

Empowering Supply Chain

AI-Driven Supplier Indexing and Recommendation



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Problem Statement

Understanding the structure and dynamics of the supply chain enables businesses to optimize their production and distribution flows and to prepare for potential disruptions.



Who are the critical suppliers? What are their characteristics?

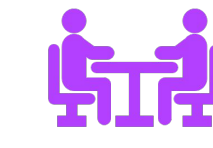
Where does a client company stand relative to its competitors?

Who are the best suppliers for the client company given industry patterns and client-specific needs?

Objective



Developing an indexing method **to identify key suppliers** in a supply chain



Building a recommendation system that **recommends the set of best potential suppliers** for any company of interest

Dataset

Factset Supply Chain Relationships

name, country, industry, partnership type, start/end date for each supplier-customer relationship.

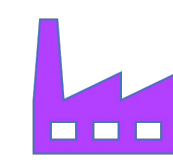
Factset Relevance Rank

Relevance grade assigned to suppliers in each customer-supplier relationship

Arabesque

Company-specific sustainability scores, rated based on Environmental, social and governance (ESG) indices

Pilot Industry:



Mining and Mineral

4065
Reported Relationships
2052
Unique Suppliers

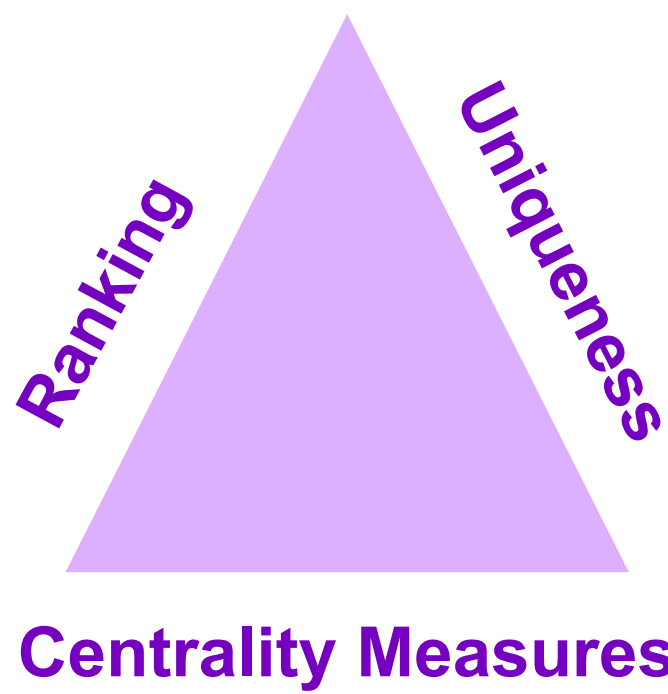
538
Unique Companies
74
Unique Countries

Methodology

Phase 1 – Supplier Indexing

Goal: Obtain a score representing the relative importance for each supplier

How valuable is the supplier to its downstream customers?

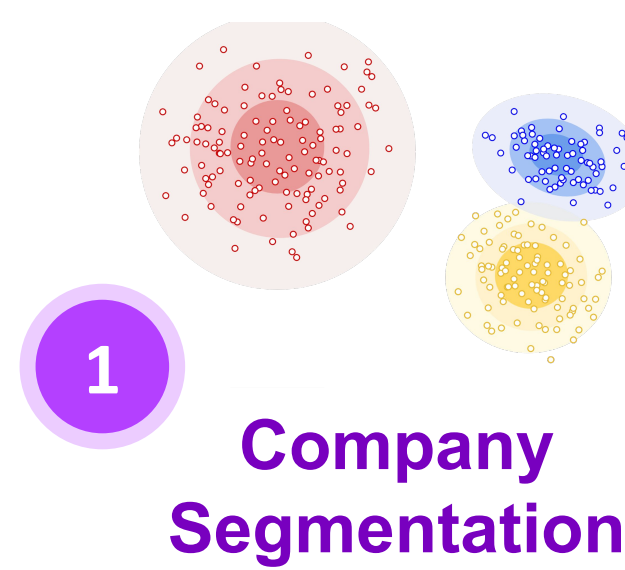


How replaceable is the supplier?

How important is the supplier from a network perspective?

Phase 2 – Supplier Recommendation

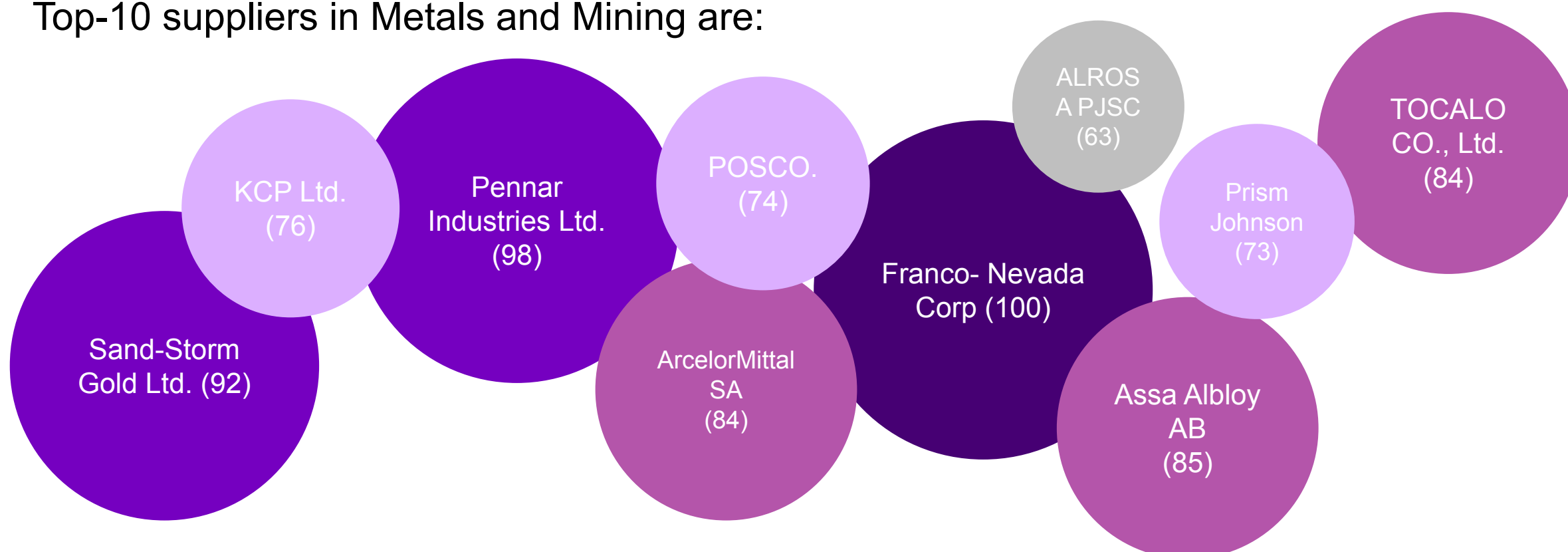
Goal: For a target company, recommend the set of best suppliers given industry patterns and client-specific needs



Results

Phase 1 – Supplier Indexing

Top-10 suppliers in Metals and Mining are:



Phase 2 – Supplier Recommendation

Ex. "I want the **TOP 5** suppliers that are in **Mining and Mineral** and have **sustainability scores above 50 in Canada** "

Number of Recommendations needed: Sustainability Cutoff:

Canada

Mining and Mineral Products

supplier_id	supplier_name	supplier_country	supplier_industry	supplier_sustainability_rating	rounded_rating
06LBVF-E	Lundin Mining Corp.	Canada	Mining and Mineral Products	61.45	6.08
06LTWP-E	First Majestic Silver Corp.	Canada	Mining and Mineral Products	73.98	5.57
001YSZ-E	Pan American Silver Corp.	Canada	Mining and Mineral Products	64.67	5.33
003PGF-E	Yamana Gold, Inc.	Canada	Mining and Mineral Products	70.37	4.98
05DZGZ-E	Barrick Gold Corp.	Canada	Mining and Mineral Products	65.62	4.95

Figure. Web-based Interface Display of the above query

Business Impact



21.4% improvement in RMSE compared to the baseline



Expected to **save over 21,000 work hours** if applied to all companies in Mining and Mineral



Customizable recommendation results from Web Interface



Highly adaptable to other industries

Future Works

Short Term:



Expand drivers in previous analysis



Improve on interactive user interface

Long Term:



Simulation

What happens after we recommend a potential partnership for a target company? How would the entire network and supply chain change after the target company establish new partnership?