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Diversity and inclusion in mining: An analysis of indicators used in sustainability reporting



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ABSTRACT

The mining industry is increasingly turning to Diversity and Inclusion (D&I) programs to address a range of challenges including an aging workforce, increased public pressure, and growing demand for innovative technical solutions to mining problems. However, there is a lack of information on D&I initiatives in mining contexts, creating one barrier to adoption and development of these programs. To determine how and to what extent companies are reporting on their D&I programs, we conducted an analysis of twenty-six D&I-related indicators in the public sustainability reports of eight major metals mining companies from 2012–2019. This analysis demonstrates greater attention being paid to D&I over time and a preference for reporting on simple indicators which are relatively easy to obtain, such as demographics and policies. However, reporting on ethnic diversity and established industry goals that do not have corresponding GRI standards was extremely limited, and there was a decline in reporting of several indicators of structural aspects of employee inclusion, presenting a potentially concerning trend. We conclude that while some progress is being made, increasing D&I reporting in the mining industry remains a promising means of boosting the global equity of the industry and aligning with the 2015 UN Sustainable Development Goals.

1. Introduction

As the mining industry moves into the next decade, it must overcome several important social challenges. In addition to increased metals demand and environmental challenges, mining corporations face increasing public pressure to address the rights of indigenous and local peoples in natural resource extraction (Harvey, 2013; Owen and Kemp, 2013). At the same time, the industry also faces a looming workforce crisis, as nearly half of the skilled technical workforce is set to retire in the next decade (MiHR, 2016, PwC 2019). Many mining companies are attempting to address these challenges via workforce Diversity and Inclusion (D&I) strategies (Brightmore, 2017).

Despite public enthusiasm, the largest barrier to adopting D&I strategies in the mining industry, as perceived by mining industry professionals and executive leadership, is the lack of available information on D&I initiatives in mining contexts (Zaffron, Poulton, Loffredi, and Seedorff, 2019). Although there are country-specific reports on workforce demographics and programs in Australia and Canada, there is no current report on the state of D&I in the mining workforce across the

industry (AUSIMM, 2009; MiHR, 2016; PwC, 2019). Industry leaders also lack concrete data on the effects of D&I programs on commodity-producing industries, such as mining, because much of the literature on D&I programs is focused on consumer-facing corporations, e.g., Google (Bezrukova, Juhn, and Spell, 2012; Williams et. al., 2014). As commodity-focused corporations do not typically interact with consumers and perceptions of worth do not adversely affect business, there is doubt as to the relationship between D&I programs and concrete returns in commodity industries (WIM, 2015; MiHR, 2016; Yokom, 2018). Additionally, there is little research available on differing perspectives on D&I in international contexts (Bond and Haynes, 2014; Henry and Evans, 2007). This is especially important in the mining industry due to the international nature of mining corporations .

Further obstacles to adopting D&I strategies in the mining industry include aspects of organizational culture and structural barriers that may also influence to what extent a corporation is able to “internally govern its social and legal obligations” (Kemp and Owen, 2020: 835). These mirror barriers to D&I in other industries, such as oil and gas, that make it difficult for some employees to keep up with others in the

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workforce (Williams et. al, 2014, Apfelbaum, 2016). For example, limited parental leave or a culture of relocation and travel often limit the advancement of women in mining and oil and gas corporations (Williams et. al, 2014, Mayes and Pini, 2014). A review of D&I indicators reported on in mining companies' sustainability reports may provide an indication of some of these structural barriers that impact D&I in the mining industry. Furthermore, it can be a source for industry professionals to benchmark from to meet industry stated goals of increasing global equity in mining, increasing innovation and efficiency, and aligning with the 2015 UN Sustainable Development Goals (SDGs).

In this paper, we examine how and to what extent mining corporations reported on their activities and progress towards D&I in public sustainability reports from 2012–2019 and what their reporting suggests about overall industry priorities and progress. Through an analysis of D&I related indicators in eight major mining companies' sustainability reports, we demonstrate that overall, attention to D&I increased among mining corporations, that there was a positive trajectory towards meeting some of the industry's established D&I goals, and that there was a strong preference for reporting easily obtainable demographic data and policies, with some notable exceptions. Furthermore, several indicators trended significantly upward in terms of the percentage of reports containing them over the study period, demonstrating a potential shift in focus away from shallow metrics such as demographics in favor of more holistic reporting on D&I progress. Conversely, downward trending indicators included important aspects of structural inclusion in organizational processes such as decision making and advancement. Several D&I issues which are demonstrated concerns of mining industry actors were omitted from reporting, resulting in an incomplete picture of companies' D&I programs. We conclude that while some progress is being made, there remain several opportunities to improve D&I reporting in mining sustainability reports.

2. Background

2.1. D&I in Industry Contexts

In corporate contexts, definitions of diversity and inclusion are subjective and often change based on various factors including corporate culture, location, external culture, and government regulations (Nair and Vohra, 2015). Diversity is generally understood to represent "the varied perspectives and approaches to work that members of different identity groups bring" (Thomas and Ely, 1996:80) and is generally associated with demographics (Roberson, 2006). Many corporations focus specifically on gender, race, and ethnicity, due to the historical disenfranchisement of these groups and to comply with many countries' anti-discrimination laws (Anand and Winters, 2008). However, achieving equal representation of all major demographic groups in organizations is complicated by regional demographic distributions, which may introduce conflicting definitions of *major* demographic groups (Anand and Winters, 2008).

Inclusion was introduced in 2000 and first adopted by industry in 2010 (Mor Barak, 2015). Inclusion typically refers to the extent to which individuals can access information and resources, are involved in workgroups, and can influence intra-organization decision-making processes (Deloitte Australia, 2013). Inclusion is an experiential phenomenon, i.e., it depends on the extent to which individuals feel they are a part of organizational success (Deloitte Australia, 2013). Because of this, the term 'inclusion' often has multiple definitions within a single organization (Roberson, 2006). The particular definitions of inclusion utilized by an organization are often tailored to suit that organization's needs and business strategy (Mor Barak, 2015; Nair and Vohra, 2015; Ferdman and Deane, 2014). In this study, we are concerned with inclusion as indicated by the presence of formal or informal barriers to or encouragement of full employee participation in organizational productivity, decision making, and advancement.

D&I programs are often characterized by public alignment with core

company values, such as innovation or equity (Wentling and Palma-Rivas, 2000). In many of these programs, corporations attempt to communicate a dual commitment to both the business case for D&I and the moral high ground of providing equal opportunity (Wentling and Palma-Rivas, 2000). The business case for diversity, i.e., the theory that diverse workforces foster increased revenue, sales, and market shares in consumer firms (Kochan et al., 2003), has gained traction over the last decade. Research has shown that leaders who practice inclusivity reported better performance statistics, including greater employee satisfaction and higher sales rates, regardless of the relative diversity of their teams (Cottrill, Lopez, and Hoffman, 2014). Companies with a public commitment D&I are typically more successful in recruiting (Avery et al., 2013). Furthermore, companies that are perceived to value D&I have benefitted from increased sales revenue, share price, and market share, positive consumer opinions, and increased employee satisfaction (Bendick, Egan, and Lanier, 2010).

2.2. D&I in Mining

Early movements for diversity in mining occurred in the 1970s and primarily focused on gender diversity (Rolston, 2014). The current movement for D&I in mining began in the early 2000s, with the push for D&I in the tech industry (MCA, 2007). Since 2012, the mining industry has expressed widespread commitment to increasing diversity as a strategy to encourage sustainable development, acquire social license to operate, and address a looming retirement crisis (Zaffron, Poulton, Loffredi, and Seedorff, 2019; Harvey, 2013; IIED, 2002; MiHR, 2016). The mining industry's primary focus on gender diversity reflects the actions of other industries and the historical development of similar diversity movements (Faltholm and Norberg, 2017; Mayes and Pini, 2014). This approach also aligns with the 2015 UN SDGs and ensures compliance with anti-discrimination regulations (UN General Assembly, 2015). Despite this, current estimates of women in the global mining workforce range from 7% to 18% (Yokom, 2018; American Geosciences Institute, 2019), and fewer than 25% of women in the mining industry are retained or advance to management (Ozkan and Beckton, 2012).

More recently, the movement has expanded to include ethnic diversity due to several high-profile social movements such as Black Lives Matter (BLM) (Mell, 2020; London Mining Network, 2020). Statistics on ethnic diversity are unavailable for the industry as a whole, but regional mining industry human resources reports over the past five years indicate that between 3% and 5% of employees in these regions are non-white individuals (MiHR, 2016; WIM, 2015). Interestingly, age diversity is reported as a far greater concern for mining leaders than those in other industries (MiHR, 2016; Williams et. al., 2014). The mining workforce is rapidly aging, resulting in a widening skilled labor gap and growing demand for intergenerationally inclusive management (MiHR, 2016). Current D&I programs in mining utilize a variety of initiatives designed to encourage inclusivity and increase the diversity of the workforce. Newmont, for example, emphasizes the creation of employee professional and social networks through their business resource groups, while De Beers has found success through instituting hiring targets for female employees and announced that they had reached gender parity among new hires in 2019.

2.3. Evaluation of D&I Programs

It is imperative to evaluate the effectiveness of D&I programs over time to ensure an equitable division of company resources among facets of the D&I program and the effectiveness of their D&I programs (Mor Barak, 2015; IIED, 2002). This presents a major challenge for industry leaders and researchers due to the complexity of D&I and the difficulty of measuring the effects of programs on individuals and linking those effects to business returns (Holmes, 2010;). Corporations often evaluate diversity via self-reported employee demographic data (Hays-Thomas

and Bendick, 2013). A certain amount of D&I-related information from nearly every major corporation has been available to the public annually since the late 1960s to comply with many countries' anti-discrimination regulations (Anand and Winters, 2008; Bernard and Cooperdock, 2018). Companies often attempt to characterize inclusion through climate surveys or other methods intended to provide anonymous spaces for employees to offer information (Moore, 2014, Brightmore, 2017). However, evidence suggests that employees may be hesitant to respond truthfully to such surveys for fear of a lack of anonymity, and anonymized survey results are rarely publicized or studied (Wilkie, 2018). Early efforts to characterize inclusion have utilized indicators that require reporting on metrics, policies, and other quantifiable data which serve as proxy measurements of the inclusiveness of a company (GRI, 2019; UN General Assembly, 2015).

More data on D&I in mining has become publicly available due to the increase of D&I indicators in corporate sustainability reporting. The non-profit Global Reporting Initiative (GRI) was founded in 1997 to support businesses, policymakers, investors, and other organizations in reporting on their sustainability efforts (GRI 2019). The *GRI Standards*, first released by the GRI in 1998, have become the leading standards for corporate sustainability reporting and consist of three core modules, known as the GRI's 100 series, that are intended to be applied to any business preparing its sustainability report. There are also three *Topic Standards*, which include: GRI 200, Economic Topics; GRI 300, Environmental Topics; and GRI 400, Social Topics which are aimed at helping businesses report specific disclosures for each material topic. (GRI, 2019). Following the introduction of the GRI, the International Institute for Environment and Development recommended the implementation of regular public sustainability reporting and the adoption of GRI standards by mining companies (IIED, 2002). Adoption was initially sluggish but has become ubiquitous, and nearly every major mining company now publishes an annual sustainability report.

The inclusion of D&I indicators in corporate sustainability reporting was cemented in 2015 when the UN specifically identified Gender Equality in the SDGs (UN General Assembly, 2015). These reports serve many purposes, including providing companies with a way to compare their sustainability performance to that of other companies, comply with regulatory standards in some countries, and broadcast their commitment to and support of sustainability efforts, including those related to diversity and inclusion, to the public (Azapagic, 2004; Herzig and Schaltegger, 2006). They are limited, however, by their faithful adherence to the "business case" for sustainability, including the business case for D&I, and their un-reflexive reproduction of this perspective, providing evidence for the critique that sustainability reports are merely a public relations or "green-washing" strategy (Mahoney et al., 2013). There is also the possibility that the reported data is politically or socially motivated or simply inaccurate given that a company chooses which indicators to report on (or not) and which data to report (Jenkins and Yakovleva, 2006). That being said, though these reports may not provide a complete picture of D&I in the mining industry, they present an opportunity to analyze areas of emphasis and potential gaps in mining corporations' D&I reporting.

3. Methods

To examine how and to what extent major mining corporations are reporting on their activities related to D&I, we conducted an analysis of D&I indicators that appeared in the sustainability reports of eight mining corporations from 2012–2019. We selected corporations based on the availability of public sustainability reports and their adherence to GRI reporting standards. Data were aggregated beginning 2012, as this was the first year that sustainability reports were issued by all companies in the sample. Together, these companies represented at least 75% of the market share in each of the primary mineral industries (gold, copper, nickel, and iron) (Table 1). Although these companies own the majority of mine sites globally, they represent a small portion of the

Table 1
Companies Included in the Study Sample

Company	Commodity	Headquartered	Site Locations
A	Copper	United States	North and South America, Southeast Asia
B	Multiple	Australia	North America, Asia, Africa, Australia, Europe
C	Multiple	Australia	North and South America, Africa, Australia
D	Multiple	Canada	North and South America, Africa, Asia, Australia
E	Nickel	Russia	Africa, Europe, Asia
F	Gold	Canada	North and South America, Africa
G	Gold	United States	North and South America, Africa, Australia
H	Multiple	Switzerland	North and South America, Africa, Australia, Asia, Europe

number of mining companies active in the world and do not reflect the performance of companies operating in the artisanal and small-scale mining sector. We recognize that other "junior" or private commercial mining companies may be implementing D&I strategies and programming; however, we chose to focus on the companies in our sample, as they are considered to be major drivers of organizational behavior and activities in the area of industrial mining."

To create our D&I indicator set, we drew from GRI 400, which is specific to social topics and categorizes indicators into several standards, many of which are related in some way to D&I. We drew indicators from the following standards: GRI 401, Employment Data; GRI 402, Labor/Management Relations; GRI 404, Training and Education; GRI 405, Diversity and Equal Opportunity; and GRI 406, Anti-discrimination (Table 2). Although GRI 405 was introduced in 2014 and specifically addresses diversity and equal opportunity, the other GRI standards we drew from also contain metrics related to the evaluation of D&I programs, such as human rights, labor management, and employment metrics.

Within these GRI standards, we selected 26 indicators based on their similarity to D&I metrics utilized for evaluation of either diversity or inclusion in the literature. Current evaluations of D&I programs often include information on demographics, policies, and promotion structures (Deloitte Australia, 2013; Hays-Thomas and Bendick, 2013). After selecting our set of indicators, we categorized them according to their focus on either diversity or inclusion related evaluation methods, as defined in the literature on D&I. We assigned nine indicators that referred to workforce number and composition to the diversity category (Table 3) and 17 indicators that related to employee career development, benefits, and organizational encouragement of employee inclusion in the inclusion category (Table 4).

The final dataset comprised eight companies' reports over an eight-

Table 2
GRI Standards

GRI Standard	Description
GRI 401: Employment Data	Concern the number, location, organizational level, and demographics of employees
GRI 402: Labor/ Management Relations	Specific policies to manage relations between employees, corporate leadership, and organized labor at operational sites
GRI 404: Training and Education	Availability and provision of training and education opportunities to employees, managers, and corporate leadership, including job related training and career development or transition education
GRI 405: Diversity and Equal Opportunity	The state of workforce D&I specifically and demographics and policies specifically intended to foster diverse and inclusive workforces
GRI 406: Anti- Discrimination	The number and severity of discrimination instances in the corporation per year, policies to prevent discrimination, and grievance mechanisms to report discrimination.

Table 3
Diversity Indicator Set

GRI Standard	Diversity Indicator
GRI 401	Total workforce by employment type, employment contract, and region.
GRI 401	Total number and rate of employee turnover by age group, gender, and region.
GRI 401	Breakdown by region or country of the number of direct employees on company payroll
GRI 401	Number of indirect employees (e.g., contractors, consultants) expressed as full-time equivalents
GRI 405	Percentage of women employed relative to the total number of employees
GRI 405	Percentage of women in senior executive and senior and middle management ranks
GRI 405	Composition of governance bodies and breakdown of employees per category according to gender, age group, minority group membership, and other descriptive diversity indicators
GRI 405	Percentage of ethnic minorities employed relative to the total number of employees, with an explanation of how representative that is of the regional or national population makeup*
GRI 405	Percentage of ethnic minorities in senior executive and senior and middle management ranks

* reported only as the percentage of Indigenous employees in the workforce on sites adjacent to historically Indigenous-owned lands

Table 4
Inclusion Indicator Set

GRI Standard	Inclusion Indicator
GRI 401	Employee turnover expressed as percentage of employees leaving company relative to the total number of new employees
GRI 401	Benefits provided to full-time employees that are not provided to temporary or part-time employees, by major operation
GRI 401	Socially responsible employment and working conditions
GRI 401	Socially responsible approach to personal development
GRI 402	Ranking of the company as an employer in the internal ranking and surveys
GRI 402	Policy procedures involving consultation and negotiation with employees over changes in the company (e.g. restructuring, redundancies etc.)
GRI 402	Socially responsible management policies and systems
GRI 402	Socially responsible communication strategy and employee involvement
GRI 404	Percentage of hours training (excl. health and safety) relative to the total hours worked (e.g., management, production, technical, administrative, cultural etc.)
GRI 404	Number of employees that are financially sponsored per year by the company for further education
GRI 404	Summary of programs to support the continued employability of employees and to manage career endings
GRI 404	Average hours of training per year per employee by employee category
GRI 404	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings
GRI 404	Percentage of employees receiving regular performance and career development reviews
GRI 405	Summary of the equal opportunity policy
GRI 405	Ratio of basic salary of men to women by employee category.
GRI 406	Total number of incidents of discrimination and actions taken.

year period (2012–2019). There were 26 indicators which could be reported, totaling 208 total possible indicators in a given year. We examined indicators individually and grouped into D&I sets to determine the distribution by year and observed trends in the number and types of categories and indicators reported per year and over the study period. We then utilized Kruskal-Wallis (KW) Testing² (Kruskal and Wallis, 1952) to validate observed trends and determine whether or not there was statistically significant variation over time in the dataset. We further validated observed trends through Friedman Testing³ (Friedman, 1937), to determine whether or not there was statistically significant variation in the dataset over time and according to specific indicators. We followed up Friedman and KW Testing with pair-wise t-testing between years to determine the periods of greatest variation.

4. Results and Discussion

Our analysis showed that every company in the sample had incorporated D&I related indicators into their annual sustainability reports. The entire sample reflected no preference for diversity-coded indicators compared to inclusion-coded indicators, with 70% ($n_{\text{Diversity}} = 576$; $n_{\text{Inclusion}} = 1088$) of the total possible indicators in both categories reported over the study period.

4.1. Variations in Company Reporting across all indicators

In the first year of the study period (2012), 71% ($n = 145$) of the total number of D&I indicators were reported on by all companies in the sample (Fig. 1). This remained steady in 2013, decreased slightly in 2014 and then increased in 2015 to 74%, following the announcement of the 2015 UN SDGs. We also observed that all companies in the sample, following the announcement of the SDGs, utilized a “materiality matrix” or similar tool to map their progress and reflect the links between the GRI standards and the SDGs, as well as to highlight those goals and standards which the company devoted the most resources to over the previous fiscal year. The total percentage of indicators reported remained at 74% in 2016, then declined in 2017, reaching a low of 65% in 2018. The percentage of indicators reported rebounded in 2019. Variation in the number of indicators reported from year to year was found to be statistically insignificant over the eight-year study period, with KW testing returning $p > 0.05$ (Kruskal and Wallis, 1952). However, the percentage of indicators reported in 2018 fell below the standard deviation of this dataset (Fig. 1). Follow-up pairwise testing for 2018 showed that variation between 2015 and 2018 was statistically significant, with $p < 0.05$ between these two years. Furthermore, pairwise testing showed that the rebound between 2018 and 2019 was significant, with $p < 0.05$ between these two years.

The percentage of diversity indicators reported by all companies over the study period fluctuated in accordance with the whole sample trend (Fig. 2). Friedman testing on the set of diversity indicators showed that there was statistically significant variation between both individual indicator reporting and the total reporting of these indicators per year, with $p < 0.05$. Pairwise testing indicated that the greatest variation in

² Kruskal-Wallis testing is a statistical test used to determine whether or not variation between subsets of data is significant based on a single factor when evaluated against the dataset as a whole (Kruskal and Wallis, 1952). It differs from standard variation testing by utilizing normalized data ranking, which optimizes for non-normally distributed datasets (Kruskal and Wallis, 1952). It is the non-parametric equivalent of one-way ANOVA testing.

³ Friedman Testing is a statistical test used to determine whether or not variation between subsets of data is significant based on two factors when evaluated against the dataset as a whole (Friedman, 1937). It is similar to Kruskal-Wallis testing in that it utilizes normalized data ranking, optimizing it for non-normally distributed datasets (Friedman, 1937). It is the non-parametric equivalent of two-way ANOVA testing.

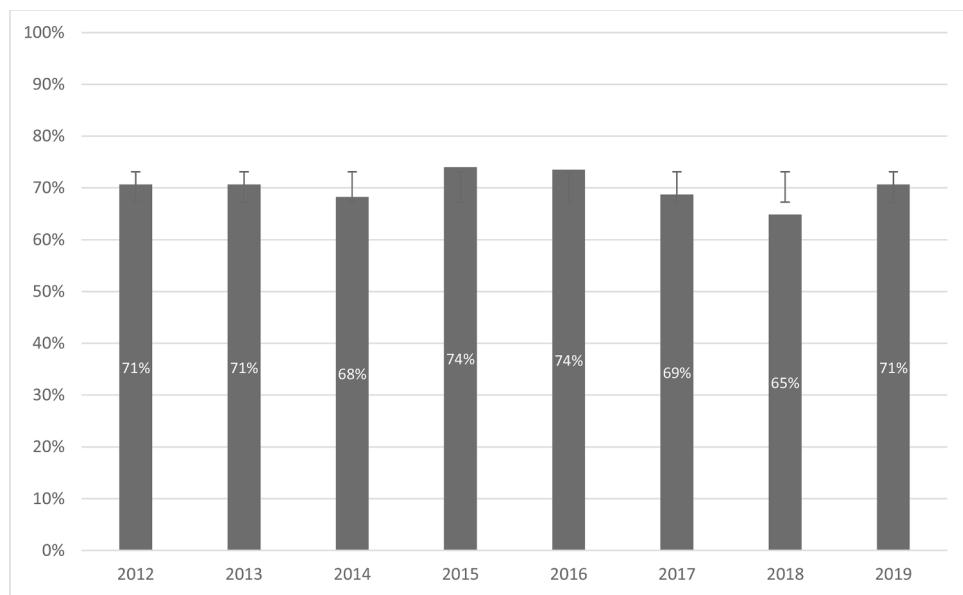


Fig. 1. Percentage of indicators reported per year ($n = 208$) by all companies in the sample, with standard deviation bars

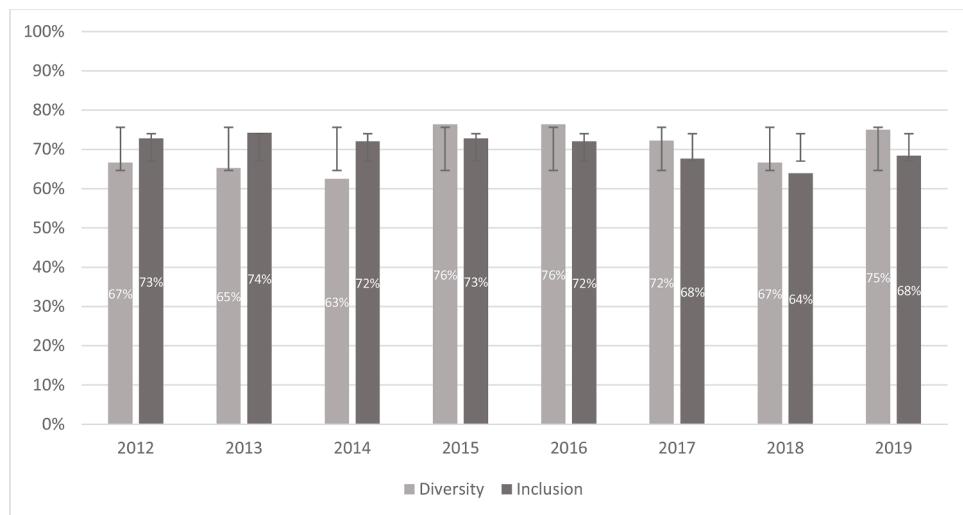


Fig. 2. Percentages of diversity ($n = 72$) and inclusion ($n = 136$) indicators reported by all companies per year 2012–2019 with standard deviation

reporting in this set occurred between 2014 and 2016 ($p < 0.05$), in line with the increase in reporting between these years in the entire sample. The percentage of diversity indicators reported also rebounded significantly between 2018 and 2019, with pairwise testing showing $p < 0.05$, consistent with the sample.

Conversely, while the percentage of inclusion indicators reported did show significant variation between indicators and years, with Friedman testing showing $p < 0.05$ over the eight-year study period, the majority of this variation occurred after 2016—contrasting with the entire sample. The percentage of inclusion indicators reported remained relatively stable from 2012–2016 and decreased in 2017. Pairwise t-testing showed that the greatest variation of inclusion indicators reported between years occurred between 2013 and 2018 ($p < 0.05$). This was consistent with the whole-dataset drop in reporting in 2018. Additionally, though the percentage of inclusion indicators rebounded following a dip in 2018, consistent with the sample trend, it rebounded significantly less than the percentage of diversity indicators reported. While the first three years of the analysis (2012–2014) showed a greater percentage of inclusion indicators reported than diversity indicators, the

remainder of the study period (2016–2019) reflected a shift toward more reporting of diversity indicators than inclusion indicators (Fig. 2).

4.2. Trends in Diversity Indicator Reporting

Friedman testing showed significant variation ($p < 0.05$) in reporting of each individual indicator in both the diversity and inclusion categories, as compared to other indicators in the same category, as well as across the entire dataset. KW testing confirmed this result ($p < 0.05$) for each category, controlling for factor-wise error. In the set of diversity indicators, the indicator breakdown by region or country of the *number of direct employees*, appeared in 100% of the reports (Table 5). These data are relatively straightforward to obtain from Human Resources (HR) records. Notably, the *percentage of women employed relative to the total number of employees* appeared in 99% of the reports and the *percentage of women in senior executive and senior and middle management ranks* appeared in 91% of the reports, reflecting the general workforce trend where women were the initial focus and primary beneficiaries of D&I programs (Faltholm and Norberg, 2017). The indicator *total workforce by*

Table 5

Percentage of Diversity Indicators Reported Each Year with Average for all Companies in the Sample

Diversity Indicator	2012	2013	2014	2015	2016	2017	2018	2019	Average (All Years)
Breakdown by region or country of the number of direct employees	100%	100%	100%	100%	100%	100%	100%	100%	100%
Percentage of women employed relative to the total number of employees	100%	100%	100%	100%	100%	100%	88%	100%	99%
Percentage of women in senior executive and senior and middle management ranks	88%	88%	75%	100%	100%	88%	88%	100%	91%
Total workforce by employment type, employment contract, and region.	75%	75%	75%	100%	100%	100%	100%	100%	91%
Number of indirect employees expressed as full-time equivalents	75%	75%	75%	88%	88%	75%	63%	75%	77%
Composition of governance bodies and breakdown of employees per category according to gender, age group, minority group membership, and other descriptive diversity indicators	63%	63%	50%	88%	88%	75%	75%	88%	74%
Total number and rate of employee turnover by age group, gender, and region.	63%	63%	63%	63%	50%	50%	50%	75%	60%
Percentage of ethnic minorities employed relative to the total number of employees, with an explanation of how representative that is of the regional or national population makeup *	38%	25%	25%	38%	50%	50%	38%	38%	38%
Percentage of ethnic minorities in senior executive and senior and middle management ranks	0%	0%	0%	13%	13%	13%	0%	0%	5%

* reported as only the percentage of Indigenous employees in the workforce on sites adjacent to historically Indigenous-owned lands

employment type, employment contract, and region was also present in 91% of the reports, again reflecting the ability to easily obtain these kinds of data from HR reports.

As the percentage of women in the workforce and women in leadership were among the most commonly reported indicators in the dataset, we looked more closely at these data to understand patterns in women's representation in the mining industry. Our data showed that between 2014 and 2019 the percentage of women in the global mining workforce increased from 17% to 18%. While this may appear as a relatively small increase, a boom cycle during this period increased the overall size of the mining workforce (Yokom, 2018), indicating a greater number of women in the workforce than in 2014. Similarly, the percentage of women in global senior management and board positions increased from 14% to 22% from 2014 to 2019, placing mining roughly in line with leading tech companies in terms of gender representation in leadership (Bernard and Cooperdock, 2018, Williams et. al., 2014). These increases may indicate progress towards the established industry goal of increasing gender diversity in mining (WIM 2018, PwC 2019).

The two least reported diversity indicators, percentage of ethnic minorities employed relative to the total number of employees and percentage of ethnic minorities in senior executive and senior and middle management ranks appeared in 38% and 5% of the reports. Additionally, when these indicators were reported, detail was limited. For example, percentage of ethnic minorities employed relative to the total number of employees exclusively represented the percentage of Indigenous employees in the workforce on sites adjacent to historically Indigenous-owned lands, and percentage of ethnic minorities in senior executive and senior and middle management ranks exclusively represented Black, Indigenous, and People of Color (BIPOC) on boards of directors. Although these indicators showed an increase in reporting in 2015, with reporting on percentage of ethnic minorities employed relative to the total number of employees increasing in 2016, and reporting on percentage of ethnic minorities in senior executive and senior and middle management ranks remaining steady in 2016 and 2017, the reporting on both dropped in 2018 and remained low in 2019.

Reporting on ethnic minorities, as opposed to gender, in the workforce, is significantly more complex in an international setting, as it requires in-depth study of the regional demographic makeup to contextualize the site-specific meaning of "ethnic minority" (GRI 2019; Henry and Evans, 2007). For example, BIPOC individuals employed on sites in West Africa would not necessarily be categorized as an ethnic minority, as they would be in some areas of North America. Additionally, though strides have been made for the recognition of Indigenous Peoples' rights, Indigenous People are not recognized by some governments, making measuring and reporting on their workforce representation difficult (Retziaff, 2005). Underreporting in these indicators may be due to the increased complexity necessary to accurately describe

them under GRI guidelines (GRI, 2019), as well as their fraught political nature (Horowitz et al., 2018; Retziaff, 2005). This is not unique to mining, however, as research has shown that other (non-mining) companies face similar difficulties in reporting on ethnic minority employment (Singh and Point, 2006).

It is also possible that mining companies avoid reporting on ethnic minorities simply because they are underrepresented, as they are in many other industries (Nair and Vohra, 2008; Bernard and Cooperdock, 2018). It also contributes to the critique that these reports are merely public relations documents, as data can be intentionally omitted (Azaagic, 2004). These data are consistent with regional reports of mining workforce demographics, such as the MiHR report on the makeup of the Canadian workforce in 2016, which reported low representation of Indigenous workers (MiHR, 2016). Though data on ethnic minorities was generally lacking, reports began to include metrics on Indigenous Peoples' employment in 2017. However, reports from 2019 indicate that, on sites adjacent to Indigenous populations, anywhere between 11% and 18% of the workforce were local Indigenous People. The limited metrics on Indigenous employment were often accompanied by extensive qualitative information on companies' relationships with Indigenous Peoples, such as details on hiring initiatives aimed at Indigenous populations. However, the low level of reporting on percentage of ethnic minorities in senior executive and senior and middle management ranks demonstrates a lack of evidence of Indigenous Peoples in higher levels of the organization.

Despite the low level of reporting on BIPOC representation in the industry to date, recent international movements towards racial justice and equity may push mining corporations to devote more time and resources to increasing ethnic minority representation in their workforces. There is already some movement in the industry toward this goal, with professional societies such as Women in Mining and the London Mining Network publicly aligning with the Black Lives Matter (BLM) movement in 2020 (WIM, 2020; LMN, 2020) and popular mining publications calling for more action on racial diversity in the industry (Mell, 2020).

Many of the companies in the dataset also focused on the percent of local or national employees in each region, which is represented by the indicator breakdown by region or country of the number of direct employees. This focus mirrors a stated goal of the mining, as well as oil and gas industries, to promote "local" hiring or hiring and promoting people from regions adjacent to the mine site (Ayanoore, 2020; Hilson and Ovadia, 2020; Kogel, 2014, 1). This has been proposed as a way to promote community involvement and leadership in mine operations and as a potential avenue to acquire the social license to operate (Solomon et. al., 2008; Harvey, 2013). In 2014, the percentage of locally or nationally hired workers, aggregated from all reports in the study, was approximately 63%. This increased to 71% in 2019, reflecting progress toward the established industry goal.

4.3. Trends in Inclusion Indicator Reporting

Similar to observed trends in diversity indicator reporting, the most commonly reported inclusion indicators reflected easily obtainable, pre-existing metrics. These specifically referred to corporate policies including *socially responsible management policies and systems*, *socially responsible approach to personal development*, *socially responsible communication strategy and employee involvement*, and *summary of the equal opportunity policy* (Table 6). These indicators were present in over 97% of reports in the study. Policies that correspond to each of these indicators are publicly available on company websites and in employee handbooks and can be gathered from these sources and integrated into sustainability reports. This mirrors the tendency of companies to report pre-existing metrics pulled from HR data in the diversity category.

A notable departure from this preference for reporting on policies is seen the relatively low reporting of policy procedures involving *consultation and negotiation with employees over changes in the company*, which is only included in 43% of the reports. This indicator refers to the extent to which companies have structures in place to encourage employee involvement in major organizational changes, such as site acquisitions or departmental reorganization (GRI, 2019).

The least commonly reported inclusion indicator was *the number of employees that are financially sponsored per year by the company for further education*, which was present in only 21% of reports. When financial sponsorship of employees for further education was mentioned, it was often reported as part of a larger metric, for example, the amount of money spent by a company on educational initiatives in a given year. This metric is not included in any GRI standard, and when reported, often included figures pertaining to various educational initiatives in addition to employee sponsorship. The low reporting of this indicator contrasts with the relatively high reporting of other indicators in the inclusion set which pertain to investment in employee education, such as the *summary of programs to support the continued employability of employees and to manage career endings*, which is reported in 88% of reports and the *average hours of training per year by employee category*, which is reported in 69% of reports.

The next least commonly reported indicator, appearing in less than half (42%) of the reports, was *the ranking of the company as an employer in internal surveys*. This may be unpopular in sustainability reporting due to

the difficulty of engaging employees in internal surveys of this type, often due to fears of lack of anonymity and the potential for retaliation from managers (Wilkie, 2018). Though this indicator is relatively uncommon in the dataset, notably, one company incorporated analyses of corporate climate studies into their sustainability reports at regular intervals throughout the study period. These analyses resembled “mini-studies,” with employee survey responses, case studies, and employee testimonials, which were not linked to any of the GRI indicators (GRI, 2019). These analyses presented a much more holistic picture of this company’s D&I program (Mor Barak, 2015), and may be indicative of significant corporate resources being devoted to D&I (Thurm, 2006; Roca and Searcy, 2011). Although some of the other companies in the dataset also reported on climate surveys, these analyses appeared infrequently.

Notably, we observed that two indicators in the inclusion set which serve as important markers of gender inclusion, the *ratio of basic salary of men to women by employee category*, and the *total number of incidents of discrimination*, were present in only 60% and 69% of reports in the set, respectively. Though they are still present in the majority of reports, these numbers contrast sharply with the high levels of reporting on indicators related to gender in the diversity set. Literature suggests that incidents of gender discrimination and male/female salary ratio are salient issues in the mining industry (WIM 2018, Perks and Schultz 2020, PwC 2019). Thus, the relatively low levels of reporting on these inclusion-related indicators contrasts with the established mining industry goal of gender inclusion and may indicate that mine sites continue to be “masculine” spaces (Pugliese 2020: 2).

4.4. Increasing Trends in Individual Indicator Reporting over Time

To understand reporting trends in individual D&I indicators over time, we applied Friedman testing to each indicator. Three indicators showed a significant ($p < 0.05$) increasing trend over time: (1) *total workforce by employment type, employment contract, and region*; (2) *composition of governance bodies and breakdown of employees per category according to gender, age group, minority group membership, and other description diversity indicators*; and (3) *ranking of the company as an employer in internal ranking and surveys* (Fig. 3). Indicators (1) and (2) are diversity indicators, and indicator (3) is an inclusion indicator. Pairwise

Table 6
Percentage of Inclusion Indicators Reported Each Year and Averaged for all Companies in the Sample

Inclusion Indicator	2012	2013	2014	2015	2016	2017	2018	2019	Average (All Years)
Socially responsible management policies and systems	100%	100%	100%	100%	100%	100%	100%	100%	100%
Socially responsible employment and working conditions	100%	100%	100%	100%	100%	100%	100%	100%	100%
Socially responsible communication strategy and employee involvement	100%	100%	100%	100%	100%	88%	100%	100%	99%
Summary of the equal opportunity policy	100%	100%	100%	88%	100%	88%	100%	100%	97%
Summary of programs to support the continued employability of employees and to manage career endings	100%	88%	75%	88%	88%	88%	75%	100%	88%
Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings	100%	88%	88%	88%	88%	88%	75%	88%	88%
Socially responsible approach to personal development	88%	88%	88%	88%	88%	75%	75%	88%	85%
Employee turnover expressed as percentage of employees leaving company relative to the total number of new employees	75%	75%	75%	88%	88%	88%	63%	88%	80%
Benefits provided to full-time employees that are not provided to temporary or part-time employees, by major operation	75%	75%	75%	88%	88%	75%	63%	75%	77%
Total number of incidents of discrimination and actions taken.	75%	75%	75%	75%	75%	63%	63%	50%	69%
Average hours of training per year per employee by employee category	75%	75%	75%	75%	75%	63%	50%	63%	69%
Ratio of basic salary of men to women by employee category.	63%	63%	63%	63%	63%	75%	38%	50%	60%
Percentage of hours training (excl. health and safety) relative to the total hours worked	63%	63%	50%	50%	50%	38%	63%	50%	54%
Percentage of employees receiving regular performance and career development reviews	38%	63%	63%	75%	63%	50%	38%	38%	53%
Policy procedures involving consultation and									
Negotiation with employees over changes in the company	38%	63%	50%	63%	38%	25%	25%	38%	43%
Ranking of the company as an employer in the internal ranking and surveys	38%	25%	38%	25%	63%	50%	50%	50%	42%
Number of employees that are financially sponsored per year by the company for further education	25%	25%	25%	25%	13%	13%	25%	13%	21%

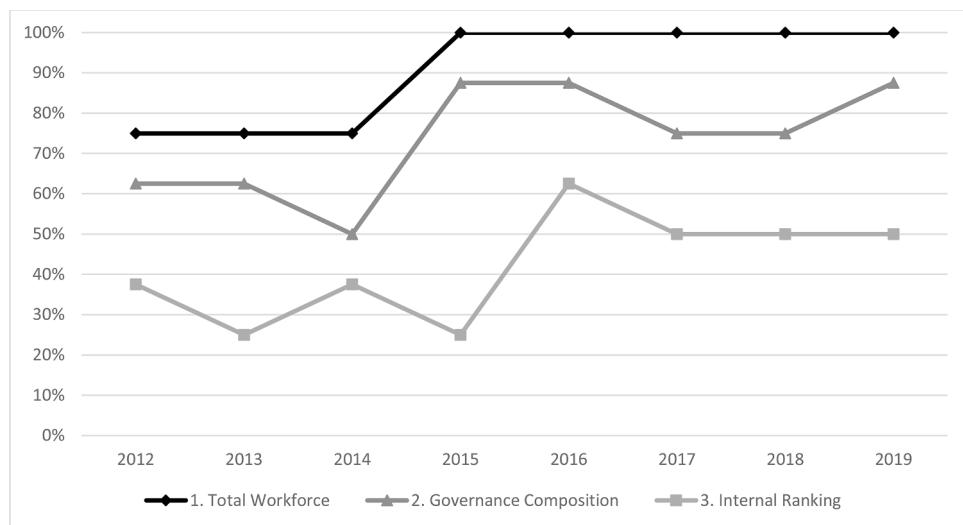


Fig. 3. Upward trending D&I indicators reported over the study period

t-testing between years for this subset of indicators showed the greatest variance ($p < 0.05$) between 2013 and 2016, reflecting the behavior of the whole dataset.

Two of these indicators (1 and 2), showed a marked increase in 2015 and the third (3) increased sharply in 2016. The increase in representation of these indicators during these years may signal efforts to align with the 2015 SDGs (UN General Assembly, 2015). However only indicator (1) remained steady in the following years, with indicators (2) and (3) dropping in 2017, and only one of these indicators (2) returned to 2016 levels in 2019.

While the increase in reporting indicator (1) was fairly consistent, there was significantly more variation in the reporting of indicators (2) and (3), even with the significant upward trend. Indicator (2) was present in many (74%) of the reports over the study period and was interpreted by companies as the demographic composition of their boards of directors. This indicator is the only GRI indicator which breaks from standard symbols of diversity (i.e., gender and race) by identifying age group and other descriptive diversity indicators (GRI, 2019). Despite its open-endedness, however, companies generally reported on the conventional aspects of diversity—gender and minority group—and did not include board members' nationalities.

In addition, prior to 2014, indicator (2) was reported on by companies in a few short sentences, occasionally with a graph. However, beginning in 2015, companies shifted towards a multi-page introduction of individual board members, which included photos and a short biography that detailed members' backgrounds and motivations. This shift towards long form, qualitative mini-reports within the greater sustainability report format may be the beginning of a shift toward reporting more nuanced, contextual D&I indicators.

Furthermore, the 38% increase in reporting of indicator (2) from 2014 to 2015 and the 25% increase in reporting of *percentage of women in senior executive and senior and middle management ranks* over the same period, are still reported on at a relatively low rate, which may be indicative of the limited advancement of women in the mining industry (Perks and Shulz 2020). This was also reflected in the detailed information provided on companies' boards of directors. However, the changing composition of boards also showed a slight increase in international representation, where several companies added board members from countries in which they operate but are not headquartered. This may be evidence of progress towards the mining industry's goal of increasing local representation at all levels of the corporation, especially when combined with the increase in local and national hiring reported by companies between 2014 and 2019 (Kogel, 2014).

Indicator (3), *ranking of the company as an employer in internal ranking*

and surveys, increased over the study period; however, it remained one of the least reported inclusion indicators in the dataset and was present in fewer than half (42%) of reports. No less, the increase in reporting of this indicator over time may be indicative of a shift in corporate focus toward internal surveys as indices of company inclusivity.

4.5. Downward trends in individual indicator reporting over time

We applied Friedman testing to identify four indicators which showed a statistically significant decreasing trend over time throughout the study period ($p < 0.05$): (1) *policy procedures involving consultation and negotiation with employees over changes in the company*; (2) *percentage of employees receiving regular performance and career development reviews*; (3) *ratio of basic salary of men to women by employee category*; and (4) *the total number of incidents of discrimination and actions taken* (Fig. 4). All indicators in this subset are inclusion indicators. Pairwise t-testing showed that the greatest variation in this set occurred between 2015 and 2018 ($p < 0.05$). This was consistent with the behavior of the entire dataset.

The significant decrease in these four indicators followed the entire sample trend, showing a general decline in reporting from 2016 to 2018 and rebounding slightly or leveling out in 2019, with the exception of indicator (4) which continued to decline in 2019 (Fig. 4). It is important to note, however, that several companies reported on this indicator in alternative public forums such as annual financial reports or legal disclosures, both of which could be accessed from the companies' websites.

Indicator (3), *ratio of basic salary of men to women by employee category*, was reported on relatively consistently from 2012 to 2017 and dramatically decreased in reporting between 2017 and 2018. Even though more than half (63%) of the companies reported on this indicator from 2012 to 2017, these numbers contrasted with the consistently high reporting of gender diversity metrics throughout the sample. Although companies overwhelmingly reported on these metrics, they appeared reluctant to report on salary ratios between men and women. This is especially discordant given the focus on salary ratio in several high-profile gender diversity reports by mining industry watchdogs (AUSIMM, 2009; WIM, 2019; Kogel, 2014).

Indicator (1), *policy procedures involving consultation and negotiation with employees over changes in the company* reflects the presence of structures to facilitate employee inclusion in major organizational changes to the company. Not only does the lack of reporting on this indicator represent a departure from the observed company preference for reporting on policies, it also dramatically decreased in reporting occurrence between 2015 and 2017, remained steady in 2018, and only

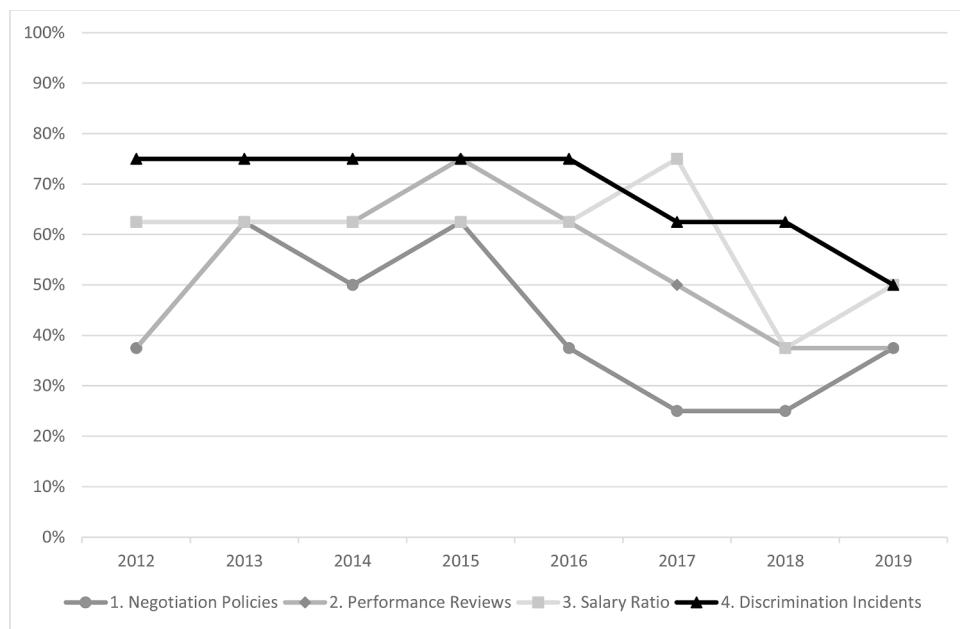


Fig. 4. Downward trending D&I indicators reported over the study period

increased 14% in 2019. It is not clear why this indicator did not rebound to pre-2015 levels of reporting in 2019; however, it may suggest that mining companies are moving away from structural inclusion of employees in organizational change decisions.

Indicator (2), *percentage of employees receiving regular performance and career development reviews* also showed a dramatic decrease between 2015 and 2018, remaining at 2018 levels in 2019. However, prior to this, it showed a dramatic increase in reporting between 2012 and 2015, reaching the height of its reporting occurrence in 2015, corresponding to the release of the UN SDGs (UN General Assembly, 2015). The general decrease in reporting on this indicator is concerning, as regular performance reviews for all employees regardless of position or background are a crucial part of career advancement and inclusive advancement structures (Williams et al., 2014; Apfelbaum, 2016; Faltholm and Norberg, 2017; Mayes and Pini, 2014).

Taken together, the decrease in the percentage of reports containing these four indicators over time presents a potentially alarming pattern and may signal increases in symbolic and material inequalities in these corporations. It appears that companies are moving away from reporting on important structural aspects of inclusion in their organizations, which may in fact imply *exclusive cultures*, whereby employees are excluded from important advancement milestones and involvement in relevant organizational changes. Furthermore, the decrease in reporting on salary differentials between men and women contrasts the industry's focus on gender diversity, as evidenced from the reporting on gender diversity indicators (AUSIMM, 2009; MiHR 2011; WIM 2018). It may behoove mining corporations to re-examine these trends and resume reporting on salary ratios and discrimination in annual sustainability reports. Their reports will then provide evidence that mining corporations are taking the necessary organizational steps to address structural inequalities and support gender diversity in the workplace.

5. Conclusions

D&I shows promise as a means for mining companies to pursue sustainable development and align with the SDGs, while also increasing the inclusion of stakeholder groups, attracting new talent to the industry, and solving the complex technological and social challenges of the next decade of mining (UN General Assembly, 2015; MiHR, 2011; Brightmore, 2017). Our analysis provides evidence from D&I reporting

that there is support for D&I among mining corporations, as shown by the relatively high percentage of D&I indicators reported between 2012 and 2019 (70%). Furthermore, we observed a positive trajectory toward meeting established D&I goals in the industry— primarily gender diversity and local and national hiring, each of which has increased significantly since 2014. This increase suggests that internal programs to support the ascension of women into leadership and the hiring of local labor have been moderately successful, though we note that mining companies could provide more program details in their annual sustainability reports. We also observed a tendency of mining companies to report more easily obtainable data and metrics, such as employee demographics and policy summaries. These indicators serve a number of purposes in reporting, including broadcasting corporate enthusiasm for D&I to potential employees and shareholders, as well as complying with relevant anti-discrimination regulations (Roca and Searcy, 2011; Avery et al., 2013). Notably, there is consistently high reporting on the representation of women in the workforce and women in senior leadership roles, mirroring the industry's historic focus on gender diversity (AUSIMM, 2008; MiHR, 2011; WIM, 2016).

Conversely, companies in this sample barely reported any indicators related to ethnic diversity, and when this indicator was included, it was extremely limited in scope, referring only to Indigenous Peoples in operating areas with adjacent Indigenous communities. Mining companies in this sample focused on local hiring, which reflects the mining industry's established commitment to "local" employees (Kogel, 2014, 1).

There are several indicators which trend significantly upward or downward in their occurrence of reporting over the study period. Of the upward trending indicators, two may reflect a shift in focus away from shallow metrics in favor of deeper, holistic reports on D&I progress in the company. Though the *internal ranking of the company as an employer* is one of the least reported indicators in the set, the percentage of reports which included this indicator increased over the study period, and information related to this indicator was typically reported within multiple page 'mini-reports' on employee survey responses, contained within the sustainability report. This increase was mirrored by the rise in the percentage of companies which reported on the *composition of governance bodies* which was also notable for its explicit labeling of age and other types of diversity, as it is the only GRI 405 indicator to do so. If companies continue to conduct surveys at regular intervals, it could

establish an industry-wide preference for this evaluation technique. Further observation of D&I indicators in mining sustainability reporting is necessary to determine if this will be the case.

The downward trending indicators all represent important facets of structural inclusion of employees in organizational changes and advancement. Two of these indicators, *male/female salary ratio* and *incidences of discrimination*, have declined sharply since 2017. This decline in reporting contrasted the mining industry's established focus on gender diversity and the consistently high reporting on female representation in the industry. Along with the other declining indicators, this downward trend may indicate that mining companies are decreasing their reporting on important structural aspects of inclusion. This lack of transparency may imply exclusive cultures and present a barrier to meeting long term D&I goals in the industry.

There were also several D&I issues which were notably absent from the majority of the sample. There was no mention in any of the reports of intergenerational diversity or inclusion despite the established industry concern (PwC, 2019; MiHR, 2016; Williams et. al., 2014). Although three reports referenced the attrition of skilled workers in the sections dealing with employee turnover rates by demographic group, there were no other references to age diversity or the skilled workforce gap (PwC, 2019; MiHR, 2016). Additionally, though there was increased public pressure to acknowledge intersectionality and 'invisible diversity' such as sexual orientation (Moore, 2014; Colgan, 2011), only two companies in the sample mention LGBTQ inclusion, and only state a commitment to and policy supporting the inclusion of LGBTQ individuals—eschewing any concrete data on LGBTQ representation. However, it may also be indicative of the more recent introduction of these issues in D&I, as over the past decade, these populations have been more incorporated into the greater D&I movement (Colgan, 2011). Nonetheless, the lack of attention devoted to these issues may indicate that companies are hesitant to report on more complex D&I subjects, or that these issues are just beginning to gain traction in the industry.

Additionally, there are no GRI indicators which incorporate intersectionality or invisible diversity (GRI, 2019). The GRI reporting standards bias reports towards policies and demographics, as these indicators comprise the bulk of current guidelines (GRI, 2019). As D&I in mining expands beyond regulatory compliance and gender diversity, these 'newer' facets of diversity may begin to garner more awareness and resources from D&I programs. There is also an opportunity for mining companies to examine their reporting frameworks for D&I and expand upon existing standards or adopt more appropriate frameworks (Thurm, 2006). Furthermore, the industry must increase reporting on ethnic minorities in the workforce and reverse the observed decline in reporting on structural aspects of inclusion.

To conclude, we observed that the mining industry appears to be comparable to other tech and manufacturing industries in terms of representation of women in the workforce and is showing some progress toward two important industry goals: gender diversity and local hiring. However, there is room for improvement. Increasing D&I efforts and reporting in the mining industry not only can be a means of boosting the global equity of the industry and aligning with the SDGs, it can also facilitate more innovation and efficiency and address labor pool concerns. Industry professionals would benefit from evaluating the indicators they are both reporting on and omitting, as well as the corporate structures that may serve to embed and enhance or inhibit their D&I programs.

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