
How to Assess Supplier Flexibility?

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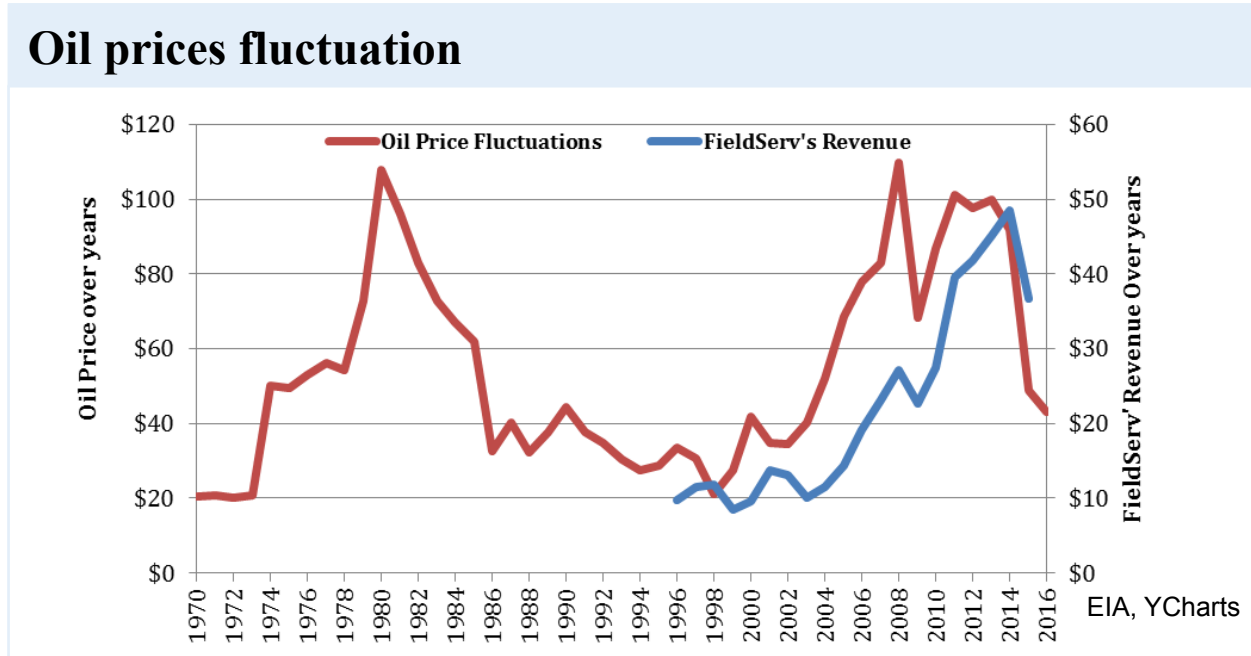
MIT SCM Research FEST

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Agenda

- Introduction
- Methodology
- Findings
- Recommendations

Oil price fluctuations present challenges for companies in the O&G industry



Oil prices downturns

- Layoffs - 42,000 in 2015 (25%)
- Supplier bankruptcies
- Increased prices
- Supplier switching

Oil prices upturns

- Difficult to secure capacities
- Potential supplier bottlenecks
- Missed revenue opportunities
- Supplier development costs

A more flexible and agile supply chain can help companies to overcome the challenges

“Agility is critical, because in most industries, both demand and supply fluctuate more rapidly and widely than they used to.”

*-By Haul Lee
from Stanford University, The
Triple-A Supply Chain, Harvard
Business review*

“..., when a company increases supply chain flexibility, it can both withstand significant disruptions and better respond to demand fluctuations.”

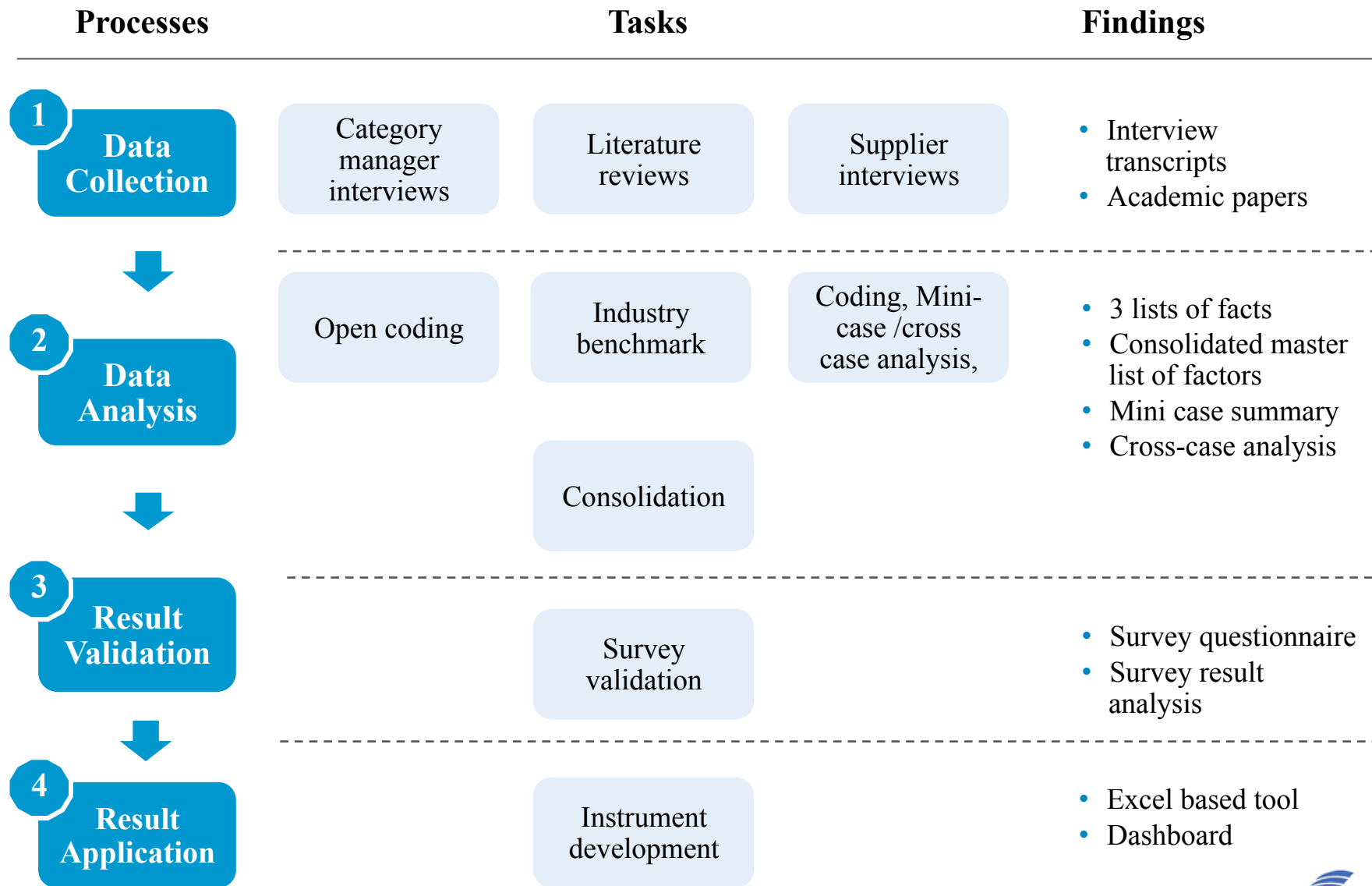
*-By Yossi Sheffi
from Massachusetts Institute of
Technology, Building a Resilient
Supply Chain, Harvard Business
review*

Our task is to figure out how to assess companies' flexibility, especially for companies acting as suppliers in the O&G industry

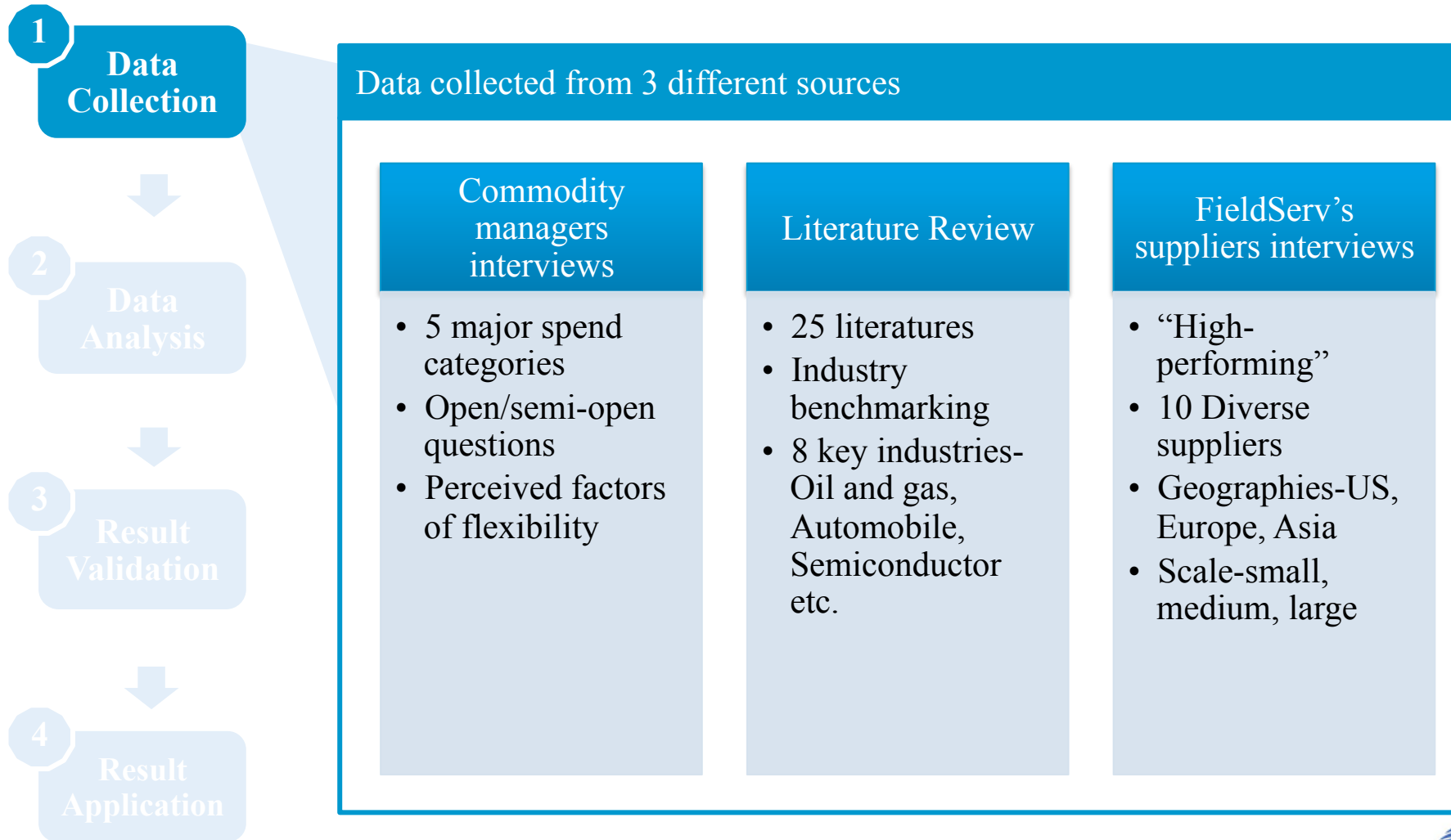
Our objectives:

- Develop an understanding of flexibility factors
- Develop a self-administered tool to assess
supplier's flexibility

We took a 4-step approach in our project



Data are collected through FieldServ category managers interviews, supplier interviews and literature reviews



Through interviews with FieldServ, we gained insights of the O&G industry and its internal understanding of flexibility

1
Data
Collection



2
Data
Analysis



3
Result
Validation



4
Result
Application

Highlights of category manager interview insights

“Downtime is very expensive in the oil and gas industry!”

“If a supplier is less dependent on the oil and gas industry, it is more likely to survive the oil downturns and provide consistent service.”

“Companies that are more vertically integrated would have more secure access to products and services.”

“The financial stability of a company is a good indication of whether the company can survive business downturn.”

Literature reviews provide insights from various industries regarding what factors contribute to flexibility

1 Data Collection



2 Data Analysis



3 Result Validation

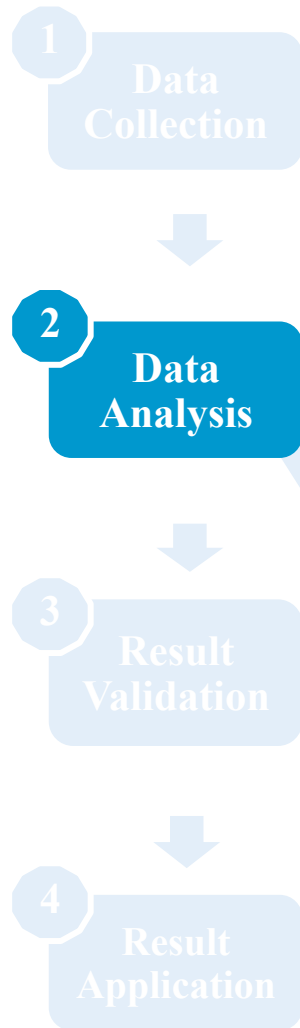


4 Result Application

Example of findings from literature reviews

Literature	Industry	Factors of flexibility
Sivapornpunlerd & Setamanit (2014)	Oil and gas	Inventory & capacity flexibility, negotiability
Thomé et al. 2014	Automobile	Volume and inventory flexibility, trust
Vickery et al. (1999)	Furniture	Volume, launch and distribution flexibility
Geissbauer & Householder (2011)	Semiconductors	Supplier relationships and information sharing
Li & Kouvelis(1999)	Manufacturing	Flexible contracts
Tachizawa & Giménez (2009)	Manufacturing	Joint planning, delivery and logistics flexibility

We summarized 7 mini-cases, each demonstrating different approaches suppliers took to be flexible : Supplier A



Mini-case summary: Supplier A (Small private Canadian supplier)

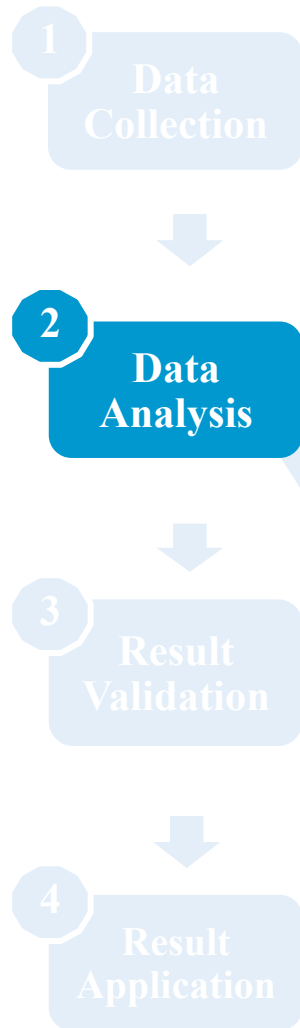
Background:

Machine parts supplier, 65 employees, single manufacturing facility, private, 25 years experience in O&G, 30-40% layoffs.

Company initiatives:

- Diversifies into other industries and different sectors of oil and gas.
- Streamlines its production and operations to cut down lead-times
- Invests in expensive cutting tools to increase productivity and yield
- Shares customers' forecast with sub-suppliers
- Encourages sub-suppliers to carry more inventory to reduce raw material lead-time

We summarized 7 mini-cases, each demonstrating different approaches suppliers took to be flexible : Supplier B



Mini-case summary: Supplier B (Large public U.S. supplier)

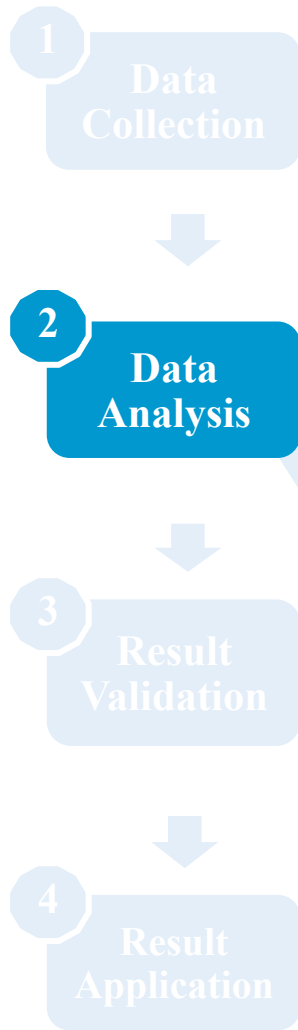
Background:

Electronics assemblies supplier, 200,000 employees, multiple manufacturing facility, public listed, flexible work force, 10% layoffs

Company initiatives:

- Well diversified into other industries
- Shares forecasts with sub-suppliers
- Manufacturing and capacity flexibility- multiple versatile facilities
- Ability to respond quickly to information during upturn and downturn
- Dedicated business intelligence team
- Flexible supply agreements with sub-suppliers

Cross case analysis is conducted to learn the difference and similarities among mini-cases



Cross-case analysis example

Factors mentioned in interviews	Supplier A	Supplier B	Supplier C	Supplier D	Significance (count of times mentioned)
Business diversification	Diversified into sectors		15% revenue from O&G	Less than 10%	3
Cut down lead time	to shorten lead time	Invest in equipments		High level automation	3
Push inventory to vendors	Yes		Yes		2
Make to order		Yes	Yes	Yes	3
Leverage customer forecast	Yes				1
Do not rely on customer forecast		Yes	Yes	Yes	3
Hedge on some specialty materials	Yes			Yes	2
Market insight team	Yes	Yes			2

To validate the relevance and test the importance of flexibility factors identified, we developed a survey



Supplier flexibility factor survey

* 1. How do you rank the following factors in their order of importance that lead to an organisations' flexibility to adapt to changing market conditions?

	Unimportant	Of Little importance	Moderately Important	Important	Very Important
Business portfolio diversification to non-oil and gas sectors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ability to reduce raw material purchasing lead-time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ability to production lead-time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ability to reduce delivery lead-time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inventory flexibility(policy to keep buffer inventory in good times vs. lean inventory in bad times)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Could you think of any other factors, which you believe, are contributing to supply chain flexibility in your company which did not appear in the list in first question?

All factors are rated at least moderately important through our survey

1 Data Collection

2 Data Analysis

3 Result Validation

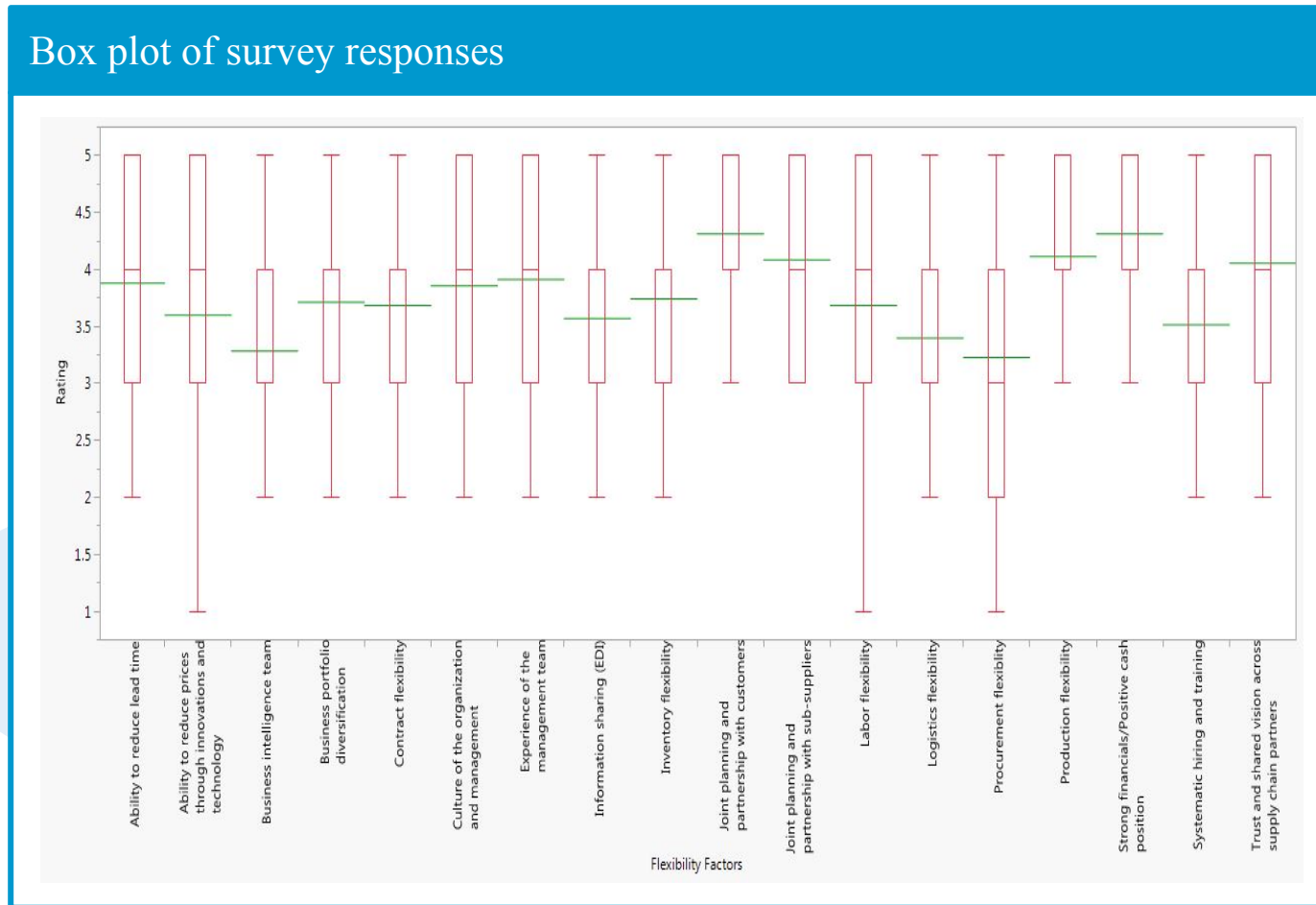
4 Result Application

Survey result

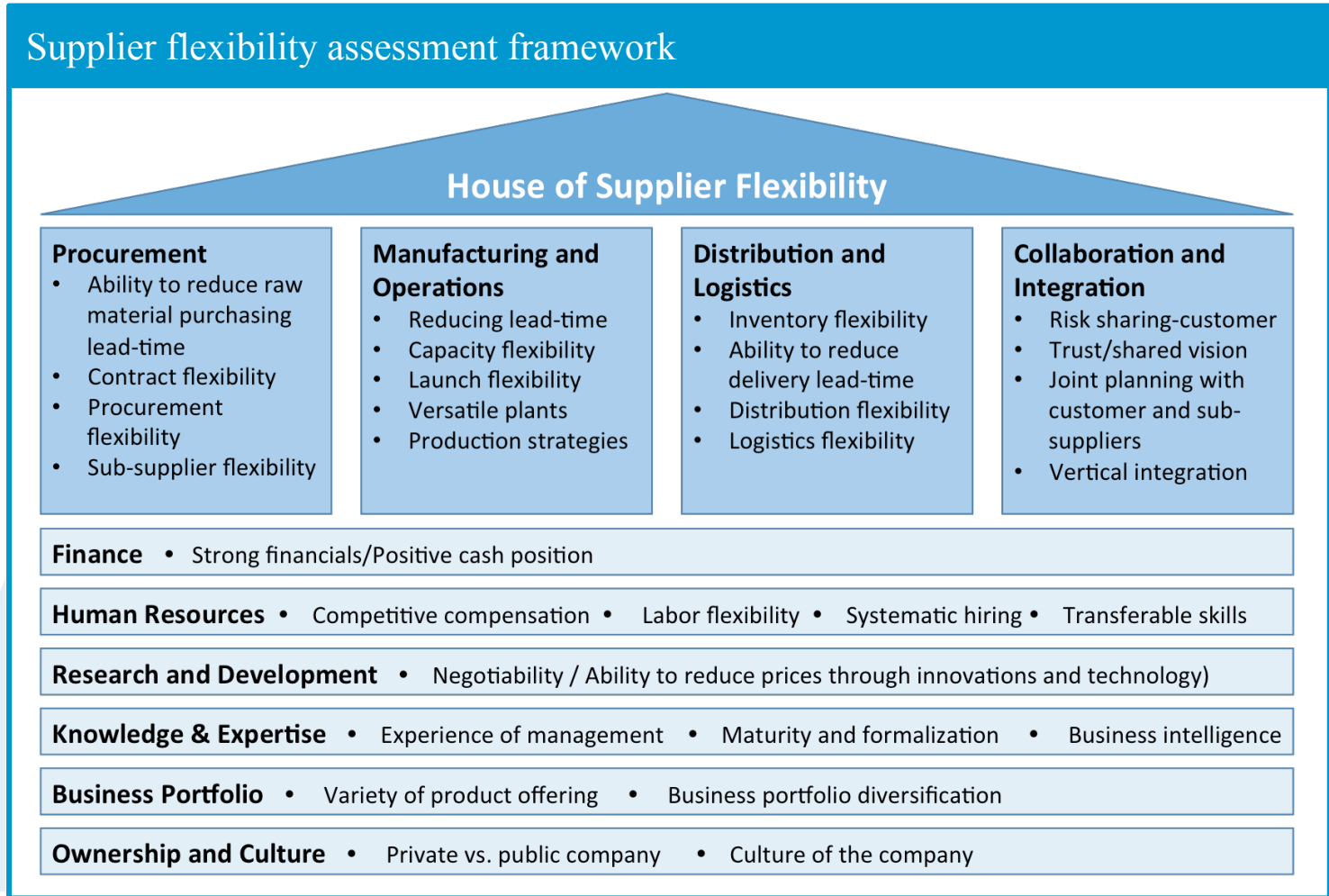
Ranking by importance (5- most important, 1-least important)



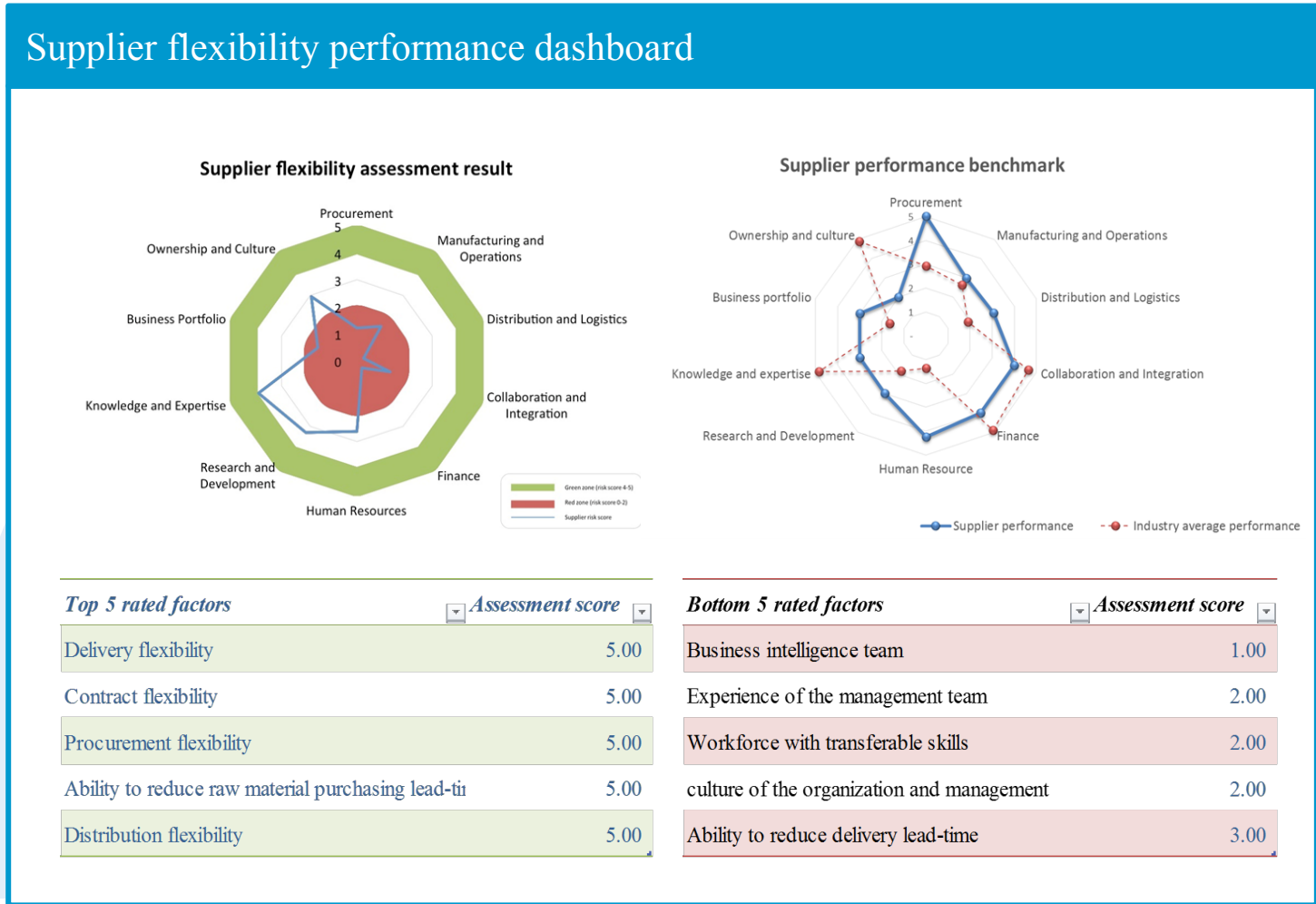
Variation among responses is small



According to similarities among factors, we developed a supplier flexibility framework



Building on the House of Supplier Flexibility, we developed an excel based assessment tool



Recommendations

- Educate suppliers and increase the awareness of challenges in cyclical industries
- Combine flexibility evaluation into supply selection and development process
- Benchmark and track suppliers' flexibility performance



**Q&A
TIME**

A graphic featuring the text "Q&A TIME" in a bold, white, sans-serif font with a thick black outline. The text is centered against a background of purple and magenta rays radiating from the center, creating a sunburst effect. The entire graphic is framed by a black border.