

25. Toyota has decided to set up regional warehouses where some variants of the Scion will be customized and shipped to dealers on demand. Customizing and shipping on demand will raise production and transportation cost per car by \$100. Each car costs \$20,000, and Toyota has a holding cost of 20 percent. Cars at the dealer are owned by Toyota for the first 90 days. Thus, for all practical purposes, Toyota owns all inventory, whether at the dealers or at the regional warehouse. Consider a region with five large dealers and thirty small dealers. Toyota has partitioned the variants into two groups—popular variants and uncommon variants. Weekly demand for the two types of variants at the two types of dealers is shown in Table 12-7. The goal is to provide a 95 percent cycle service level using a continuous review policy. Replenishment lead times for both dealers and regional warehouses are four weeks. Customization and shipping from a regional warehouse to a dealer can be done in a day, and this time can be ignored. Assume demand to be independent across all dealers.

- a. How much safety inventory of a popular variant is required at a large or small dealer?
- b. What is the safety inventory required if inventory for the popular variant (for both large and small dealers) is centralized at the regional warehouse by Toyota?
- c. What is the safety inventory required if inventory for the popular variant at small dealers is centralized at the regional warehouse but that for large dealers is decentralized?
- d. Given the additional customization and transportation cost, which structure do you recommend for the popular variant?
- e. Repeat parts (a) to (d) for the uncommon variant.
- f. How should Toyota structure inventories given its regional warehouses?

normally distributed, with a mean of 300 and a standard deviation of 50. The drug costs \$10 per unit. What is the annual holding cost of safety inventory across all retail stores? If the drug were centralized in one location, what would the annual cost of holding safety inventory at the central location be? What would the annual increase in inventory charge be? Do you recommend centralization?

Now consider a drug with daily demand at each store that is normally distributed, with a mean of 5 and a standard deviation of 4. The drug costs \$10 per unit. What is the annual holding cost of safety inventory across all retail stores? If the drug were centralized in one location, what would the annual cost of holding safety inventory at the central location be? What would the annual increase in inventory charge be? Do you recommend centralization?

cost, which structure do you recommend?
 e. Repeat parts (a) to (d) for the uncommon variant?
 f. How should Toyota structure inventory across its warehouses?

26. Orion is a global company that sells copiers. Orion sells ten variants of a copier, with a variety of finished-goods form. The primary component that creates the copiers is the printing subassembly. The strategy discussed is to introduce commonality in the assembly so that final assembly can be done in a few factories kept in component form. Currently, the cost of the print subassembly is \$1,000 in terms of components. Introducing commonality in the print subassembly will increase the cost to \$1,025. One of the ten variants represents 10% of the total demand. Weekly demand for

TABLE 12-7 Weekly Demand at Car Dealers

	Popular Variant		Uncommon Variant	
	Mean	Standard Deviation	Mean	Standard Deviation
Large dealer	50	15	8	5
Small dealer	10	5	2	2