

Case Analysis

Overview

e² -ISM Inc. is a Hydrogen Fuel Cell (HFC) company established in 2015. The company entered the Hydrogen fuel cell (HFC) market with an innovative technology that enabled a 100X performance increase in the power delivery system of the HFC, thus scoring an alternative to the Lithium-ion Battery within the Electric Vehicle global market. The turnover of the company is \$8.5 billion, and the company has 3 lines of products- HFCe2-6300 (1st generation), the HFCe2- 7300 (2nd generation), and HFCe2-8300 (3rd generation) slated for production in 2023. thus, second and third-generation HFC is facing challenges from procurement as there are only two major suppliers in the market, and one of them is planning to exit, thus leading to the high bargaining power of the supplier. There are other suppliers as well in the market, but their procurement volumes are low and also few have low-capacity utilization. The company went public in 2017 and retained investors' trust in the company's product strategies and growth up to 2021. From 2022, shareholders have started developing apprehensions about its earnings, Gross profit margins, and projected growth vis a vis its competitors.

Executive summary

By identifying the variables we can impact with a holistic approach, we can propose changes in different areas and operations of the company.

1. Inventory management
2. Organizational structure
3. Supplier segmentation
4. Sourcing Strategy
5. Conclusion

Strategy and actions

With the available data, we can suggest:

1. Reduction of Inventory levels

Currently, the inventory turnover is 4.28 which is much lower than the industrial average of 7.0. Here are the strategies on how to manipulate the levers of control on inventory to reduce it with a minimum negative effect on the revenue.

The first lever of control over the inventory is service level. Currently, the company is trying to maintain a service level of 99.99%, which is causing some excess inventory to be held in the warehouses until they become obsolete.

We offer a three-year strategy of gradually lowering service levels to 95% as the best-case scenario and 97.5% as the worst-case scenario.

Understanding the brand image of “always in hand” that the company might have already established could be compromised and the company can lose the trust of its clients, and we offer to lower service levels step by step in combination with a new promotion strategy.

Calculating the effects of different service levels on the total inventory, we can see that with a reduction of service levels, we can save money on inventories. Part of that capital can be used to meet the unmet demand due to lower service levels.

In the first year, we offer to set SL at 99.5% and provide discounted pre-ordering options for the customer demand that could not be satisfied with the on-hand inventory.

Next year, depending on the success of the preordering promotion, we can lower the service level either to 99% as the worst-case scenario or 97.5% as best case scenario. There should be some more emphasis on marketing discounted pre-orders for the further success of the project.

In the third year, we should lower it further either to 97.5% or 95% again depending on the progress we make with the marketing of the promotion.

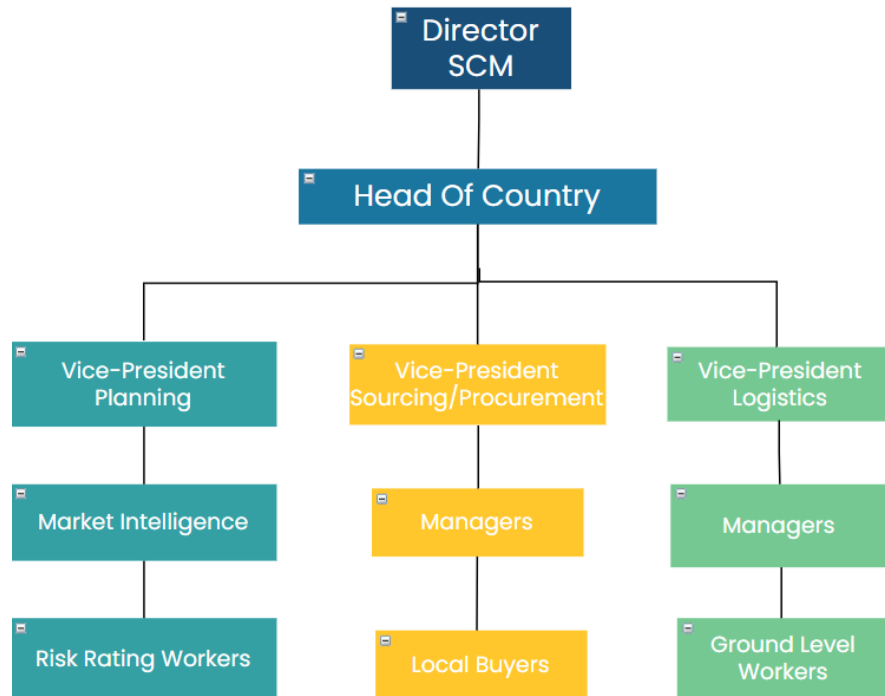
In case the promotions get successful enough, we can keep lowering the service level as low as 90% as the best-case scenario.

This alone can increase the inventory turnover to 1.0-2.0 points depending on the level of service. Another strategy for leveraging inventory would be the implementation of IT capabilities available in the market that can enable 2 pivotal capabilities: demand forecasting and virtual pooling. We can create a unified internal platform that includes all the internal data available and creates demand forecasts. The software can be used to find possible stockouts in the warehouses and proactively prevent them by finding the excess inventory in the closest warehouses. Further, for better forecasts, the platform can be provided with customers’ and other external users’ data. The combination of these techniques should provide the company with the ability to increase the inventory turnover even higher than the industrial average of 7.0

2. Redesign the organizational structure.

By implementing category management, inventory can be classified in 3 groups based on cost and frequency of use as well as the revenue they generate.

a. Center-led organizational chart.



b. Calculated total headcount required.

Specifics	Values
Industry Avg FTE (Supply chain Dept) per billion Revenue (\$)	22
Based on industry avg -supply chain strength of e2 -ISM should have	187
Actual manpower in supply chain dept of e2 -ISM	258
Excess FTE over industry avg in supply chain dept	71.00
Avg Exp per supply management FTE	
Operating Expense (\$)	147795
Salary (\$)	123164
Talent development (\$)	1265
Total exp per supply management FTE (\$)	272224
Total extra expense bore by e2 -ISM in maintaining Excess FTE over industry avg (\$)	19.327.904

Category Management

For most companies, 80% of the revenue comes from 20% of the stock.

c. New and existing roles

Existing roles: Category Managers, local buyers, ground-level workers

New Roles: market intelligence, and risk rating workers.

To reduce the expense invested in the 71 additional employees, we can incorporate the below contracting schemes and gradually close the positions that are not required.

Commission-based salaries

The buyer's pay will be following a straight commission policy where they earn a percentage of the revenue they generate. In other words, the buyer earns a commission on each sale they make, without any base salary component.

Scorecards to determine performance:

We can score an employee based on a few metrics as follows:

Operation metrics: These can include productivity, efficiency, and capacity utilization measures.

Sales Metrics: These can include sales volume, sales growth, and sales conversion rates.

Compliance Metrics: These can include compliance with regulatory requirements and adherence to policies and procedures.

At the end of each quarter, buyers will be evaluated and downsized accordingly based on the scorecards(performance).

3. Supplier segmentation

Not all suppliers can be treated equally. There must be a strategy to segment and prioritize supplier attention by their value or the company.

Gartner (2023) has done extensive research on supplier segmentation and provided a segmentation tool that we believe could be well adapted to the suppliers the company uses. Even if the supplier database is still rather small, efforts should be prioritized to make sure the suppliers that have more value for the company can be part of innovation efforts and have more resources allocated to them.

As much as e²-ISM Inc. only has two suppliers for Neodymium and Terbium from China, many other items are purchased, and a proper classification could result in interesting opportunity discoveries.

In concordance with the described Category Management strategy, the Gartner model research and segmentation tool would be very suitable for the case.

The main variables to consider are:

- *Spend* (historic spend of the last year). This value is adjusted with the aid of the standard deviation to make sure that it does not outweigh other variables.
- *Criticality*, evaluating how dependent we are on a certain supplier

- *Risk*, which will provide feedback on the overall status of a supplier and the risk it may present to the company

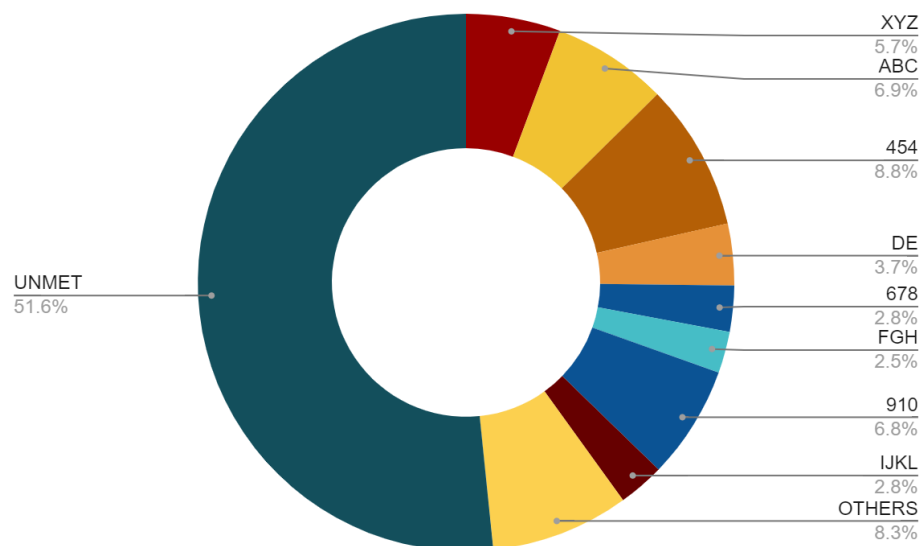
These last 2 variables have ratings based on scorecards and we believe there is the possibility of incorporating an observation for sustainability.

As many companies are still in their early efforts, to have a sustainability policy, an implemented program, or to be in a more mature stage of sustainable actions, sustainability could be a variable included in a scorecard to be able to measure their efforts and get one final rating.

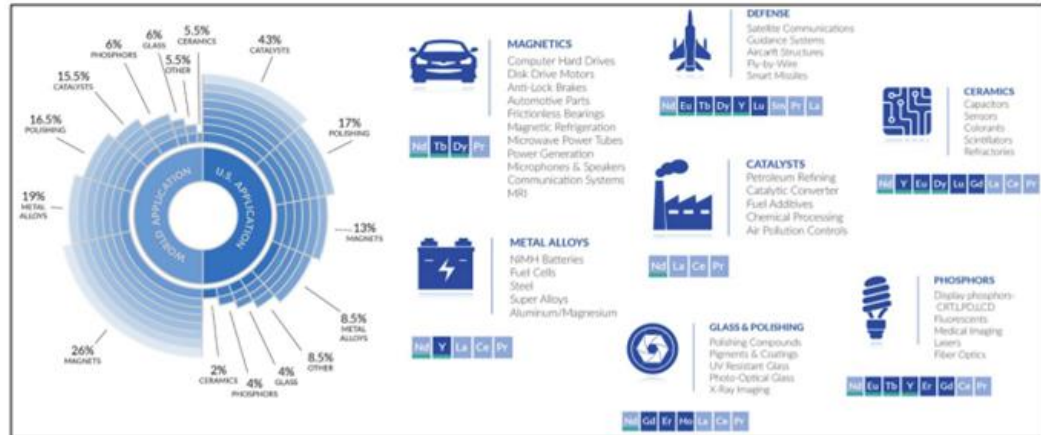
The steps to supplier segmentation would be to get the suppliers that represent 80% of the total spend. Once these are filtered, their spend is adjusted by using the standard deviation. We would also get a criticality score based on a scorecard, and with a decision tree formula, we can locate the suppliers in different segments. Once they have been allocated to their segment, we incorporate risk and determine the risk priority. Finally, in a similar manner to the incorporation of risk, we could include the sustainability score.

4. Sourcing strategy for REE

Based on the provided data, and since one of the suppliers will be exiting the market, we can see that there will be a portion of demand that will not be satisfied by the existing suppliers.



To be able to determine the sourcing strategies, we had to learn more about rare earth materials (the main component for HFCs).



Source: National Energy Technology Laboratory (NETL), "REE-CM Program," <https://www.netl.doe.gov/coal/rare-earth-elements/program-overview/background>.

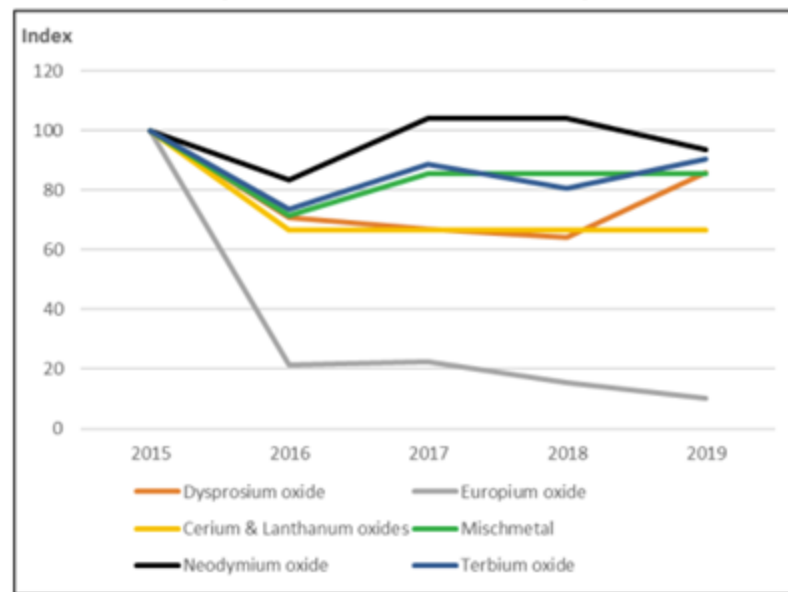
"Hydrogen fuel cells use hydrogen as a fuel in an electrochemical process that combines hydrogen and oxygen to produce electrical energy and water. The reverse process of electrolysis, which produces 'green' hydrogen and oxygen from water, can use a range of renewable energy resources (wind, wave, solar) to produce hydrogen as a fuel for renewable power generation". (TWI [twi-global.com](https://www.twi-global.com))

These materials are the most abundant in the universe and they have presented great opportunities and options. However, hydrogen does not exist by itself in the Universe, and it has to be extracted from water or separated from carbon fossil fuels. Both these methods require a significant amount of energy to achieve and the gain from hydrogen itself might be shadowed by this cost and using carbon fossils.

Ree (Ns and Tb) market outlook and risks

Typically, 60% of REE consumed domestically is used in catalysts (e.g., oil refineries, automobiles); the remainder is typically divided (around 10% each) among metallurgical applications and alloys, ceramics, glass, polishing, and other uses. Prices vary greatly among REEs; two examples from 2018 include \$455 per kilogram of terbium oxide and \$2 per kilogram of lanthanum oxide. Price trends for REE appear to have stabilized after China lifted its export restrictions. (CSRE reports, 2020)

Figure 3. Relative REO Price Changes



Source: CRS calculations using nominal price data from U.S. Geological Survey, *Mineral Commodity Summaries*, 2020, p. 132.

Notes: Cerium and Lanthanum oxide values are identical. See source for purity grade of each category. Mischmetal is an alloy of REE. Values for 2019 are estimates.

Prices are rather stable for both Nd and Tb, however, given the more extended use and the fact that China may pose new restrictions, prices may also increase if there are no new suppliers. If demand grows and there is no supply increase, prices may be affected.

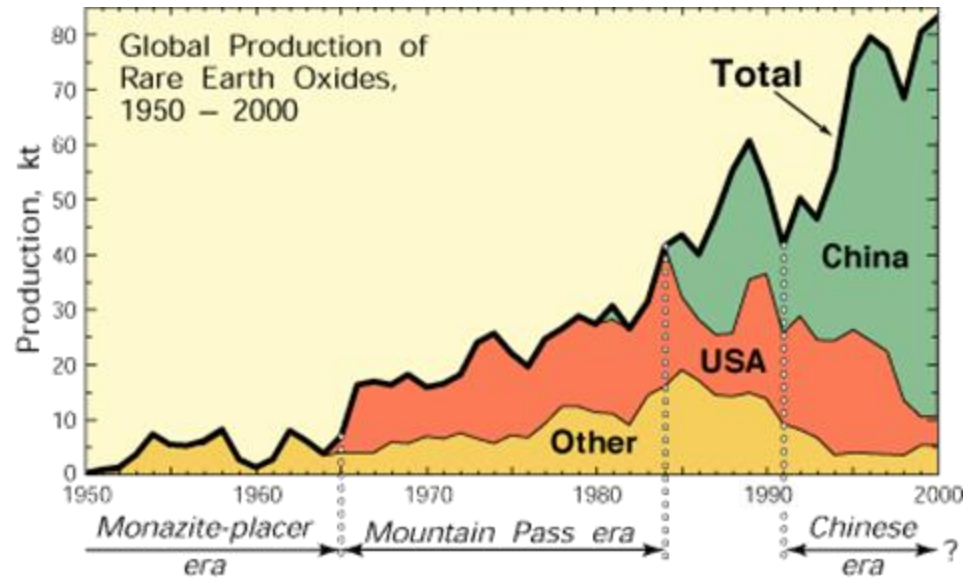
Innovation opportunities are to come, and the market will be very dynamic to these changes. This means there must be a quick turnover of goods to avoid obsolescence.

Innovation may come from within the organization or from other market competitors or even new actors.

Strategic sourcing plan to achieve projected product growth.

1. New suppliers and strategic alliances for in-house (US) production

Supply of RRE, specifically Tb and Nd is still very dependent on China. However, there are other parts of the world where these elements can be found. (United States Geological Survey, 2022)



Source: <https://pubs.usgs.gov/fs/2002/fs087-02/> report of 2002

USA, India, Sri Lanka, and Brazil) have both components and market intelligence should be able to do research and benchmarking for potential suppliers in these or other regions. In addition, there are bills in Congress to incentivize in-house (US) production. This is a possible advantage for the company.

By segmenting its suppliers, the company can select strategic suppliers in the Category of raw materials and the model of Corporation- Cooperative proposed by S. 2093 and H.R. 4410 Bill of Congress. This model can also benefit from the proposals of tax incentives and research investment proposed in the same document and be aligned with other propositions and strategic alliances to increase the US production of supplies. (Congressional Research Service, 2020)

2. Sourcing events

Based on the market intelligence report and the information provided in the case, the suppliers should be invited to participate in a sourcing event.

This sourcing event should be prepared based on the most important factors that need to be evaluated for potential new suppliers. These are market and commercial terms, logistics, and risk ratings, plus additional benefits that they may provide.

Scorecards should be prepared for evaluation. These should include:

- Price
- Lead time (which has an effect also on inventory)
- Capacity
- Investments forecast
- Shipping methods
- Location
- Benefits

Risk rating processes should also be put in place as well as criticality scores based on specific criteria.

At the end of the sourcing event and once suppliers are selected, long-term contracts should be negotiated, especially considering the market's forecast for price increases due to higher demand and insufficient supply. Negotiation of master agreements with caps for price increases from period to period and service level agreements is key. This same kind of contract should be re-negotiated with existing suppliers as soon as possible.

As seen before by decreasing the service level, we would also decrease the revenue. therefore, we should consider the possibility of reducing the lead time, and this can be achieved by also analyzing each location's demand and establishing the possibility of pooling.

3. Explore the alternative to recycling

Based on the research on the characteristics of REE, proton exchange membranes are highly recyclable. Processes for recycling and re-use are being researched and developed constantly. Platinum, Palladium, and Ruthenium can be reclaimed and therefore used. (Hydrogen and Fuel Cell Technologies Office | Department of Energy)

We would suggest that as part of the new in-house strategy and in joint efforts with suppliers, there is development and implementation of recycling capabilities since sometimes the extraction processes of sustainable materials can also create an important impact on the environment and so can the disposal.

Conclusion

Based on the presented analysis and the holistic approach to identified problems, the internal and external changes proposed would radically change the performance of the company and positively impact profit.

- ❖ With the management of inventory and service levels and by implementing the proposed organizational changes, we would increase internal efficiency.
- ❖ The implementation of supplier segmentation and a sourcing strategy would allow us to better manage suppliers and the market as well as the external impact.

Constant re-evaluation and iteration are very important to remain a strategic enterprise.

References

1. *4 types of key performance metrics to track (with examples)*. (n.d.).
<https://www.indeed.com/career-advice/career-development/key-performance-metrics>
2. Category Management

<https://www.gsa.gov/buy-through-us/category-management#:~:text=Category%20Management%20is%20the%20practice%20of%20buying%20common,supplies%2C%20travel%20and%20lodging%2C%20housekeeping%20services%2C%20and%20more.>
3. <https://www.gartner.com/en/documents/3904069> TWI (What are the Pros and Cons of Hydrogen Fuel Cells? - TWI (twi-global.com))
4. Sourcing and Procurement, Gartner 2023 <https://www.gartner.com/en/supply-chain/role/sourcing-procurement-leaders>
5. *Rare earth elements—critical resources for high technology: USGS fact sheet 087-02*. Rare Earth Elements - Critical Resources for High Technology | USGS Fact Sheet 087-02. (n.d.). Retrieved March 4, 2023, from <https://pubs.usgs.gov/fs/2002/fs087-02/>
6. *Congressional Research Service – An overview of Rare Earth Elements and Related Issues for Congress* (n.d.).from <https://crsreports.congress.gov/product/pdf/R/R46618>
7. *Hydrogen and Fuel Cell Technologies Office*. Energy.gov. (n.d.). from <https://www.energy.gov/eere/fuelcells/hydrogen-and-fuel-cell-technologies-office>