on linking sustainability activities to innovation and collaboration throughout the firm and extending to cross-firm collaboration. It aims to integrate socially-responsibility policies into the business plan and create a culture of social innovation at the firm level. A culture of social innovation allows for firm wide action towards sustainability challenges internally as well as provides a strategic link across competitors. The firm culture of

innovation and collaboration that CSI aims to engender is well aligned with space industry tradition – where innovation and collaboration is ingrained in the culture and viewed as critical for success. Table 2, below, uses a Strengths, Weakness, Opportunities and Threats analysis framework to further describe the potential application of CSR principles in the space sector.

*Table 2:  SWOT Analysis of Applying CSI to Space Industry Challenges*

| Strengths | Weaknesses |
|---|---|
| <ul><li>Innovation focus is aligned with space industry</li><li>Emphasis on collaboration supportive of companies working jointly on industry wide action</li><li>Fully integrated with business plan and all levels of company therefore link to operations challenges more clear</li><li>Adoption not driven by reputation pressures</li></ul> | <ul><li>Little track record of understood impact</li><li>Difficult to adopt in established enterprise</li><li>Lack of recognition of concepts and ideas may make it difficult to get leadership buy-in</li></ul> |
| Opportunities | Threats |
| <ul><li>CSI helps businesses think about delivering services in low income areas: space technology is well suited to deliver services in low income areas</li><li>Fosters intra-industry collaboration in development of new products and relationships</li><li>In some geographic regions, it's a vehicle for attracting and sustaining talent</li><li>Links innovation to social outcomes in an innovative field</li><li>Facilitates transparency to support collective action</li></ul> | <ul><li>Enhanced attention to innovation could lead to resource distraction</li></ul> |

## X.     CONCLUSION

When implemented at a firm level CSI-based activities provides a strategic culture which supports firm wide action towards sustainability challenges. It encourages collaborative across competitors to address shared challenges. However, CSR or CSI does not itself provide a business or strategic imperative for the development of industry led norms for responsible behavior. Adoption of CSR or CSI practices will be primarily driven by business motivations and impact at the firm level. However, development of norms in a way that is consistent with CSI in particular will facilitate adoption by helping to ensure that implementation is aligned with business culture and practice.

The Satellite Industry Association provides three suggested principles that should be kept in mind in efforts to develop industry norms:

- First, any new initiatives should be consistent with existing SSA practices and readily available technologies.
- Second, new initiatives should minimize any financial burdens placed on space operators.
- Third, new initiatives should encourage the exchange of best practices focused around the common goal of orbital safety rather than mandating specific approaches to achieving this goal" (Satellite Industry Association 2015).

Essentially this is an argument for the articulation between business strategy and technology supported by a collaborative environment that CSI practices aim to engender at the firm level. As the literature on socially responsible business suggests recognizing the need to proceed in a self-driven collaborative, cost-conscious, and technically sound fashion, principles rooted in CSR, if not CSR itself, may provide the strategic business context to help industry induce responsible behavior at the industry (not firm) level (Groot and Dankbaar 2014).

## Works Cited

Asongu, J.J. 2007. "Innovation as an Argument for Corporate Social Responsibility." *Journal of Business and Public Policy* 1 (3): 1-21. http://www.foretica.org/wp-content/uploads/2016/01/Innovation.pdf.

Christensen, Ian. 2016. "Future Issues for Commercial Space Sustainability Suggested by Space Industry Socio-Economic Trends." *67th International Astronautical Congress.* Guadalajara, Mexico. https://swfound.org/media/205635/christensen_iac_2016_e335.pdf.

Diepenhorst, Carola, Stian Glendrange, Olivier Jaeggi, Jason Jay, Martha E Mangelsdorf, Edward Ruehle, Diederik Vismans, and Douglas Woods. 2013. *The Innovation Bottom Line: How companies that see sustainability as both a necessity and an opportunity, and change their business models in response, are finding success.* Research Report, Boston: MIT Sloan Management Review. http://www.bcg.com/documents/file126806.pdf.

Groot, Asceline, and Ben Dankbaar. 2014. "Does Social Innovation Require Social Entrepreneurship." *Technology Innovation Managment Review.* http://timreview.ca/article/854.

Husted, Bryan W, and Jose De Jesus Salazar. 2006. "Taking Friedman Seriously: Maximizing Profits and Social Performance." *Journal of Managment Studies* 43 (1): 75-91.

Inmarsat. 2014. "Corporate Social Responsbility." http://www.inmarsat.com/wp-content/uploads/2014/05/06_Corporate_Social_Responsibility.pdf.

International Business Machines. n.d. Accessed August 26, 2016. http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=PM&subtype=XB&appname=GBSE_GB_TI_USEN&htmlfid=GBE03358USEN&attachment=GBE03358USEN.PDF.

International Business Machines Corporation. 2010. *Smarter Cities for Smartere Growth.* Executive, New York: IBM Global Services. http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=PM&subtype=XB&appname=GBSE_GB_TI_USEN&htmlfid=GBE03348USEN&attachment=GBE03348USEN.PDF.

International Council on Mining and Metals. 2015. "ICMM 10 Principles." https://www.icmm.com/en-gb/about-us/member-commitments/icmm-10-principles.

Investopedia. n.d. *Corporate Social Responsibility.* Accessed August 22, 2016. http://www.investopedia.com/terms/c/corp-social-responsibility.asp.

—. 2016. *Technology Sector.* Accessed August 24, 2016. http://www.investopedia.com/terms/t/technology_sector.asp.

Katsoulakos, P, M Koutsodimou, A Matraga, and L Williams. 2004. "A Historic Perspective of the CSR Movement." *CSRQuest* (CSRQuest) 1-19.

KPMG, Social Innovation Generation, Volans. 2014. "Breaking Through: How Corporate Social Innovation Creates Business Opportunity." https://www.kpmg.com/Ca/en/IssuesAndInsights/ArticlesPublications/Documents/5441-KPMG-Social-Innovation-Report-FY14-web-Final.pdf.

Mendes, Michelle. 2010. *Corporate Social Responsibility Optimization for Satellite Operators.* Executive MBA Thesis, International Space University.

Milligan, Katherine, Steve Davis, Paul Musser, and Caroline Barlerin. 2016. "Beyond Corporate Social Responsibility." *Standford Social Innovation Review.* May 5. http://ssirfrontiers.org/sessions/beyond-corporate-social-responsibility/.

Moore, Carol. 2014. *Corporate Social Responsibility and Creating Shared Value: What's the Difference?* White Paper, Heifer International. https://sharedvalue.org/sites/default/files/resource-files/CFR-047%20Corporate%20Social%20Responsibility%20White%20Paper_FINAL.pdf.

OneWeb. 2016. "Overview." *Presentation to UNCOPUOS STSC.* February 15. http://www.unoosa.org/documents/pdf/copuos/stsc/2016/tech-32E.pdf.

Reputation Institute. 2013. "2013 - Global RepTrak 100 The World's Most Reputable Companies." Reputation Stduy. https://www.reputationinstitute.com/CMSPages/GetAzureFile.aspx?path=~\media\media\media\2013_reptrak_100-global_report.pdf&hash=6723134b94fa322bab53c5245bb6dd4e50d20a77c09492746c579b7bd4ea4d8f&ext=.pdf.

Satellite Industry Association. 2015. "Responsible Space Operations." White Paper, Washington, D.C. http://www.sia.org/wp-content/uploads/2015/08/SIA_Responsible_Space_Operations_White_Paper_2015_08_Final.pdf.

Sharma, Deepankar, and Priya Bhatnagar. 2014. "Corporate Social Responsibility of Mining Industries." http://ssrn.com/abstract=2407014.

SpaceWatch Middle East. 2016. *Senior US Air Force Official Urges Private Sector to Take Lead in Building Space Norms.* Accessed August 12, 2016. http://spacewatchme.com/2016/03/senior-us-air-force-official-urges-private-sector-to-take-lead-in-building-space-norms/.

The National Mining Association. 2015. *Federal Environmental Laws that Govern U.S. Mining.* Accessed August 24, 2016. http://www.nma.org/index.php/federal-environmental-laws-that-govern-u-s-mining.

Walker, Jim, and Steve Howard. 2002. *Finding the Way Forward: How Could Voluntary Action Move Mining Towards Sustainable Development?* Working Paper, London: International Institute for Environment and Development.

World Economic Forum. 2016. *Social Innovation: A Guide to Achieving Corporate and Societal Value.*
February 25. Accessed August 22, 2016. https://www.weforum.org/reports/social-innovation.

Xerox. n.d. *Global Citizenship.* Accessed August 24, 2016. https://www.xerox.com/en-us/about/corporate-citizenship.