編號：C 389　系所：企業管理學系在職專班　　科目：管理實務（含個案分析）（專班）

本試題是否可以使用計算機：□可使用，☑不可使用　（請命題老師勾選）

1. Why do you think organizations have increased the use of groups for making decisions during the past thirty years?
   When would you recommend using groups to make decisions?
   How are authority and organization structure related?
   Give an example to illustrate your answer. (20%)

2. Do call centers in general improve customer satisfaction?
   Are customers increasingly accepting the use of call centers and Internet as the only available interfaces with the firm?
   Can the success of companies like Dell (or UPS) be attributed to this? (20%)

3. Many enterprises hope to improve core competitiveness by managing knowledge using software applications known as knowledge platforms, which enhance the abilities of employees, and communication with collaborative partners, by managing a combination of knowledge flow and information processing. This includes information creation, collection, identification, taxonomy, storage, search, share and feedback.
   (1) Identify some commonly held expectations which motivate organizations to deploy knowledge platforms.
   (2) What are the key factors affecting knowledge platform success and how are they related to company practice? (25%)

4. Case: Can Boeing Keep Flying High?

The Boeing Company has been critical to the United States for over 60 years in both war and peace. During World War II, it produced the B17 and B29 bombers that were the heart of the military bombing campaign against the Axis powers. In 1958, the 707, Boeing's first successful civilian passenger plane, began commercial operation and was so successful that 348 of that model are still flying today. When in 1969 Boeing came out with its long-range 747 jumbo jet, the company became the largest exporter of any corporation in the United States. During the 1990s, the company underwent rapid expansion, acquiring Rockwell International, a major aerospace and defense company in 1996, competing aircraft manufacturer McDonnell Douglas in 1997, and Hughes Aircraft, a leading space and communications company in 2000. Boeing is a giant producer of passenger planes, business jets, fighter planes, helicopters, flight instruments, and even satellites and missiles.

Although Boeing is a major force in the aerospace, defense, and communications industries as well as the commercial airline industry, its path to growth and prosperity has become clouded. In its commercial airline business it faces a formidable competitor. Airbus Industrie had been established in 1971 by the British and French governments and was immediately subsidized by these governments. In 1996, Airbus decided to challenge Boeing for the jumbo jet market, then ruled exclusively by Boeing with its 416-seat long-distance 747-400. Airbus predicts air travel will expand rapidly during the next decade, requiring many giant jumbo jets. Its Airbus A380 seats 555 passengers, and is the world's largest jetliner. It features a full double-deck rather than the 747's shorter second story "hump," and later versions could eventually be stretched to accommodate over 650 seats. The A380's major benefit would be that by carrying more passengers, it will not require additional landing slots at the overcrowded hub airports. Moreover, Airbus claims the operating costs for its A380 will be 17 percent lower compared to the Boeing 747. Airbus, as a newer company, could also build more modern technology into its planes. Its cockpit designs are similar in all of its jets, so pilots need only a few days of extra training to fly another

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model. Airbus has steadily taken market share away from Boeing, and by 1999 had surpassed Boeing in the number of planes sold.

At first, Boeing decided to compete with Airbus in the giant jumbo jetliner market by "stretching" its existing 747 at a development cost of only $3 to $4 billion, far lower than the $12 billion price tag for developing the Airbus plane. In March 2001, however, Boeing withdrew from the competition. Its management developed a very different vision of the market for jumbo jets. Boeing's management foresees a turn to smaller airliners that will fly close to the speed of sound, enabling passengers to fly nonstop from departure to destination, bypassing the overcrowded hubs. This would stimulate the growth of smaller regional airlines and reduce the need for huge jumbo jets. Boeing announced it was designing a new 230 to 250 passenger aircraft, dubbed the Sonic Cruiser. It will fly fast enough to cut one hour out of each 3,000 miles of flight, enabling many more direct flights, greatly reducing the need for flight transfers at the large hubs. Moreover, while the current coast-to-coast and overseas jumbo jet flights enable a plane to make one round-trip daily, Boeing claims its faster new plane will fly two round trips daily, making it a valuable investment. Further, management claims, these planes will especially attract the profitable first- and business-class passengers. For airlines struggling with lower-cost competitors, Boeing is also considering an ultra-efficient 250-seat airplane built from lightweight materials that travels at the same speed as existing jetliners but would be 20 percent cheaper to operate. All in all, Boeing foresees a strong expansion of smaller jet sales rather than of jumbo jet sales.

In addition to Airbus competition, Boeing has been facing difficult conditions because the market for commercial airplanes has been shrinking due to airline mergers and the downturn in air travel after the September 11, 2001, terrorist attacks. Boeing's CEO Phil Condit is pushing Boeing into the lucrative services area: maintenance, modifications, financing, and pilot training. He is also looking beyond aircraft and related services to steer Boeing into a variety of high technology businesses, including airborne Internet services and digital movie distribution. This diversification is one reason why Boeing moved its global headquarters from Seattle,Washington, to Chicago, Illinois. Boeing now sees its military and space business as its biggest growth area as it switches from commercial airplane production to newer businesses based on information and communications technologies. In July 2002, it announced it was merging its satellite and communications businesses with its military manufacturing unit, creating an operation equal in size to its commercial airplane division. Boeing is a contractor for the U.S. government's National Missile Defense project. The company is also working on projects related to "network centric warfare," in which the United States would use a global information grid to orchestrate all of its missiles, planes, tanks, and ships in battle from a central command post. Boeing makes satellites, AWACS (Airborne Warning and Control System) airplanes, unmanned surveillance aircraft, guided missiles, and Global Positioning System (GPS)-equipped handheld radios. The company is developing broadband technology and standards that could network all of these "smart" devices and every element of warfare so that they could be visually displayed on the "data wall" at a command-and-control center. If Boeing's infrastructure becomes adopted, the company could see $20 to $30 billion in defense business opportunities over the next ten years. Analysts warn, however, that the U.S. government may not like depending on Boeing alone to construct such systems.

Another Boeing initiative is in air traffic management. Boeing set up a separate business unit to overhaul the way air traffic is controlled. It would like to see the United States air traffic controller system transformed from ground-based traffic control to air-based traffic control relying on the Global Positioning System (GPS). Navigation computers would be required on all jetliners, enabling every airplane continually to transmit its exact position, direction, and speed to nearby aircraft. This method would permit planes to fly shorter distances on each flight while also reducing the long waits for takeoffs. Some air traffic controllers would still be needed, particularly at larger airports. Inexpensive computer and GPS technology already exists, and both Boeing and Airbus airplanes are already equipped for flying without using ground-based systems.

In these new initiatives and its commercial airplane business, Boeing's management is trying to lower costs by using technology to reform inefficient business processes. Boeing's airplane production process was paper-intensive, with a final design of the Boeing 747 consisting of approximately 75,000 paper engineering drawings. Boeing designers long ago realized they would save much production time if they reused existing designs rather than designing each aircraft from scratch. The process of design customization was manual and took more than 1,000 engineers a year of full-time work to complete. For every customization choice on every airplane built, hundreds of pages of detailed drawings needed to be drawn manually. To reuse old paper aircraft

configurations and parts designs, the engineers first needed to search through an immense number of paper drawings to find appropriate designs to reuse for the specific configuration. They then laboriously copied the old designs to use for the new plane. Inevitably, errors crept into the new designs—large numbers of errors, given the large numbers of design sheets—because of unavoidable copying mistakes.

It used to take 800 computers to manage the coordination of engineering and manufacturing and many of these did not communicate directly with each other. The list of parts produced by engineering for a given airplane was configured differently from the lists used by manufacturing and customer service. Ultimately the parts list had to be broken down, converted, and recomputed up to 13 times during the production of a single plane. Another problem with manual design was that the staff needed to create life-size mock-ups in plywood and plastic to ensure that everything fit and that the pipes and wires that run through the plane are placed properly and do not interfere with other necessary equipment. They were also needed to verify the accuracy of part specifications. Building mock-ups was a slow, expensive, laborious process. At production time, errors would again occur when part numbers of specifications were manually copied and at times miscopied onto order sheets, resulting in many wrong or mis-sized parts arriving. Engineers worked in separate fiefdoms based on their field of specialization. Some engineers designed the plane's parts, others assembled them, and others designed the parts' packing crates. They rarely compared notes. If production engineers discovered a part that didn't fit, they sent a complaint back to the designers located in another plant. The designers then pulled out their drawings, reconfigured the part to make it match drawings of the surrounding parts, and sent the new design back to the plant. Warehouses were filled with paper.

In the early 1990s, Boeing began switching to a "paperless design" model, which it used to computerize the design and production of its 777 aircraft. The 777 aircraft carries 300 to 440 passengers and has lower operating, maintenance, and fuel costs because it uses lighter materials and can fly with only two pilots and two engines. The "paperless design" system employs nine IBM mainframes, a Cray supercomputer, and 2,200 workstations, storing 3,500 billion bits of information. It enables engineers to call up any of the 777's millions of parts, modify them, fit them into the surrounding structure, and put them back into the plane's "electronic box" so that other engineers can make their own adjustments. Boeing assembled a single parts list that can be used by every division without modification and without tabbing. In addition management established design–production teams that brought together designers and fabricators from a range of specialties throughout the whole process. Ultimately the airplane was designed entirely on the computer screen and was initially assembled without expensive mock-ups. The company cut overall engineering design errors by 50 percent while designing and building a 777 in 10 months.

Boeing has been using systems to address its massive supply chain problem. Five to six million parts are required for its large twin-aisle airplanes alone. Inventory of these parts has been handled manually, and the production sites became infamous for the large piles of parts not being used. Not surprisingly, Boeing inventory turned over only two to three times per year compared to 12 times a year in an efficient manufacturing operation. Needed parts often arrived late. Boeing had to assign about 300 materials planners in different plants just to find needed parts on the shop floor.

In 1994, Boeing launched a process improvement program known as Define and Control Airplane Configuration/Manufacturing Resource Management (DCAC/MRM) to streamline and simplify the processes of configuring and assembling airplanes. Boeing had been using 400 software programs, each with its own independent database, to support production. The management team decided to replace these 400 programs with four interconnected, off-the-shelf software packages, one each for configuration, manufacturing, purchasing, and inventory control. This would enable everyone to work from the same database, offering data integrity and coordination. Each airplane was assigned its own unique identification number that could be used to identify all the parts required by that plane. Each airplane would have only one parts list, and it would be updated electronically during the production cycle. Management estimated that the project would cost $1 billion and would require more than 1,000 employees but would pay for itself within two years. Boeing decided to purchase enterprise resource planning (ERP) software from Baan Co., of Putten, Netherlands, because this software could be used to control the flow of parts and was considered particularly well suited for companies with multi-site hybrid manufacturing processes such as Boeing. The software also includes EDI links with external suppliers and database links for internal suppliers. "As soon as our ERP system determines we don't have enough of a certain

part in the assembly line to satisfy an airplane," explained one production manager, "we can identify which supplier we need and where that supplier's part needs to be delivered." Boeing's goal was that 45,000 persons would use the system at 70 plants to coordinate commercial airplane manufacturing. Rollout completion was targeted for the end of 1997. In addition to Baan's software, Boeing selected forecasting software from i2 Technologies, factory floor process planning software from CimLinc, product data management software from Structural Dynamics Research, and a product configuration system from Trilogy.

This project encountered serious problems, nearly causing a "manufacturing nervous breakdown." Parts shortages, defective parts, rework, and overtime approached all-time highs. Managers calculated that Boeing's production system was more than $1 billion over initial cost projections. The company was forced to make late deliveries, jeopardizing Boeing's standing with clients and its financial performance.

Eventually these problems were solved and Boeing went on to make other process improvements. At "moonshine shops," mechanics and assemblers are experimenting on innovations to improve efficiency, such as redesigning parts so that they are easier to assemble and load.Management is also working to standardize designs, to design units that require fewer parts, and to emphasize just-in-time parts delivery. Overall Boeing has already been able to decrease its 777 assembly time from 71 days to 31 days. Boeing is trying to use Internet technology to reduce procurement costs by moving all purchasing online, reducing the number of suppliers to 18,000, and eliminating EDI. Boeing's old procurement processes were excessively paper-driven, with about 90 percent of all transactions such as purchase orders, contracts, invoices, requests for proposal (RFP), and shipping notices involving paper. Just removing reliance on paper could potentially save Boeing 20 to 27 percent of its internal costs. As a result of Boeing's recent corporate acquisitions, Boeing absorbed a number of different divisional order processing systems, many of which were left unchanged. This meant that Boeing now had 18 separate EDI connections for each of its many suppliers.

Boeing's launched its Commercial Aviation Web portal called myboeingfleet.com in May 2000. Boeing has 850 customers, including airlines, governments, and leasing companies. The new portal is a customer source of tools, parts and information about specific planes. Customers can access 1.5 million engineering drawings, 70,000 maintenance manuals, official service bulletins, and even a Web page where customers can discuss their problems with Boeing engineers. Prior to the portal, customers had to go to different sites for different functions such as part purchases. Using the unified Web site reduced the cost and the amount of paper needed in each transaction. Boeing now involves only nine people in each transaction rather than the 38 previously needed. The portal has reduced the amount of paper exchanged between Boeing and its airplane customers, and improved customer relations, but it has not inspired new customer service programs that might create additional revenue.

Boeing's next B2B step was joining BAE Systems, Lockheed Martin, Raytheon Company, and Rolls-Royce to launch Exostar, a global Net marketplace for the aerospace and defense industry in September 2000. The founders had all been building their own e-commerce supply-chainWeb sites, investing millions of dollars, and they realized it would be cheaper and easier to join together to create a global electronic marketplace for their industry. While these companies are intense rivals for supplies and for commercial military aircraft and space contracts, they are also suppliers to and customers of each other. Their goal is to reduce costs while making their supply chains more efficient. In the past processing a purchase order cost Boeing about $150 manually.Today the standardized and automated contracts now cost around $1.50 each.

Quickly more than 8,000 suppliers joined Exostar out of the approximately 37,000 industry suppliers worldwide. Exostar gave suppliers a single connection point, improving their relationship with their buyers. Exostar uses the XML language, making it much easier for all suppliers and purchasers to join and use. It also enables Boeing and its suppliers to keep their internal systems, including Boeing's 18 legacy purchasing systems. Its suppliers now never have to deal with multiple systems. Moreover, it is now much easier for Boeing to know how much business the whole company is doing with its major suppliers. It also means future merger and acquisition integrations will be much easier. Exostar also includes a facility for suppliers and producers to work together in real time to plan schedules and to design or redesign products. Finally, Exostar is a much cheaper and easier system than is EDI. Boeing hopes Exostar will eventually wean all suppliers off EDI. However, small suppliers have been reluctant to switch to Exostar because they do not have the technical sophistication or financial incentive to change their business processes and systems to work with an online marketplace. Industry analysts also point out that using an industry consortium Net marketplace may not work to Boeing's competitive

advantage. Boeing has unique products and has used its status as a major industry player to set procurement standards that were in its best interests. While working on common solutions, each Exostar partner will try to protect its supply chain practices. The four companies compete for business, and the question is whether they will be able to separate their individual interests from their common goals for Exostar. To date, the bulk of Exostar purchases have been for indirect maintenance, repair, and operation goods.

Boeing also hopes to gain efficiencies from stepped-up use of knowledge management systems. Its Commercial Airplanes division, for example, must provide maintenance and support for a wide range of equipment with long lifespans. The company's global field workforce needs to refer 50 percent of its questions to Boeing's service engineers. It would cost Boeing up to thousands of dollars each time an engineer had to answer a query, because they were spending hours retrieving data and records. About half of the queries engineers receive each day have been previously answered, sometimes several times before. But unless the engineer remembered that a query had been previously answered, he or she would treat the inquiry as an entirely new investigation. Boeing implemented software from Primus Knowledge Solutions that includes an electronic repository of answers to a specified set of questions. This system can capture engineers' knowledge more easily, putting documents, messages, and drawings into folders that can be accessed with a sophisticated search engine. This saves engineers as much as several hours per day, since they no longer have to manually organize and coordinate information gathering. Every time a field service person answers a question, it can be funneled to the knowledge management system and indexed for future users.

In the summer of 2001, Boeing started rolling out an employee portal, starting first with 2,000 finance and engineering employees. All employees can access the portal, including nearly 50,000 factory employees given access through factory floor kiosks. For software, the company turned to Plumtree Software's Corporate Portal system. One problem that hopefully this portal would solve was that 172,000 employees were already connected, but to literally hundreds of intranets. The new portal is linking common data from Boeing's four big divisions, enabling the divisions to share significant data and applications over the Web. The company's plan is to identify the best-of-breed products in use in various units, and standardize the company's software on them. The portal gives employees access to large amounts of information, including: technical information, such as design data; personalized tools like calendars; human resources information such as retirement systems; and library items such as a glossary of aerospace industry acronyms. In addition, it gives employees such as aircraft designers an easy way to collaborate with other Boeing designers at home or abroad. The Boeing designers will also be able to collaborate with supplier designers when Boeing links its employee portal up with Exostar.

Overall, Boeing's aircraft production costs are still higher than the competition and the company is trying to reduce its U.S. workforce so that it can outsource more of its parts production work with components suppliers in China, Malaysia, and other countries. Jerry Calhoun, Boeing's lead labor negotiator stated that ". . . even with our efficiencies, even with our abilities to squeeze cost out of our product, we're still not cost-effective." According to Calhoun, Boeing would never win a sales campaign strictly on price.

CIO Scott Griffin has said, "The interesting issue for a big company is that when you're big, it is very hard to be fast. . . . We want to be big and fast." While Boeing has made many changes, the question remains whether these changes will make Boeing a strong yet nimble competitor in both its traditional and new lines of business. Can Boeing go fast enough to keep on flying?

Case Questions:

(1) Summarize the business and technology conditions that caused Boeing to change its business strategy. What management, organization, and technology problems prompted this change?

(2) Evaluate Boeing's new business strategy. What management, organization, and technology issues will Boeing face as it attempts to implement the strategy? How successful will Boeing be in pursuing that strategy?

(35%)