Operations and Supply Chain Management - The Core 5th edition Jacobs Solutions Manual

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CHAPTER 1
OPERATIONS AND SUPPLY CHAIN MANAGEMENT

Discussion Questions

1. Using Exhibit 1.2 as a model, describe the source-make-deliver-return relationships in the following systems:

   a. *An airline*

   Source: *Aircraft manufacturer, in-flight food, repair parts, computer systems*
   Make: *Aircraft and flight crew scheduling, ground services provided at airports, aircraft maintenance and repair*
   Deliver: *Outbound and arriving passenger service, baggage handling*
   Return: *Resolve any post-service issues such as lost or damaged luggage*

   b. *An automobile manufacturer*

   Source: *Suppliers of components and raw materials*
   Make: *Manufacturing of vehicles and components or subassemblies to be sold as spare parts*
   Deliver: *Delivery to and sales from dealerships, delivery of spare parts to the wholesale system*
   Return: *Warranty and recall repairs, trade-ins*

   c. *A hospital*

   Source: *Medical supplies, cleaning services, disposal services, food services, qualified personnel*
   Make: *Inpatient rooms, outpatient clinics, emergency room, operating rooms*
   Deliver: *Scheduling patients, providing treatment, ambulance service, family counseling*
   Return: *Billing errors, follow up visits*

   d. *An insurance company*

   Source: *Supplies needed for the office, underwriters, legal authority to operate*
   Make: *Establish policy guidelines and pricing, field agent/representative and facility network, develop Internet service capabilities, establish preferred vehicle repair service network*
   Deliver: *Meet with and advise clients, write policies, process and pay claims*
   Return: *Refund of overpayments*

2. Define the service package of your college or university. What is its strongest element? What is its weakest one?

   The categories with examples are:
   Supporting facility - location, buildings, labs, parking
   Facilitating goods – class schedules, computers, books, chalk
   Explicit services – classes with qualified instructors, placement offices
   Implicit services – status and reputation (e.g., Ivy League schools)

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At Indiana University and the University of Southern California, among their strongest elements are their business schools and their Operations Management programs (of course). Both also have very dedicated alumni networks. A weak element of Indiana University is its weak football program; for USC, weak elements are on-campus parking and housing.

3. What service industry has impressed you the most with its innovativeness?

   Our vote goes to cruise lines which have introduced such onboard innovations as wave machines for belly boarding and rock climbing walls, as well as all sorts of other amenities to keep cruisers involved. The industry is doing record business as well.

   Some of the standout companies in less innovative industries are Bank of America (has a formalized research program to try out new customer services/amenities such as video screens in next to teller lines), Intuit (e.g., putting Quicken money management software online), Ikea, JetBlue Airlines, and Progressive Insurance (discussed later in the book).

4. What is product-service bundling and what are the benefits to customers?

   Product-service bundling is adding value-added services to a firm's product offerings to create more value for the customer. This provides benefits in two areas. First, this differentiates the organization from the competition. Secondly, these services tie customers to the organization in a positive way. Alternatively, bundling can also involve adding products to a service, for example, adding the sale of convenience items and snacks at a hotel.

5. What is the difference between a service and a good?

   A service is an intangible process (you can't hold it in your hands), while a good is the physical output of a process. Some service businesses also provide a physical good as part of the service, like a restaurant. Also, mots manufacturers of goods provide services for after-sales support, like computer tech support or automobile warranty service. So while a service and a good are definitely distinguishable, customers will often encounter both in their experiences with a company.

6. Some people tend to use the terms effectiveness and efficiency interchangeably, though we've seen they are different concepts. But is there any relationship at all between them? Can a firm be effective but inefficient? Very efficient but essentially ineffective? Both? Neither?

   Firms can be anywhere on these two dimensions. It is possible for a firm to be the best at what they do in serving their market, but be very wasteful in doing so. Alternatively, a firm could squeeze every last dollar out of their processes but fail to deliver what the market expects and desires. Of course, the best firms will provide the goods and services that the market desires, exactly as the market desires, and do so at a minimum cost. Firms that are both inefficient and ineffective do not survive for long in any market.

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7. Two of the efficiency ratios mentioned in the chapter are the *receivable turnover ratio* and the *inventory turnover ratio*. While they are two completely separate measures, they are very similar in one way. What is the common thread between these two?

   (There are a number of answers that students may come up with, from simplistic to more thoughtful. Following is one of the latter.) *Both are measuring the average amount of a valuable asset that is not generating value for the company. Accounts receivable are an asset, but they do not create value for the firm until the money is received. Reducing the average amount of accounts receivable frees up that money for use by the company on a recurring basis. Inventory is another asset, but while inventory is being held by the company it is not making any money for the firm. Reducing inventory allows the firm to invest the money that would otherwise be spent on the inventory.*

8. Look at the job postings at http://jobs.apics.org and evaluate the opportunities for an OSCM major with several years of experience.

   There are pages and pages of these in the APICS Career Center. Here are some examples:

   Purchasing and Planning Manager
   Sennheiser New Mexico
   Sennheiser is seeking an innovative and enthusiastic individual to manage the purchasing and planning areas at our Albuquerque manufacturing facility. This key role is responsible for leading the Purchasing, Planning and Warehouse departments to achieve outstanding results. You will be charged with ensuring cost effective on-time delivery, as well as building solid relationships with other internal departments and international sister facilities. You will use production planning, procurement, inventory and materials management concepts to solve problems and provide continuous improvement in the supply chain process.

   Senior Manager Supply Chain Financer
   Pharmavite
   This role contributes to Pharmavite's success by providing decision support to the organization to drive business growth and improve profitability. Responsible for supporting company innovation with respect to total delivered cost. Also supports direct sourcing team on reporting & analyzing purchase price variance and seeking out new cost savings projects. Performs ad-hoc analysis and/or support cross-functional projects to improve operational efficiencies and optimize profitability. Also manages the control function around headquarters-based operations overhead expenditures as well as capital investments.

   Medical Device Supply Chain Manager
   Cadwell

   The Supply Chain Manager provides overall leadership and mentoring for the purchasing, shipping, and receiving functions for Cadwell Industries, Inc., a leading medical device manufacturer. This position oversees the organization wide management of strategic sourcing, procurement, contract negotiations, and evaluation of services while collaborating closely with staff in Engineering, Marketing, Regulatory, Sales, and Service.

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Production/Operations Planner
CG Industrial Specialties
US - Nationwide
Reporting to the Operations Manager or Branch Manager; this position is responsible for preparing assembly schedules for shop technicians; coordinate material requirements with purchasing as well as coordinate shipping / receiving activities with warehouse staff.

9. Recent outsourcing of parts and services that had previously been produced internally is addressed by which current issue facing operations and supply management today?

   The coordination of relationships between mutually supportive but separate organizations.

10. What factors account for the resurgence of interest in OSCM today?

    With companies facing competition on a global scale, and ever-advancing manufacturing and information technologies, firms realize the competitive advantage their OSCM functions can provide if properly managed. Many have found that the same old way of doing business leaves them unable to compete successfully. The 2011 tsunami in Japan and the 2015 LA ports closure have also brought to the forefront how important supply chains are, as well as the negative economic impact that disruptions in the supply chain can cause.

11. As the field of OSCM has advanced, new concepts have been applied to help companies compete in a number of ways, including the advertisement of the firm's products or services. One recent concept to gain the attention of companies is promoting s*ustainability*. Discuss how you have seen the idea of sustainability used by companies to advertise their goods or services.

    There of course will be a number of examples that students will bring up, though they may need some prodding to jog their memories. Some examples to start with might be IBM's "I'm an IBMer" campaign where they advertise how they are "building a smarter planet." Bottled water manufacturers have reduced the amount of plastic used in many of their products, thus saving production and distribution costs, but also allowing them to advertise how the new bottles are better for the environment because they result in less waste.

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Objective Questions

1. What are the three elements that require integration to be successful in operations and supply chain management?

   Strategy, Processes, and Analytics

2. Operations and supply chain management is concerned with the design and management of the entire system that has what function?

   Produces a product or delivers a service

3. Consider the following financial data from the past year for Midwest Outdoor Equipment Corporation.

Gross Income	$25,240,000
Total Sales	24,324,000
Total Credit Sales	18,785,000
Net Income	2,975,000
Cost of Goods Sold	12,600,000
Total Assets	10,550,000
Average Inventory	2,875,000
Average Receivables	3,445,000

   a. Compute the *receivable turnover ratio*.

$$\frac{\$18{,}785{,}000}{\$3{,}445{,}000} = 5.453$$

   b. Compute the *inventory turnover ratio*.

$$\frac{\$12{,}600{,}000}{\$2{,}875{,}000} = 4.383$$

   c. Compute the *asset turnover ratio*.

$$\frac{\$24{,}324{,}000}{\$10{,}550{,}000} = 2.306$$

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4. A manufacturing company has entered into a new contract with a major supplier of raw materials used in the manufacturing process. Under the new arrangement, called *vendor managed inventory*, the supplier manages their raw material inventory inside the manufacturer's plant, and only bills the manufacturer when the manufacturer consumes the raw material. How is this likely to affect the manufacturer's inventory turnover ratio?

   This will reduce the average amount of money the firm has invested in raw material, so the inventory turnover ratio should increase.

5. What is the name of the process in which one company studies the processes of another firm in order to identify best practices?

   Benchmarking

6. A company has recently implemented an automated online billing and payment processing system for orders it ships to customers. As a result, it has reduced the average number of days between billing a customer and receiving payment by 10 days. How will this affect the receivables turnover ratio?

   Quicker payments will reduce the average amount of accounts receivables, so the receivables turnover ratio will increase.

7. Match the following OSCM job titles with the appropriate duties and responsibilities.

C Plant manager	A: Plans and coordinates staff activities such as new product development and new facility location
D Supply chain manager	B: Oversees the movement of goods throughout the supply chain
A Project manager	C: Oversees the workforce and resources required to produce the firm's products
E Business process improvement analyst	D: Negotiates contracts with vendors and coordinates the flow of material inputs to the production process
B Logistics manager	E: Applies the tools of lean production to reduce cycle time and eliminate waste in a process

8. What high-level OSCM position manager is responsible for working with the CEO and company president to determine the company's competitive strategy?

   Chief Operating Officer

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9. Order the following major concepts that have helped define the OSCM field on a time line. Use 1 for the earliest to be introduced, and 5 for the most recent.

   _3_ Supply chain management
   _1_ Manufacturing strategy
   _5_ Business analytics
   _2_ Total quality management
   _4_ Electronic commerce

10. Which major OSCM concept can be described as an integrated set of activities designed to achieve high-volume production using minimal inventories of parts that arrive at workstations exactly when they are needed?

    Just-in-time (JIT) production

11. _____ leverage the vast amount of data in enterprise resource planning systems to make decisions related to managing resources.

    Business analytics

12. Which current issue in OSCM relates to the ability of a firm to maintain balance in a system, considering the ongoing economic, employee, and environmental viability of the firm?

    Sustainability

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Analytics Exercise: Comparing Companies Using Wall Street Efficiency Measures

Each student is asked to pick an industry and compare three companies within that industry based on income per employee, revenue per employee, receivable turnover, inventory turnover, and asset turnover. The following is typical of what you might obtain:

	BP	Shell	ExxonMobil	Oil Industry
Management Efficiency				
Net Income/Employee	315,300	343,533	414,328	289,320
Revenue/Employee	4.6 Mil	5.2 mil	4.7 mil	3 Mil
Receivable Turnover	9.38	6.29	13.17	13.5
Inventory Turnover	11.92	13.59	21.91	15.5
Asset Turnover	1.92	1.36	1.41	1.1

Students are then asked to identify which company appears to have the most productive employees.

With this data we see that ExxonMobil does very well in generating $414,328 net income per employee. Comparing Shell to ExxonMobil we can observe that ExxonMobil appears to be more efficient since it can generate more net income on lower revenue/employee, at least compared to Shell. The inventory turnover is highest for ExxonMobil indicating that the company is the most efficient from an operations and supply chain processes view. ExxonMobil also appears to do a good job in collecting receivables as well, thus supporting the idea that the company is very efficient. BP seems to do a little better in asset turnover, which relates to the use of its facility and equipment assets. But ExxonMobil is very good especially in comparison to the oil industry average.

Overall, ExxonMobil appears to be the most efficient, so the other companies might find it valuable to benchmark the company's processes.

Of course, the data generated by each student will be different and an interesting interchange can be developed with students each presenting what they found from their research. It is very interesting to do comparisons across industries; retailers versus oil companies, and computer makes versus software companies, for example.

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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 Patagonia. For details see their current sustainability page:

   http://www.patagonia.com/home/

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.*

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• 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,

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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.

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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

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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

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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*

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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

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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.

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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

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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.

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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)

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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

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Timbuk2[1]

You can have a lot of fun with this case. Start off by logging on to the Timbk2 website and explore what is going on there. If you have a little money in a teaching account you might actually order a custom bag and give it away or raffle it off in class, this will really get their attention. You make a big deal of it all when the back comes in and you give it to the lucky student. This also helps to reinforce the topic with the students.

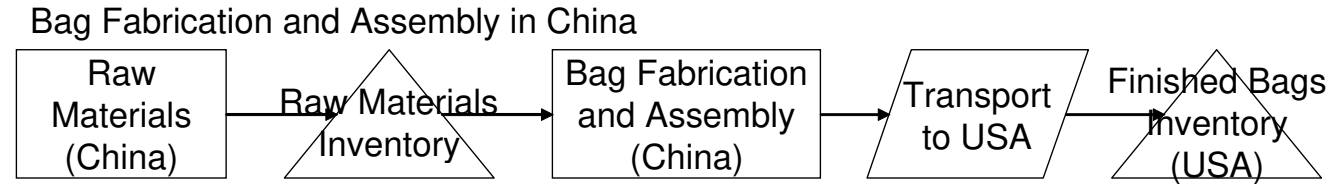
1. Consider the two categories of products that Timbk2 makes and sells. For the custom messenger bag, what are the key competitive dimensions that are driving sales? Are their competitive priorities different for the new laptop bags sourced in China?

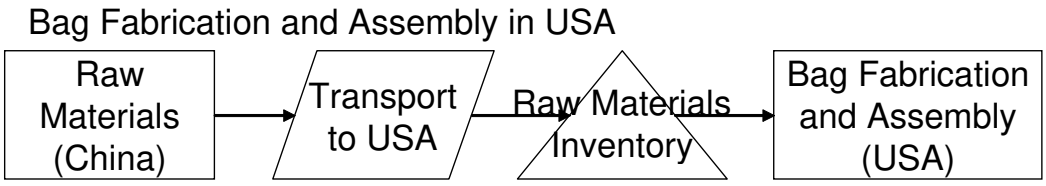
This is one of the "other dimensions" and in this case it is the customization of the bag. Other than being able to get the colors they prefer; the customer also get pockets that meet the unique needs the customer has in mind. They can be successful with standardizing the laptop bags since the purpose here is well defined.

2. Compare the assembly line in China to that in San Francisco along the following dimensions: (1) volume or rate of production, (2) required skill of the workers, (3) level of automation, and (4) amount of raw materials and finished goods inventory.

Dimension	China	San Francisco
Volume/rate of production	High	Low
Required skill of workers	Low	High
Level of automation	High	Low
Raw materials and finished good inventory	Low raw materials, but may have finished goods	High raw materials, virtually no finished goods

3. Draw two diagrams, one depicting the supply chain for those products sourced in China and the other depicting the bags produced in San Francisco. Show all the major steps including raw material, manufacturing, finished goods, distribution inventory, and transportation. Other than manufacturing cost, what other costs should Timbuk2 consider when making the sourcing decision?





The big cost other than manufacturing is the cost to transport material to the USA versus the cost of transporting the completed bags to the USA. Here we assume that the material would be sourced in China. This is probably not a bad assumption.

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