MIREU Survey Results: Perceptions of Mining in Europe

Summary Report

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Authors:

Pamela Lesser (University of Lapland)
Gregory Poelzer (Luleå University of Technology)
Michael Tost, Katharina Gugerell (Montanuniversitaet Leoben)

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Background

There is an increasing interest from both governments and companies to rejuvenate European mining. Numerous reasons for this exist, not least of which is to support Europe's commitments to the Paris Agreement on climate change, the transition to a renewable-energy based economy, ensuring that mining is conducted in an ethical and sustainable manner and securing the supply of raw materials for continued European innovation. Recycling and new technologies alone will not be enough to satisfy these conditions. The materials from mining are essential for a greener future.

There are many people across Europe, however, who do not believe that mining is necessary. Opposition to new mining, especially to new metal mines, appears to be increasing with one mining regulator from a MIREU partner region noting that it is now the norm. Why this is happening, what the issues are and how to begin to resolve them are the crux of the Social License to Operate Work Package in MIREU. Workshops, expert panels, monthly calls, voluminous email exchanges and mapping exercises provided insight into attitudes and perceptions of mining across Europe, the drivers of SLO, and the preferred approaches to SLO. These were then tested via the survey, which provides valuable input to the SLO Guidelines and Toolkit.

Introduction

The online survey entitled *The Perceptions of Mining in Europe* was conducted in the fall of 2019 with an aim to more clearly understand the relationship between individual attitudes toward mining and the most important conditions for the acceptance of mining. Or if mining can be accepted at all. The survey was initially written in English and then translated into six other languages. It was distributed via email to a wide range of individuals: academics, public officials, representatives from NGOs, industry representatives, students, and members of communities near mines. The intent was to gather data from different perspectives via snowball distribution, as a representative sample was not possible due to time and budgetary constraints.

Given the survey distribution method, it is not possible to calculate a response rate. This, in combination with the small sample size, cautions us against extrapolating the results to the rest of Europe. We remind you that this data is not representative of any community, region, country or the EU itself. It is a very select group of respondents and must be interpreted as such. In essence, the survey is a first test of whether there is something unique about Europe with respect to SLO and mining, and indeed, there are interesting trends that need to be explored and understood further.

While metallurgy is also a component of MIREU, to date the perceptions of metallurgy, at least in the context of SLO, have been found to be very different than those of mining. A question was added to the survey asking if the metallurgy industry was worse, the same or better than the mining industry to gauge whether this is an area that needs to be followed up in more depth.

The survey is divided into two sections, the first using a well-tested social science method called the Schwartz Scale of Basic Values to measure personal values, as these influence perceptions and attitudes, and the

second focusing on three aspects of mining: 1) attitudes toward mining activity, 2) the roles of various stakeholders and 3) preferred approaches to SLO.

The survey ran for two months in seven languages for a total of 278 responses from the following countries: Austria, Bulgaria, Croatia, England, Estonia, Finland, France, Germany, Ireland, Italy, Poland, Portugal, Romania, Spain and Sweden. As the individual sample sizes in each language are small, all of the surveys have been combined together so that basic statistical analysis can be done. For the first section, the Schwartz Scale values, the initial questions are 1) to see whether the values of individuals across Europe are represented across the categories of the Schwartz Scale, 2) if there is a statistically significant relationship between a respondent's individual values and their attitudes toward mining and 3) if there is a statistically significant relationship between a respondent's individual values and their preferred approaches to SLO. For the second section, the initial questions are 1) to determine if there is a correlation between the socio-demographic information and attitudes toward mining, 2) to determine if there is a correlation between socio-demographic information and preferred approaches to SLO, and 3) if the preferred approaches to SLO can be grouped together and help inform companies and authorities what else they need to consider when thinking about different stakeholder groups and their concerns.

Although the survey includes the opportunity to provide written responses to some questions, the primary intent is the collection of quantitative data. There are two reasons for this approach: generalization and comparability. First, one of the primary goals of WP4, and the project, is to understand shared attitudes towards mining and the potential for common solutions. Using a six-point scale and quantitative analysis allows us to use the data from the survey to accomplish these goals. Second, in order to compare the results with previous work on SLO, particularly at the societal level, quantitative analysis is necessary. The questions and methods used are based on previous studies with the aim to produce similar analyses of mining-related values. However, while the focus of the survey is quantitative, the qualitative results are also useful moving forward. They will help inform our on-going analyses of the case studies, giving more context to national-level issues along with providing insight into issues and questions that should be added for future survey work.

The report comprises the following:

> Section 1: Respondent Demographics
> Section 2: Schwartz Scale of Guiding Principles
> Section 3: Attitudes Toward Mining
> Appendix A: Statistical Analysis
> Appendix B: MIREU SLO Model

Section 1: Respondent Demographics

Table 1. Response distribution

Survey languages	No. of responses
English	86
Finnish	62
German	50
Portuguese	30
Spanish	19
Polish	18
Swedish	13

Table 2. Socio-demographic information per survey

Survey language	Average age	Educational level*	Employment (top 2)**	Gross income in Euros (monthly)
English	42	1=0% 2=2.7% 3=90.54% 4=6.76%	R 35.62 % PA 15.07%	Less than 2 999 = 33.34% 3 000 - 6 999 = 34.73% 7 000 - 10 999 = 9.71% 11 000 euros + = 5.56% No answer = 18.06%
Finnish	52	1=1.61% 2=6.45% 3=83.87% 4=NA	R 34.43% RT 18.03%	Less than 2 999 = 16.13% 3 000-6 999 = 53.23% 7 000-10 999 = 25.81% 11 000 euros + = 4.84% No answer = 3.23%
German	22	1=23.4% 2=46.81% 3=31.91% 4=NA	S 70% CS 6.25%	Less than 2 999 = 42.23% 3 000-6 999 = 8.89% 7 000-10 999 = 2.22% 11 000 euros + = 0% No answer = 46.67%
Polish	52	1=0% 2=0% 3=100% 4=0%	R 35.62% MI 6.25%	Less than 2 999 = 56.25% 3 000-6 999 = 37.5% 7 000-10 999 = 0% 11 000 euros + = 0% No answer = 6.25%
Portuguese	39	1=4% 2=20% 3=80% 4=4%	PA 23.08%, S 23.08% CS 15.38%	Less than 2 999 = 62.5% 3 000-6 999 = 20.83% 7 000-10 999 = 4.17% 11 000 euros + = 4.17% No answer = 8.33%
Spanish	48	1=0% 2=0% 3=100% 4=0%	MI 52.63% R 26.32%	Less than 2 999 = 26.31% 3 000-6 999 = 47.37% 7 000-10 999 = 5.26% 11 000 euros + = 5.26% No answer = 15.79%
Swedish	54	1=0% 2=7.69% 3=92.31% 4=7.69%	R 23.08% PA 15.38% CS 15.38%	Less than 2 999 = 0% 3 000-6 999 = 23.07% 7 000-10 999 = 30.76% 11 000 euros + = 15.38% No answer = 30.77%

Educational level: 1=Elementary school, 2=High school, 3=University, 4=Postgraduate
**Occupation: CS = civil society, MI = mining industry, PA = public administration, R = researcher, RT = retired, S= students

Researchers are the most represented group comprising roughly one-third of respondents in the English, Finnish and Polish surveys and roughly one-quarter in the Swedish survey. Only in the Spanish survey did the mining industry have a very strong showing with 52.63%. The German language survey, comprised mainly of university level students at University of Leoben in Austria since the survey was given as a class project, far outweighed any other groups at 70%.

Comparing the individual language surveys with Table 3 below, the six language surveys are compared with their respective country and the English survey compared to the UK and EU numbers. Respondents are older

than the average age, educational level is typically higher as is annual income. While it is not possible to compare employment numbers given the different measurement criteria, employment figures for 2019 are still provided for an overview.

Table 3: Socio-demographic information at the country level

Country	Average age of population ([2020 est](#))	Adult educational level: (1) Below upper secondary (2) Upper secondary (3) Tertiary	Employment (2019) (as % of the population aged 20 to 64)	Average income annually
Austria	44.5	1) 14.7 % 2) 52.6 % 3) 32.7 %	76.8 %	41 600 €
Finland	42.8	1) 10.9 % (of 25-64 year olds) 2) 43.9 % 3) 45.2 %	77.2 %	40 720 €
Germany	47.8	1) 13.3 % 2) 57.6 % 3) 29.1 %	80.6 %	39 720 €
Poland	41.9	1) 7.6 % 2) 61.5 % 3) 30.9 %	73.0 %	11 890 €
Portugal	44.6	1) 50.2 % 2) (NA) 3) 25.0 %	76.1 %	18 530 €
Spain	43.9	1) 39.9 % 2) 22.9 % 3) 37.3 %	68.0 %	24 700 €
Sweden	41.1	1) 16.8 % 2) 39.9 % 3) 43.3 %	82.1 %	46 800 €
United Kingdom	40.6	1) 20.7 % 2) 33.5 % 3) 45.8 %	79.3 %	35 230 €
EU27	42.5	Not available	73.1 %	Not available

Median age: https://www.cia.gov/library/publications/resources/the-world-factbook/fields/343.html for EU: https://www.worldometers.info/world-population/europe-population/

Adult educational level: https://data.oecd.org/eduatt/adult-education-level.htm

Percentage of post-graduates by country:

Employment: https://ec.europa.eu/eurostat/statistics-explained/index.php/Employment_statistics

Average Income Annually: https://www.worlddata.info/average-income.php

Section 2: Schwartz Scale of Guiding Principles

The Schwartz Scale of Guiding Principles is a well-tested social science method that has established every major culture in the world shares fundamental values. There are four core motivations: Self-Transcendence, Conservation, Openness to Change, and Self-Enhancement. These are divided into ten motivational values: Universalism, Benevolence, Conformity, Tradition, Security, Power, Achievement, Hedonism, Stimulation and Self-Direction. And these are further broken down into 26 motivational goals, which are provided in the table on the following page. Please see the theoretical model for a visual representation as to how these relate to one another.

Schwartz's theory of universal values

Figure 1. Theoretical model of relations among ten motivational types of values
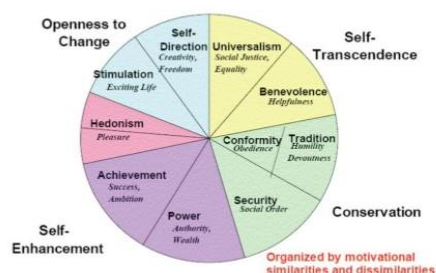
"Ten motivationally distinct value orientations that people in all cultures recognize" (quote and figure: Schwartz, underlined undated). Used with over 270 samples in 70 countries with different measurement instruments. The values are ordered according to two dimensions: Self Transcendence v. Self Enhancement; and Openness to Change v. Conservation. Values are positively related if they are close together, and antagonistic if they are on opposite sides of the circle.

The Schwartz Scale was used in the survey to see (a) which values are most important to Europeans and which ones are most contrary, (b) if European values align with the categories of the Schwartz Scale and (c) as SLO is values based, whether understanding the underlying values of people affects their attitudes toward mining and preferred approaches to SLO. People's perceptions of how important the respective values are is measured with a Likert scale where 1 is contrary to one's values, 0 is not at all important, 3 is important, 6 is very important and 7 is extremely important.

Table 4. Schwartz Scale of Guiding Principles: Individual Survey Responses (raw data across 7 surveys)

Schwartz Scale of Guiding Principles								
26 Potentially desirable ways of acting	10 Core motivational values	Core motivations	Eng n=77	Finn n=61	Ger n=49	Pol n=16	Por n=28	Spa n=18	Swe n=13
Fulfillment of duties (to complete tasks for which you are responsible)	Conformity	Conservation	5.12	5.93	5.49	5.75	5.54	5.83	5.62
Authority (to have the right to lead and decide)	Power	Self-Enhancement	3.8	2.97	3.82	3.33	4.25	4.06	4.69
Wealth (to have material possessions, money)	Power	Self-Enhancement	3.32	3.52	4.45	2.44	3.48	2.89	2.31
World peace (to strive for a world free of war and conflict)	Universalism	Self-Transcendence	5.09	5.3	5.06	6.0	5.29	4.78	5.69
Ambition (to work hard, to be goal oriented)	Achievement	Self-Enhancement	4.39	3.93	4.82	4.88	4.75	4.33	5.23
Harmonise with nature (lifestyle choices spend time in nature)	Universalism	Self-Transcendence	5.26	5.4	5.24	4.56	5.25	4.17	5.23
Family security (security for the people I hold dear)	**Security**	**Conservation**	5.66	6.27	6.45	6.63	6.04	611	6 23
Social justice (to oppose injustice, to care for the weak)	Universalism	Self-Transcendence	5.09	5.88	5.35	5.53	5.57	5.22	5.85
Influence (to be able to influence people and events)	Achievement	Self-Enhancement	3.8	3.47	4.43	2.67	3.75	3.61	4.15
Self-control (to be able to restrain oneself and to resist temptations)	Conformity	Conservation	4.11	3.75	5.06	4.33	4.96	4.61	4.69
Consider the environment (protect nature)	Universalism	Self-Transcendence	5.18	5.67	5.45	5.6	5.5	4.72	5.62
Social power (to be in control of others, to dominate)	**Power**	**Self-Enhancement**	1.61	1.55	2.08	0.73	2.75	0.72	1.54
Feeling of togetherness (to feel that others care about me)	Security	Conservation	4.34	4.07	4.86	3.93	4.43	4.0	4.92
Helpfulness (to work for the well-being of others)	Benevolence	Self-Transcendence	4.55	4.83	4.94	4.80	5.29	4.44	5.15
Respect Earth (to live in harmony with other species)	Universalism	Self-Transcendence	5.04	5.2	5.29	5.47	5.46	4.44	5.38
Enjoy life (to enjoy food, sex, pleasure)	Hedonism	Self-Enhancement/Openness to Change	4.88	4.81	6.06	4.47	5.14	4.83	4.15

Equality (to strive for equal opportunities among all people)	Universalism	Self-Transcendence	4.76	4.75	5.35	4.38	5.44	4.89	5.38
A beautiful world (to experience beauty in nature and art)	Universalism	Self-Transcendence	4.66	4.43	5.16	4.60	5.0	4.33	4.23
Honour parents and family (to show respect)	Conformity	Conservation	4.84	4.62	5.63	5.87	5.78	5.12	3.85
Thriftiness (to not be wasteful with resources and money)	Tradition	Conservation	4.86	4.8	4.96	4.93	4.7	4.33	4.0
Variation in life (a life full of challenges, happenings and change)	Stimulation	Openness to Change	4.21	3.73	5.59	3.53	5.19	4.11	4.08
Curiosity (to be interested in everything, to explore)	Self-direction	Openness to Change	5.16	5.03	5.41	4.47	5.37	4.78	4.77
Loyalty (to be loyal to friends)	Benevolence	Self-Transcendence	5.12	5.32	6.1	5.81	5.96	5.41	5.23
Pleasure (to satisfy desires)	Hedonism	Self-Enhancement/Openness to Change	3.92	3.2	5.65	3.0	4.96	3.94	3.46
Prevent pollution (stop pollution at personal cost)	Security	Conservation	4.82	4.78	5.19	4.87	5.07	3.94	5.0
Social acknowledgement (to be respected, to be liked by others)	Power	Self-Enhancement	3.78	3.41	4.88	4.27	4.7	3.39	4.77

Table 5: Schwartz Scale of Guiding Principles: Combined Survey Responses

Schwartz Scale of Guiding Principles			
26 Potentially desirable ways of acting	**10 Core motivational values**	**Core motivations**	**Average Score**
1. Fulfilment of duties (to complete tasks for which you are responsible)	Conformity	Conservation	5.28
2. Authority (to have the right to lead and decide)	Power	Self-Enhancement	3.56
3. Wealth (to have material possessions, money)	Power	Self-Enhancement	3.27
4. World peace (to strive for a world free of war and conflict)	Universalism	Self-Transcendence	4.97
5. Ambition (to work hard, to be goal oriented)	Achievement	Self-Enhancement	4.27
6. Harmonise with nature (lifestyle choices spend time in nature)	Universalism	Self-Transcendence	4.93
7. Family security (security for the people I hold dear)	**Security**	**Conservation**	**5.77**
8. Social justice (to oppose injustice, to care for the weak)	Universalism	Self-Transcendence	5.16
9. Influence (to be able to influence people and events)	Achievement	Self-Enhancement	3.57
10. Self-control (to be able to restrain oneself and to resist temptations)	Conformity	Conservation	4.21
11. Consider the environment (protect nature)	Universalism	Self-Transcendence	5.10
12. Social power (to be in control of others, to dominate)	**Power**	**Self-Enhancement**	**1.69**
13. Feeling of togetherness (to feel that others care about me)	Security	Conservation	4.15
14. Helpfulness (to work for the well-being of others)	Benevolence	Self-Transcendence	4.61
15. Respect Earth (to live in harmony with other species)	Universalism	Self-Transcendence	4.92
16. Enjoy life (to enjoy food, sex, pleasure)	Hedonism	Self-Enhancement/Openness to Change	4.79
17. Equality (to strive for equal opportunities among all people)	Universalism	Self-Transcendence	4.73
18. A beautiful world (to experience beauty in nature and art)	Universalism	Self-Transcendence	4.46
19. Honour parents and family (to show respect)	Conformity	Conservation	4.84
20. Thriftiness (to not be wasteful with resources and money)	Tradition	Conservation	4.48
21. Variation in life (a life full of challenges, happenings and change)	Stimulation	Openness to Change	4.18
22. Curiosity (to be interested in everything, to explore)	Self-direction	Openness to Change	4.86
23. Loyalty (to be loyal to friends)	Benevolence	Self-Transcendence	5.28
24. Pleasure (to satisy desires)	Hedonism	Self-Enhancement/Openness to Change	3.96
25. Prevent pollution (stop pollution at personal cost)	Security	Conservation	4.57
26. Social acknowledgement (to be respected, to be liked by others)	Power	Self-Enhancement	3.87

In answer to (a) the results are unanimous across all seven surveys: Family Security is the most important personal value and Social Power is the value most contrary showing that within the parameters of the survey, European values skew toward **security and universalism.**

To answer (b), a principal components analysis (PCA), a type of factor analysis, was conducted on the 26 motivational goals to see if statistically significant relationships between the various goals could be discerned. In a PCA, the order of components, or in our case 'clusters', matters. Cluster 1 would be the most significant

result because it connects the most variables, and by connecting them, accounts for the biggest spread of data. In short, it explains the most variance. Cluster 2 would explain the second most variance and so on. For the actual PCA statistical results, please see Appendix A.

Indeed, the value clusters did align closely with one exception, **conservation** appears to be the most important core motivation as it runs through all four clusters. The least important core motivation is **openness to change**. Below are the four clusters resulting from the PCA.

Group 1: Self-Transcendence and Conservation

Motivational Goals	Motivational Values	Core Motivations
Consider Environment	Universalism	Self-Transcendence
Respect Earth	Universalism	Self-Transcendence
Social Justice	Universalism	Self-Transcendence
Harmony with Nature	Universalism	Self-Transcendence
Prevent Pollution	Security	Conservation
Helpfulness	Benevolence	Self-Transcendence
World Peace	Universalism	Self-Transcendence
Equality	Universalism	Self-Transcendence

Group 2: Openness, Self-Transcendence and Conservation

Motivational Goals	Motivational Values	Core Motivations
Pleasure	Hedonism	Openness to change
Enjoy Life	Hedonism	Openness to change
Variation in Life	Stimulation	Openness to change
Beatiful World	Universalism	Self-Transcendence
Honour Parents	Conformity	Conservation

Group 3: Self-Enhancement and Conservation

Motivational Goals	Motivational Values	Core Motivations
Social Power	Power	Self-Enhancement
Influence	Achievement	Self-Enhancement
Social Acknowledgement	Power	Self-Enhancement
Feeling of Togetherness	Security	Conservation
Authority	Power	Self-Enhancement
Self-Control	Conformity	Conservation
Ambition	Achievement	Self-Enhancement

Group 4: Conservation

Motivational Goals	Motivational Values	Core Motivations
Fulfillment of Duties	Conformity	Conservation
Family Security	Security	Conservation

To answer (c), whether understanding the underlying values of people affects their attitudes toward mining and preferred approaches to SLO, correlations between the PCA of Schwartz Scale values were run against Question 1 (attitudes toward mining) but the relationships are not clear likely due to the sample size being small and the tendency to answer toward the midpoints of the Likert scale reducing the variation between answers and blurring the results. Still, there are some relationships and these are discussed in more detail in the next section.

This section shifts away from personal values and places the focus on attitudes toward mining. For all of the questions, the first table shows the survey results across the seven surveys followed by the results of the combined survey. It opens with a Likert-scale question asking respondents to rate how mining affects communities and society. It should be noted that the question numbers in this report do not correspond to the survey as only the quantitative data is provided in the report.

Q1: On a scale of 1-6 where 1 is harmful and 6 is beneficial: How do you think mining affects communities? How do you think mining affects society in general?

	ENG N=79	FIN N=60	GER N=49	POL N=16	POR N=30	SPA N=19	SWE N=11
How do you think mining affects communities?	3.30	3.80	4.67	4.06	2.73	5.11	3.82
How does mining affect society in general?	3.84	4.47	4.66	4.38	4.0	5.26	4.27

	AVERAGE N=264
How do you think mining affects communities?	3.60
How does mining affect society in general?	4.16

Results show that across all seven surveys, respondents thought that mining benefits society more than it benefits communities; although, in the German language survey, the results were essentially tied. Given 70% of the respondents are University students involved in mining, it is not surprising they think the effects of mining are positive and the same for communities and society. The English survey has the largest geographic spread and a similar demographic make-up to the other surveys and is therefore likely to be a better bell-weather regarding perceptions of mining across Europe. Here perceptions are at the midpoint of the scale indicating a more neutral attitude toward mining and perhaps also that benefits and risks are somewhat balanced. The biggest discrepancy is in the Portuguese survey where mining is perceived as beneficial for society while simultaneously being harmful to communities. The Spanish survey is the most positive toward mining, an unsurprising outcome since industry made up more than half of all respondents. The Polish survey is objectively the most positive toward mining with the Finnish and Swedish results showing a belief that mining benefits society more than communities. For all of the countries, focusing on how mining can benefit communities would likely improve attitudes toward mining as a whole.

The next several questions look at the preferred approaches to SLO.

Q2: On a scale of 1-6 where 1 is not at all important and 6 is very important, what is the importance of the following?

	ENG N=79	FIN N=62	GER N=49	POL N=16	POR N=30	SPA N=19	SWE N=13
a) Government capacity to regulate the mining industry	5.53	5.39	4.0	4.63	5.70	4.89	5.23
b) Trust in the mining industry to regulate themselves	3.62	3.95	4.12	2.88	2.67	3.53	3.62
c) Economic growth	3.87	3.66	4.37	5.13	3.50	4.95	3.62
d) Ensure responsible mining	5.60	5.46	5.53	5.13	5.83	5.53	5.54
e) Keeping things as they are	2.51	2.31	2.96	2.56	1.87	1.63	2.31

f) A fair legal system in the extraction of natural resources	5.67	4.95	5.20	5.38	5.40	5.42	5.31
g) A process that gives equal voice to all interested actors	4.87	4.39	4.57	4.81	5.37	4.26	4.31
h) Open communication between companies and affected actors	5.24	5.47	5.18	5.19	5.50	5.0	5.31
i) Action in response to community concerns	5.29	5.47	4.94	5.31	5.57	5.26	4.58
j) Sharing the revenue from resources development with the local community	4.64	4.77	4.02	4.88	3.83	5.42	5.25
k) Ensuring part of the profits are reinvested in society	4.70	4.97	4.43	5.25	3.79	5.58	5.42

	Combined Average N=268
a) Government capacity to regulate the mining industry	5.15
b) Trust in the mining industry to regulate themselves	3.47
c) Economic growth	3.92
d) Ensure responsible mining	5.54
e) Keeping things as they are	2.33
f) A fair legal system in the extraction of natural resources	5.33
g) A process that gives equal voice to all interested actors	4.77
h) Open communication between companies and affected actors	5.18
i) Action in response to community concerns	5.27
j) Sharing the revenue from resources development with the local community	4.39
k) Ensuring part of the profits are reinvested in society	4.50

The raw data indicates that in this grouping of approaches, which cover both community and societal SLO and address both government and industry approaches, 'ensuring responsible mining' (d) is the most important element for achieving SLO followed by 'a fair legal system in the extraction of natural resources' (f). This indicates that people want a system that ensures responsible mining and they look to the legal system first. Across all seven surveys, 'keeping things as they are' (e) was the least important, and strongly so, indicating room for improvement within the current 'mining system'.

In the combined survey, the results indicate the same trends both positive and negative. It is easier to see here that 'action in response to community concerns' (i) also ranks high and that issues around distributional fairness are less important both to communities and society. While trust in industry is just over the mid-point of the scale, the responses indicate that society favors government solutions over those of industry. Given Europe's strong governance and welfare states, it appears that solutions focusing on distributional fairness may not be as effective as in other countries.

The next question looks at the behaviour of companies both at the community and societal levels.

Q3: Regarding mining in the European context, on a scale of 1-6 where 1 is not at all important and 6 is very important, how important is the following:

	ENG N=78	FIN N=62	GER N=49	POL N=16	POR N=30	SPA N=19	SWE N=13
a) Mining companies have social acceptance for their operations	5.0	5.21	4.92	4.75	4.93	4.32	5.0
b) Acceptance for mining exists at the national, regional and local levels	4.86	5.13	4.84	5.06	4.93	3.68	5.08

c) Companies develop and use voluntary corporate social responsibility standards/sustainability protocols in addition to legal tools	4.71	5.31	4.48	4.44	3.77	4.21	4.69
d) Companies follow the existing legislation	5.60	5.84	5.59	5.75	5.27	5.11	5.77
e) Companies voluntarily go beyond what is required by legislation	4.90	5.08	4.10	3.81	3.87	4.16	4.77
f) Companies develop an on-going relationship with the general public and government	4.82	4.97	4.41	5.06	4.20	4.42	4.69
g) Mining companies are accountable to both government and the public	5.27	5.68	4.76	4.88	4.87	5.0	5.08
h) Those most affected by a mining project should have the most power to affect the outcome	4.53	4.36	3.98	3.94	5.40	3.47	4.0

	Combined Average N=267
a) Mining companies have social acceptance for their operations	4.92
b) Acceptance for mining exists at the national, regional and local levels	4.83
c) Companies develop and use voluntary corporate social responsibility standards/sustainability protocols in addition to legal tools	4.47
d) Companies follow the existing legislation	5.50
e) Companies voluntarily go beyond what is required by legislation	4.40
f) Companies develop an on-going relationship with the general public and government	4.56
g) Mining companies are accountable to both government and the public	5.09
h) Those most affected by a mining project should have the most power to affect the outcome	4.41

The answers to this question display more unanimity than in the previous one. 'Companies follow the existing legislation' (d) followed by 'Mining companies are accountable to both government and the public' (g) are strongly the most important elements with respect to companies achieving SLO. Companies must assure communities they are following existing legislation and government must demonstrate they will be responsible for regulating industry. Compliance with legislation is more important than companies demonstrating behaviors beyond it, but that is not to say company behavior is unimportant. The least important approaches also displayed more consensus and are 'Companies voluntarily go beyond what is required by legislation' (e) and 'Those most affected by a mining project should have the most power to affect the outcome' (h). As the answers tend to cluster to the mid-point of the scale and the sample size is small, it is difficult to make any definitive conclusions. Rather, the results are indications of what is important and what SLO approaches may be more successful than others.

The following question specifically tests the drivers of SLO as described in the MIREU SLO model (please see Appendix B).

Q4: For the acceptance of mining, on a scale of 1-6 where 1 is not at all important and 6 is very important, how important is:

	ENG N=78	FIN N=62	GER N=49	POL N=16	POR N=30	SPA N=19	SWE N=13
a) Pre-established, unbiased dispute resolution processes	5.19	5.15	4.38	4.88	5.17	4.32	5.0
b) Contact quality between company and community	5.13	5.06	4.90	5.25	3.90	3.68	5.17
c) Perceived procedural fairness (the community believes the company follows the laws and treats them respectfully)	5.32	5.40	5.20	5.25	5.53	4.21	5.38
d) Social benefits (more than money, the community believes the company will help realise their future vision)	4.67	4.50	4.63	4.81	4.48	5.11	4.17

e) Legal and procedural fairness (society believes government and regulations are trustworthy and industry observes the laws)	5.59	5.39	5.14	5.27	5.77	4.16	5.15
f) Confidence in governance (people trust the government will not politicise projects and regulate the mining industry according to law)	5.39	5.32	4.71	4.75	5.70	4.42	4.83
g) Distributional fairness (benefits from mining are distributed fairly to society)	4.82	5.15	4.52	4.75	4.24	5.0	4.92
h) Commodity (e.g. lithium, copper, construction materials)	4.23	4.23	4.77	4.63	3.77	3.47	4.50

	Combined Average N= 267
a) Pre-established, unbiased dispute resolution processes	**4.89**
b) Contact quality between company and community	**4.70**
c) Perceived procedural fairness (the community believes the company follows the laws and treats them respectfully)	**5.28**
d) Social benefits (more than money, the community believes the company will help realise their future vision)	**4.48**
e) Legal and procedural fairness (society believes government and regulations are trustworthy and industry observes the laws)	**5.34**
f) Confidence in governance (people trust the government will not politicise projects and regulate the mining industry according to law)	**5.11**
g) Distributional fairness (benefits from mining are distributed fairly to society)	**4.57**
h) Commodity (e.g. lithium, copper, construction materials)	**3.96**

For the acceptance of mining, 'Legal and procedural fairness (society believes government and regulations are trustworthy and industry observes the laws)' (e) and 'Perceived procedural fairness (the community believes the company follows the laws and treats them respectfully)' (c) are the most important and again highlight that the preferred solution for achieving SLO is via legislation and regulation and through ensuring companies follow the laws. The least important is 'Commodity (e.g. lithium, copper, construction materials)' (h).

The responses to Questions 2-4 led to several attempts at different statistical analyses. The first was to try and group the approaches through a PCA as that would shed light on what industry and regulators need to take into account when approaching stakeholders since these approaches are likely to be part of the discourse around any mining project. Indeed there were groupings from the PCA which were subsequently run against the individual Schwartz Scale values, but it was difficult to detect any clear patterns. We also ran correlations between employment and the PCA but there was nothing significant indicating it is not so clear that different occupations could be associated with specific views about mining. This validates earlier ideas that while traditional stakeholder mapping is always necessary and useful, perhaps also incorporating a values-based approach would speak to all stakeholders regardless of their typical 'identity'. Returning to the PCA on Q2-Q4, we developed 'stakeholder frames'. It should be noted that these are frames based on the drivers of the SLO model since those were the basis for Q2-Q4. To be clear, these are not the only frames that exist in relation to mining. The idea of the frames is not that one frame applies to a specific group or groups of stakeholders, but rather that these frames exist across Europe and when industry and government engage with communities or society at large, they should take into account these different frames. The important point is that all must be addressed and satisfied.

The PCA resulted in the following groupings:

Component 1: Q2(K & J) Q4(G & B) Q3(C) Q4(D) Q2(H)

The first iteration of a stakeholder frame resulted in 'Revenue distribution and the company as good neighbour and corporate citizen' which subsequently became Stakeholder Frame 1: The company works with the local community. This first frame believes companies should distribute revenue and social benefits at the local level. As part of this, good communication between communities and companies to negotiate this distribution is essential.

Component 2: Q3 (A, B, G, D, E, & F)

The first iteration was 'Local and societal acceptance, legislation, industry accountability' which became Stakeholder Frame 2: Mining is accepted and contributes to society. This frame believes that legislation and accountability are the foundations of societal SLO and that companies should go beyond existing legislation and be more communicative with the public at large.

Component 3: Q4 (E, C, A, & F) Q2 (A)

The first iteration was 'Governance, law and regulation, institutionalised processes' which became Stakeholder Frame 3: SLO tied to strong legislation and regulation. This frame values processes and capable bureaucrats. People want the mining process to be implemented in a fair and consistent way and to have assurances that companies will do what they are supposed to and be held accountable for following the regulations.

Component 4: Q2 (G) Q3 (H) Q2 (I)

The first iteration was 'Greater influence of stakeholders and emphasis on community concerns' which became Stakeholder Frame 4: Local self-determination and partnerships. Unlike Stakeholder Frame 1 that focuses on benefit distribution, Stakeholder Frame 4 wants local empowerment and communities to have more influence.

Component 5: Q2 (E & B)

The first iteration was 'No change and trust in industry' which became Stakeholder Frame 5: Self-governing industry. This Stakeholder Frame values the status-quo and believes that mining results in regional development and economic growth and therefore is beneficial for all. They do not see the need for more regulation or oversight.

Component 6: Q2 (D & C)

The first iteration was 'Responsible mining and economic growth'. Given the weak statistical relationship, however, we dropped this as a final stakeholder frame.

Regression of Q2, Q3, Q4 PCA against Q1 Community as Dependent

As there was little relationship in previous analyses using 'society' as the dependent variable, it was decided to focus on possible relationships between preferred SLO approaches and the importance one perceived mining to be for a community. The regression results show that Components 1 (The company works with the local community) and 6 (Responsible mining and economic growth) are significant indicating that those who have a more traditional view of SLO between company and community, where the company financially contributes to communities, would believe mining is beneficial. Component 4 (Local self-determination) is

strongly the reverse indicating that those who think communities should have a stronger voice and role would view mining as detrimental.

Q5: Should government mediate disagreements between communities and companies?

	ENG N=74	FIN N=59	GER N=49	POL N=16	POR N=30	SPA N=19	SWE N=12
Yes	85.14%	59.32%	81.63%	81.25%	90.0%	78.95%	66.67%
No	16.22%	37.29%	20.41%	25.0%	3.33%	15.79%	33.33%

	Combined Average N= 259
Yes	77.56%
No	21.62%

Here the raw data strongly indicates that Europeans believe government should have a mediating role between communities and companies if necessary. Although still a majority, it is interesting to note that Finland and Sweden have lower scores on this perhaps indicating a higher trust in companies and their ability to work out problems one-on-one with communities.

Q6: Should companies be responsible for resolving disagreements with communities by themselves?

	ENG N=73	FIN N=59	GER N=49	POL N=16	POR N=29	SPA N=19	SWE N=12
Yes	36.99%	62.71%	46.94%	62.60%	41.38%	78.95%	58.33%
No	58.90%	32.20%	53.06%	37.50%	58.62%	15.79%	41.67%

	Combined Average N=257
Yes	55.41%
No	42.53%

Answers to this question indicate some confusion, because in the free text box, a number of respondents answered that companies should initially be responsible for solving disputes with communities, but if the disputes cannot be resolved, then government should intervene. This may also indicate that some people may have interpreted it as companies bearing the costs of resolving disagreements, not just the negotiation or relationship part. Although the simple yes/no answers to this question do not tell the whole story, taken together with Q5, they do indicate that companies should take initiative to ideally prevent problems, but if they do occur then to try and first solve them by themselves.

Q7: On a scale from 1 - 6, how important do you think each phase of mining is when you think about the acceptance of mining?

	ENG N=75	FIN N=62	GER N=49	POL N=16	POR N=26	SPA N=19	SWE N=13
Exploration	4.73	4.52	4.29	3.0	5.50	3.79	4.62

Permitting	4.88	4.81	5.12	4.31	5.54	4.74	5.46
Construction	4.56	4.26	5.12	4.50	5.50	4.44	4.77
Operation	5.07	4.80	5.39	5.13	5.77	4.89	5.31
Closure	5.11	5.02	4.78	4.94	5.85	5.26	5.0

	Combined Average N=260
Exploration	4.35
Permitting	4.98
Construction	4.74
Operation	5.19
Closure	5.14

There is not a lot of differentiation between the various stages possibly indicating the respondents appear to basically accept mining and are more concerned about how it is done. The results could also indicate that all mining activities are viewed as 'mining' and that differences between exploration, mining and closure are not well understood.

Numerous responses in the free text box do indicate that 'post-closure' should have been added to the survey, hence, it is clear that latter phases of mining are of more immediate concern to Europeans, likely due to the majority of active projects being in operation or facing closure. It is interesting to note that the opposition to mining projects tend to be during exploration or permitting, however, the phases that are of most concern to those who at least accept the premise of mining are the latter ones.

Q8: In comparison to mining activities, how acceptable is the metallurgy industry?

	ENG N=69	FIN N=61	GER N=49	POL N=16	POR N=23	SPA N=19	SWE N=13
Worse	13.04%	0.0%	8.16%	18.75%	8.70%	15.79%	7.69%
Same	43.48%	44.26%	46.94%	31.25%	69.57%	31.58%	53.85%
Better	39.13%	52.46%	42.86%	37.50%	21.74%	52.63%	30.77%

	Combined Average N=250
Worse	10.30%
Same	45.85%
Better	39.58%

This question comes from the mandate of the MIREU project itself to look at both mining and metallurgy when considering SLO. Throughout the last two years, it has become clear that mining and metallurgy are not interchangeable terms. Mining is digging 'stuff' out of the ground whereas metallurgy is converting minerals into metals. Mines are located where the ore deposits are found, which tend to be in rural areas not so visible to people versus metallurgical complexes that are often sited in proximity to other industries

where the metals are utilised, e.g. in urban areas. Europeans view the two very differently and do not appear overly concerned about the metallurgical industry. This said, it is also clear that many are not so knowledgeable about it, and in terms of SLO, there is almost no literature looking at the connection between SLO and metallurgy. This needs to be researched but separate and apart from mining and SLO issues, at least in the initial stages of research.

1. Principal Components Analysis for the Schwartz Scale values.

Rotated Component Matrix[a]

	Component			
	1	2	3	4
1 Fulfilment of Duties	.366	.142	.131	**.708**
2 Authority	.139	.136	**.581**	.515
3 Wealth	-.139	.463	.382	.479
4 World Peace	**.677**	-.035	.157	.412
5 Ambition	.247	.288	**.514**	.458
6 Harmony with Nature	**.723**	.158	.130	.286
7 Family Security	.401	.288	-.012	**.652**
8 Social Justice	**.760**	.086	.205	.311
9 Influence	.198	.210	**.752**	.162
10 Self-Control	.390	.199	**.573**	.210
11 Consider Environment	**.822**	.172	.098	.161
12 Social Power	.020	.229	**.805**	.081
13 Feeling of Togetherness	.393	.354	**.598**	-.001
14 Helpfulness	**.679**	.343	.377	.138
15 Respect Earth	**.782**	.316	.074	.105
16 Enjoy Life	.177	**.726**	.256	.237
17 Equality	**.650**	.214	.365	.072
18 Beautiful World	.427	**.600**	.239	.106
19 Honour Parents	.339	**.530**	.196	.406
20 Thriftiness	.567	.499	.100	.163
21 Variation in Life	.209	**.700**	.265	.152

22 Curiosity	.372	.594	.198	.065
23 Loyalty	.407	.414	.290	.415
24 Pleasure	.108	**.760**	.411	.156
25 Prevent Pollution	**.721**	.330	.217	.030
26 Social Acknowledgement	.298	.343	**.653**	-.005

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

For a regression, the beta coefficient is the degree of change in the outcome variable for every 1-unit change in the predictor variable. The t-test assess whether the beta coefficient is significantly different from zero. If the beta coefficient is not statistically significant (i.e. the t-value is not significant), the variable does not significantly predict the outcome. If the beta coefficient is significant, then the sign of the beta needs to be examined. If the beta coefficient is positive, the interpretation is that for every 1-unit increase in the predictor variable, the outcome variable will increase by the beta coefficient value. If the beta coefficient is negative, the interpretation is that for every 1-unit increase in the predictor variable, the outcome variable will decrease by the beta coefficient value. A beta that is greater than 1.0 indicates a stronger relationship.

2. Schwartz Scale PCA regression with Q1 'mining affects community' as dependent variable

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.632	.114		31.889	.000		
	REGR factor score 1 for analysis 2	.007	.114	.004	.063	.950	1.000	1.000
	REGR factor score 2 for analysis 2	.386	.115	.208	3.344	.001	1.000	1.000
	REGR factor score 3 for analysis 2	-.443	.114	-.242	-3.882	.000	1.000	1.000
	REGR factor score 4 for analysis 2	.469	.114	.257	4.134	.000	1.000	1.000

a. Dependent Variable: question_9_row_1

3. Schwartz Scale PCA regression with Q1 'mining affects society' as dependent variable

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	4.301	.093		46.434	.000		
	REGR factor score 1 for analysis 2	-.036	.093	-.026	-.386	.700	1.000	1.000
	REGR factor score 2 for analysis 2	.130	.094	.092	1.387	.167	1.000	1.000
	REGR factor score 3 for analysis 2	-.129	.093	-.092	-1.387	.167	1.000	1.000
	REGR factor score 4 for analysis 2	.247	.092	.178	2.672	.008	1.000	1.000

a. Dependent Variable: question_9_row_2

4. Principal Components Analysis for Q2-Q4 (preferred approaches to SLO)

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
question_11_row_1	-.030	.773	.067	.176	.091	.172
question_11_row_2	.017	.762	.138	.134	.001	.156
question_11_row_3	.625	.436	.005	-.059	.178	-.138
question_11_row_4	.118	.588	.254	-.234	-.067	.110
question_11_row_5	.497	.541	.057	-.017	.008	-.126
question_11_row_6	.533	.536	.048	-.140	.196	-.052
question_11_row_7	.344	.591	.053	.128	-.045	-.090
question_11_row_8	-.140	.140	.154	.737	-.066	-.136

question_10_row_1	.018	.139	.505	.160	-.497	-.005
question_10_row_2	.223	.306	-.074	-.213	.610	.259
question_10_row_3	.232	.270	.014	-.301	.348	.457
question_10_row_4	.008	.202	.220	.158	-.029	.678
question_10_row_5	.137	-.042	.125	.092	.720	-.057
question_10_row_6	.182	-.164	.257	.434	.084	.161
question_10_row_7	-.026	.050	.107	.826	.033	-.043
question_10_row_8	.514	.226	.132	.217	.204	.152
question_10_row_9	.198	.070	.233	.641	-.163	.230
question_10_row_10	.814	.088	-.096	.148	-.102	.072
question_10_row_11	.833	.037	-.114	-.037	-.115	.145
question_12_row_1	.092	.190	.682	.112	-.005	-.353
question_12_row_2	.640	.203	.168	-.159	.274	-.196
question_12_row_3	.105	.106	.736	.085	.048	.045
question_12_row_4	.563	.016	.315	.052	.346	.080
question_12_row_5	-.003	.092	.762	.189	.065	.161
question_12_row_6	.049	.053	.677	.159	.020	.284
question_12_row_7	.730	.015	.251	.014	.189	.106
question_12_row_8	.426	-.180	.063	-.300	.218	.375

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Questions 10, 11 and 12 in the table are equivalent to Questions 2, 3 and 4 in the survey.

5. Regression of Q2, Q3, Q4 PCA against Q1 Community as Dependent

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.677	.073		50.236	.000
	REGR factor score 1 for analysis 3	.652	.073	.362	8.921	.000
	REGR factor score 2 for analysis 3	.261	.073	.145	3.574	.000
	REGR factor score 3 for analysis 3	-.143	.074	-.078	-1.929	.055
	REGR factor score 4 for analysis 3	-.876	.075	-.476	-11.724	.000
	REGR factor score 5 for analysis 3	.329	.073	.183	4.499	.000
	REGR factor score 6 for analysis 3	.569	.073	.316	7.781	.000

a. Dependent Variable: question_9_row_1

Drivers of (the loss of) SLO