Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

SKU: 9781259549724-SOLUTIONS

CHAPTER 2
STRATEGY AND SUSTAINABILITY

Discussion Questions

1. What is meant by a "triple-bottom-line" strategy? Give an example of a company that has adopted this type of strategy.

   A triple-bottom-line strategy places emphasis on a company's environmental and social responsibilities as well as the traditional bottom line of economic prosperity. It recognizes that the long-term health of the firm is interdependent with the health of the environment and the betterment of society. There are many examples – one is Kraft Foods. For details see their current sustainability page:

   http://www.kraftfoodsgroup.com/DeliciousWorld/sustainability/index.aspx

2. Find examples where companies have used features related to environmental sustainability to "win" new customers.

   Car companies use environmental concerns in marketing ads. The development of hybrid and flex-fuel cars is one way they have operationalized those concerns. Consumer goods companies display the "made with recycled material" logo on the packaging. Bottled water manufacturers are using and advertising bottles made with less plastic.

3. What are the major priorities associated with operations and supply chain strategy? For each major priority, describe the unique characteristics of the market niche with which it is most compatible.

   - *Cost: In most every industry, there is a market segment that is very price sensitive. Firms that can supply goods or services at the lowest price will have an advantage there. This requires extremely efficient operations with a continuous focus on cost minimization. As a result, large production volumes are often required to successfully compete here.*

   - *Quality: Similar to the low-cost focused customers, most industries will encounter a market segment willing to pay more for a higher quality product. Typically these goods and services will not be commodity products. Customers may focus on design quality (feature sets, materials, etc.), process quality (fit and finish, reliability, etc.) to differing levels based on the industry.*

   - *Delivery speed and reliability: When a customer has a dire and need for a good or service, companies that can deliver the product the fastest have a distinct advantage. In the business-to-business (B2B) market segment, customers depend on stated delivery windows to achieve reductions in inventory while still meeting strict production windows.*

   - *Changes in volume: Again, this is often important to be a player in many B2B markets. Customers need to know their suppliers can rapidly respond to changes in demand so they can meet the end customer demand swings.*

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

• Flexibility and new product introduction speed: The high-tech industry is a good example where this is a key competitive advantage. Being able to rapidly respond to advances in technology and correctly gauge customer expectations is key to competing successfully.

4. Why does the "proper" operations and supply chain strategy keep changing for companies that are world-class competitors?

   The top three priorities have generally remained the same over time: make it good, make it fast, and deliver it on time. Others have changed. Part of this may be explained by realizing that world class organizations have achieved excellence in these three areas and are, therefore, focusing attention on some of the more minor areas to gain competitive advantage. The changes in the minor priorities may result from recognizing opportunities or from changes in customer desires or expectations.

5. What do the expressions "order winner" and "order qualifier" mean? What was the order winner for your last major purchase of a product or service?

   Order winners are dimensions that differentiate the product or service or services of one firm from another. Order qualifiers are dimensions that are used to screen a product or service as a candidate for purchase. Order qualifiers get a company's "foot in the door." Order winners are what make the sale. Obviously, answers will vary for the order winners from your last purchase.

6. Pick a company that you are familiar with and describe its operations strategy and how it relates to winning customers. Describe specific activities used by the company that support the strategy (see Exhibit 2.2 for an example).

   Student answers will vary widely based on their experiences and views. It might be helpful for a classroom exercise to assign certain companies to a number of students/teams and compare their answers in class.

7. At times in the past, the dollar showed relative weakness with respect to foreign currencies, such as the yen, euro, and pound. This stimulated exports. Why would long-term reliance on a lower valued dollar be at best a short-term solution to the competitiveness problem?

   This approach is dependent on economic policies of other nations. This is a fragile dependency. A long-term approach is to increase manufacturing and service industry productivity in order to regain competitive advantage. At a national level, solutions appear to lie in reversing attitudes. At a firm level, competitive weapons are consistent quality, high performance, dependable delivery, competitive pricing, and design flexibility.

8. Identify an operations and supply chain - related "disruption" that recently impacted a company. What could the company have done to have minimized the impact of this type of disruption prior to it occurring?

   The March 2011 tsunami that struck Japan was geographically concentrated but had global impact on multiple firms, many of which had no physical presence at all in the affected area. Examples include firms that had sole source agreements with suppliers in the affected area. The tsunami left these companies scrambling to find new suppliers to feed into their supply chains. These firms could have reduced the impact of the tsunami by having a few high-quality,

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

dependable suppliers located in different geographical regions. There are many other examples that could be taken from this one event. A simple Internet search will provide plenty of material for discussion. More recently, the L.A. ports work slowdown in early 2015 was a man-made disruption for many global firms. Both inbound and outbound shipments were affected – some delayed and others (U.S. produce exports) were ruined. McDonald's resorted to flying over 2 million pounds of frozen French fries into Japan at significant extra cost during this period to keep restaurants open.

9. What do we mean when we say productivity is a "relative" measure?

For productivity to be meaningful, it must be compared with something else. The comparisons can be either intra-company as in the case of year-to-year comparisons of the same measure, or intercompany as in the case of benchmarking. Intercompany comparisons of single factor productivity measures can be somewhat tenuous due to differences in accounting practices (especially when comparing with foreign competitors) and the balance of labor to capital resources. Total factor productivity measures are somewhat more robust for comparison purposes.

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

Objective Questions

1. Shell Oil Company's motto "People, Planet and Profit" is a real-world implementation of what OSCM concept?

   Triple bottom line

2. A firm's *strategy* should describe how it intends to create and sustain value for _____.

   Its current shareholders

3. What is the term used to describe individuals or organizations that are influenced by the actions of the firm?

   Stakeholders

4. How often should a company develop and refine the operations and supply chain strategy.

   At least yearly

5. What is the term used to describe product attributes that attract certain customers and can be used to form the competitive position of a firm?

   Competitive dimensions

6. What are the two main competitive dimensions related to product delivery?

   Delivery speed and delivery reliability

7. What are the two characteristics of a product or service that define quality?

   Design quality and process quality

8. What is the diagram that shows how a company's strategy is delivered by a set of supporting activities called?

   Activity-system map

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

9. In implementing supply chain strategy, a firm must minimize its total cost without compromising the needs of what group of people?

   Customers

10. What is defined as the likelihood of disruption that would impact the ability of a company to continuously supply products or services?

    Supply chain risk

11. What are risks caused by natural or manmade disasters, and therefore impossible to reliably predict called?

    Disruption risks

12. Match the following common risks with the appropriate mitigation strategy.

E	Country risks	A:	Detailed tracking, alternate suppliers
D	Regulatory risk	B:	Carefully select and monitor suppliers
A	Logistics failure	C:	Contingency planning, insurance
C	Natural disaster	D:	Good legal advice, compliance
B	Major quality failure	E:	Currency hedging, local sourcing

13. What is the term used to describe the assessment of the probability of a negative event against the aggregate severity of the related loss?

    Risk mapping

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

14. As Operations Manager, you are concerned about being able to meet sales requirements in the coming months. You have just been given the following production report:

	JAN	FEB	MAR	APR
Units Produced	2300	1800	2800	3000
Hours per Machine	325	200	400	320
Number of Machines	3	5	4	4

Find the average of the monthly productivity figures (units per machine hour).

To answer this we need to realize that the measure of hours given is per machine, so we have to multiply that by the number of machines in each period to get the total machine hours in each period. Those figures are used in the calculations below.

Average productivity: (2300/975 + 1800/1000 + 2800/1600 + 3000/1280)/4

Average productivity (2.36+1.80+1.75+2.34)/4= 2.06 units per machine hour

Note that the average above weights each month the same, although output varies. An alternative answer would be to compute a weighted average productivity figure that is slightly different at 2.04 units per machine hour.

15. Sailmaster makes high-performance sails for competitive windsurfers. Below is information about the inputs and outputs for one model, the Windy 2000.

Units sold	1,217
Sale price each	$1,700
Total labor hours	46,672
Wage rate	$12/hour
Total materials	$60,000
Total energy	$4,000

Calculate the productivity in **sales revenue/labor expense**.

We have to do some interim calculations here. Sales revenue is calculated by multiplying units sold by the unit sales price. Labor expense is calculated by multiplying labor hours by the wage rate.

*(1217*1700) / (46672*12) = 3.69*

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

16. *Live Trap Corporation* received the data below for its rodent cage production unit. Find the **total** productivity?

Output	**Input**	
50,000 cages	Production time	620 labor hours
Sales price: $3.50 per unit	Wages	$7.50 per hour
	Raw materials (total cost)	$30,000
	Component parts (total cost)	$15,350

Total productivity could be expressed two ways here based on how you express output: in units sold, or dollars of sales.

Units sold:
*50,000 / ((620 * $7.50) + 30,000 + 15,350) = 1.00 units sold per dollar input*
Dollars of sales:
*(50000*3.5) / ((620 * $7.50) + 30,000 + 15,350) = 3.5 dollars in sales per dollar input*

17. Two types of cars (Deluxe and Limited) were produced by a car manufacturer last year. Quantities sold, price per unit, and labor hours are given below. What is the labor productivity for each car? Explain the problem(s) associated with the labor productivity.

	QUANTITY	$/UNIT
Deluxe car	4,000 units sold	$8,000/car
Limited car	6,000 units sold	$9,500/car
Labor, Deluxe	20,000 hours	$12/hour
Labor, Limited	30,000 hours	$14/hour

Labor Productivity – units/hour

Model	Output in Units	Input in Labor Hours	Productivity (Output/Input)
Deluxe Car	4,000	20,000	0.20 units/hour
Limited Car	6,000	30,000	0.20 units/hour

Labor Productivity – dollars

Model	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Deluxe Car	4,000($8,000)= $32,000,000	20,000($12.00)= $240,000	133.33
Limited Car	6,000($9,500)= $57,000,000	30,000($14.00)= $420,000	135.71

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

The labor productivity measure is a conventional measure of productivity. However, as a partial measure, it may not provide all of the necessary information that is needed. For example, increases in productivity could result from decreases in quality, and/or increases in material cost.

18. A U.S. manufacturing company operating a subsidiary in an LDC (less-developed country) shows the following results:

	U.S.	LDC
Sales (units)	100,000	20,000
Labor (hours)	20,000	15,000
Raw materials (currency)	$20,000	20,000 (FC)
Capital equipment (hours)	60,000	5,000

a. Calculate partial labor and capital productivity figures for the parent and subsidiary. Do the results seem misleading?

Labor Productivity

Country	Output in Units	Input in Hours	Productivity (Output/Input)
U.S.	100,000	20,000	5.00 units/hour
LDC	20,000	15,000	1.33 units/hour

Capital Equipment Productivity

Country	Output in Units	Input in Hours	Productivity (Output/Input)
U.S.	100,000	60,000	1.67 units/hour
LDC	20,000	5,000	4.00 units/hour

Yes. You might expect the capital equipment productivity measure to be higher in the U.S. than in a LDC. Also, the measures seem contradictory. Each plant appears to be far more productive than the other on one measure, but much worse on the other.

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

b. Compute the multifactor productivity figures for labor and capital together. Do the results make more sense?

Multifactor – Labor and Capital Equipment

Country	Output in Units	Input in Hours	Productivity (Output/Input)
U.S.	100,000	20,000 + 60,000= 80,000	1.25 units/hour
LDC	20,000	15,000 + 5,000= 20,000	1.00 units/hour

Yes, labor and equipment can be substituted for each other. Therefore, this multifactor measure is a better indicator of productivity in this instance.

c. Calculate raw material productivity figures (units/$ where $1 = 10 (FC)). Explain why these figures might be greater in the subsidiary.

Raw Material Productivity

Country	Output in Units	Input in Dollars	Productivity (Output/Input)
U.S.	100,000	$20,000	5.00 units/$
LDC	20,000	FC 20,000/$10 = $2,000	10.00 units/$

The raw material productivity measures might be greater in the LDC due to a reduced cost paid for raw materials, which is typical of LDC's, especially if there are local sources for the raw materials.

19. Various financial data for the past two years follow. Calculate the total productivity measure and the partial measures for labor, capital, and raw materials for this company for both years. What do these measures tell you about this company?

		Last Year	This Year
Output:	Sales	$200,000	$220,000
Input:	Labor	30,000	40,000
	Raw materials	35,000	45,000
	Energy	5,000	6,000
	Capital	50,000	50,000
	Other	2,000	3,000

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

Total Productivity

Year	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Last Year	$200,000	$30,000 + 35,000 + 5,000 + 50,000 + 2,000 = $122,000	1.64
This Year	$220,000	$40,000 + 45,000 + 6,000 + 50,000 +3,000 = $144,000	1.53

Partial Measure – Labor

Year	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Last Year	$200,000	$30,000	6.67
This Year	$220,000	$40,000	5.50

Partial Measure – Raw Materials

Year	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Last Year	$200,000	$35,000	5.71
This Year	$220,000	$45,000	4.89

Partial Measure – Capital

Year	Output in Dollars	Input in Dollars	Productivity (Output/Input)
Last Year	$200,000	$50,000	4.00
This Year	$220,000	$50,000	4.40

The overall productivity measure is declining, which indicates a possible problem. The partial measures can be used to indicate cause of the declining productivity. In this case, it is a combination of declines in both labor and raw material productivity, which were somewhat offset by an increase in the capital productivity. Further investigation should be undertaken to explain the drops in both labor and raw material productivity. An increase in the cost of both of these measures, without an accompanying increase in the selling price might explain these measures.

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

20. An electronics company makes communications devices for military contracts. The company just completed two contracts. The navy contract was for 2,300 devices and took 25 workers two weeks (40 hours per week) to complete. The army contract was for 5,500 devices that were produced by 35 workers in three weeks. On which contract were the workers more productive?

Contract	Output in Units	Input in Hours	Productivity (Output/Input)
Navy	2300	25(2)40 = 2000	1.15
Army	5500	35(3)40 = 4200	1.31

The workers were more productive on the Army contract.

21. A retail store had sales of $45,000 in April and $56,000 in May. The store employs eight full-time workers who work a 40-hour week. In April the store also had seven part-time workers at 10 hours per week, and in May the store had nine part-timers at 15 hours per week (assume four weeks in each month). Using sales dollars as the measure of output, what is the percentage change in productivity from April to May?

Month	Output in Dollars	Input in Hours	Productivity (Output/Input)	Percentage Change
April	$45,000	(8(40)+7(10))*4 = 1560	28.85	
May	$56,000	1820	30.77	(30.77-28.85)/28.85 = 6.66% increase

22. A parcel delivery company delivered 103,000 packages last year, when its average employment was 84 drivers. This year the firm handled 112,000 deliveries with 96 drivers. What was the percentage change in productivity over the past year?

Year	Output in Packages	Input in Drivers	Productivity (Output/Input)	Percentage Change
Last	103,000	84	1226.2	
This	112,000	96	1166.7	(1166.7 -1226.2)/1226.2 = - 4.85% (decrease)

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

23. A fast-food restaurant serves hamburgers, cheeseburgers, and chicken sandwiches. The restaurant counts a cheeseburger as equivalent to 1.25 hamburgers and chicken sandwiches as 0.8 hamburger. Current employment is five full-time employees who work a 40-hour week. If the restaurant sold 700 hamburgers, 900 cheeseburgers, and 500 chicken sandwiches in one week, what is its productivity? What would its productivity have been if it had sold the same number of sandwiches (2,100), but the mix was 700 of each type?

Part	Output in Hamburger Equivalents	Input in Hours	Productivity (Output/Input)
700 Hamburgers 900 Cheeseburgers (1.25) 500 Chicken Sandwiches (.80)	2225	200	11.125
700 Hamburgers 700 Cheeseburgers (1.25) 700 Chicken Sandwiches (.80)	2135	200	10.675

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

Copyright 2017 by McGraw-Hill Education. All rights reserved.

STRATEGY AND SUSTAINABILITY

Chapter 2

Operations and Supply Chain Management The Core 4th edition Jacobs Solutions Manual

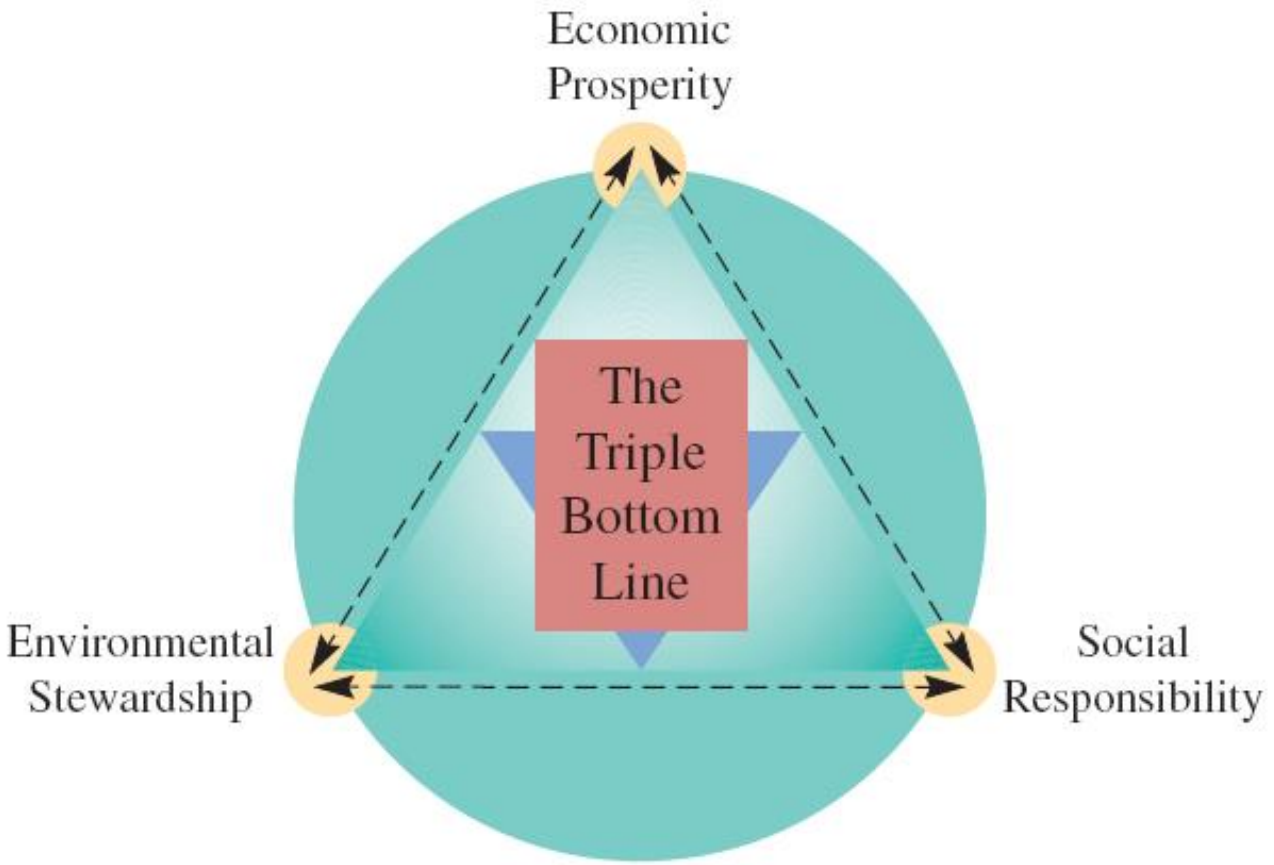
Learning Objectives

1. Know what a sustainable business strategy is and how it relates to operations and supply chain management.
2. Define operations and supply chain strategy.
3. Explain how operations and supply chain strategies are implemented.
4. Understand why strategies have implications relative to business risk.
5. Evaluate productivity in operations and supply chain management.

Sustainable Strategy

- The firm's strategy describes how it will create and sustain value for its current shareholders
  - Shareholders – individuals or companies that legally own one or more shares of stock in the company
  - Stakeholders – individuals or organizations who are directly or indirectly influenced by the actions of the firm
- The goal of sustainability means that the scope of the firm's strategy must focus on three areas (the triple bottom line)
  - Economic – shareholders must be compensated via a competitive return
  - Social – business practices should be fair to labor, the community, and the region where the firm conducts business
  - Environmental – the company should protect the environment as much as possible

Triple Bottom Line



Operations and Supply Chain Strategy

- Setting broad policies and plans for using the resources of a firm – must be integrated with corporate strategy
  - Corporate strategy provides overall direction and coordinates operational goals with those of the larger organization
- Operations effectiveness – performing activities in a manner that best implements strategic priorities at a minimum cost

Competitive Dimensions

Price

- Make the product or deliver the service cheap

Quality

- Make a great product or delivery a great service

Delivery Speed

- Make the product or deliver the service quickly

Delivery Reliability

- Deliver it when promised

Coping with Changes in Demand

- Change its volume

Flexibility and New-Product Introduction Speed

- Change it (offer a wide variety of existing products and introduce new products quickly)

Other Product-Specific Criteria

- Support it (technical assistance, meeting launch dates, after-sale support, environmental impact)

Trade-Offs

- Management must decide which parameters of performance are critical and concentrate resources on those characteristics
  - An operation cannot simultaneously excel on all competitive dimensions
  - For example, a firm that is focused on low-cost production may not be capable of quickly introducing new products
- Straddling – seeking to match a successful competitor by adding features, services, or technology to existing activities
  - Often a risky strategy

Order Winners and Order Qualifiers

- Order qualifiers are those screening dimensions that permit a firm's products to be considered for purchase by customers
  - Features customers will not forego
- Order winners are criteria used by customers to differentiate the products and services of one firm from those of other firms
  - Features that customers use to determine which product to ultimately purchase

Assessing Risk

- All strategies have an inherent level of risk
  - Uncertainty in the environment causes supply chain planners to evaluate the relative riskiness of their strategies
- Supply chain risk is the likelihood of a disruption that would impact the ability of a company to continuously supply products or services
  - Supply chain coordination risks are associated with the day-to-day management of the supply chain
  - Disruption risks are caused by natural or manmade disasters

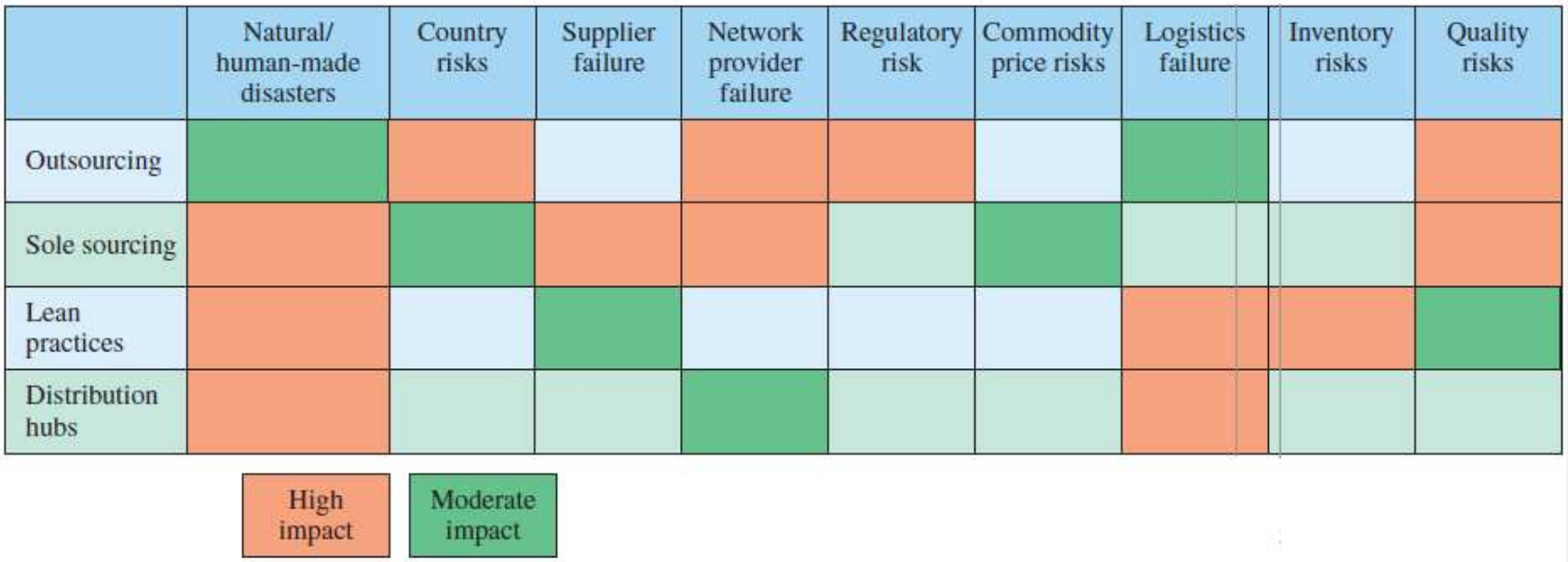
Risk Management Framework and Risk Mitigation Strategies

1. Identify the sources of potential disruptions.
2. Assess the potential impact of the risk.
3. Develop plans to mitigate the risk

Risk	Risk Mitigation Strategy
Natural disaster	Contingency planning (alternate sites, etc.), insurance
Country risks	Hedge currency, produce/source locally
Supplier failures	Multiple suppliers
Logistics failure	Safety stock, detailed tracking, and alternate suppliers

Supply Chain Risk Matrix

- Different supply chain strategies are exposed to specific types of risk – the supply chain risk matrix shows the level and type of risk for various strategies



Productivity Measurement

- Productivity is a measure of how well resources are used
- $\text{Productivity} = \frac{\text{Outputs}}{\text{Inputs}}$
- Productivity is a relative measure
  - Must be compared to something else to be meaningful
    - Operations can be compared to each other
    - Firms can be compared to other firms
- Partial productivity measures compare output to a single input
- Multifactor productivity measures compare output to a group of inputs
- Total productivity measures compare output to all inputs

Productivity Measurement - Example

Partial measure	$\frac{\text{Output}}{\text{Labor}}$ or $\frac{\text{Output}}{\text{Capital}}$ or $\frac{\text{Output}}{\text{Materials}}$ or $\frac{\text{Output}}{\text{Energy}}$
Multifactor measure	$\frac{\text{Output}}{\text{Labor + Capital + Energy}}$ or $\frac{\text{Output}}{\text{Labor + Capital + Materials}}$
Total measure	$\frac{\text{Output}}{\text{Inputs}}$ or $\frac{\text{Goods and services produced}}{\text{All resources used}}$

Input and Output Production Data ($)		Productivity Measure Examples
Output		Total measure
1. Finished units $10,000		$\frac{\text{Total output}}{\text{Total input}} = \frac{13,500}{15,193} = 0.89$
2. Work in process	2,500	
3. Dividends	1,000	Multifactor measures:
4. Bonds		
5. Other income		$\frac{\text{Total output}}{\text{Human + Material}} = \frac{13,500}{3,153} = 4.28$
Total output	$13,500	
		$\frac{\text{Finished units}}{\text{Human + Material}} = \frac{10,000}{3,153} = 317$
Input		
1. Human	$ 3,000	Partial measures:
2. Material	153	
3. Capital	10,000	$\frac{\text{Total output}}{\text{Energy}} = \frac{13,500}{540} = 25$
4. Energy	540	
5. Other expenses	1,500	$\frac{\text{Finished units}}{\text{Energy}} = \frac{10,000}{540} = 18.52$
Total input	$ 15,193	



Excel: Productivity Measurement