MEASI
Institute *of* Management

OPERATIONS MANAGEMENT – 434C2D

CASE STUDY

1. Virginia Mason Hospital

When you think of a hospital, what comes to mind? Patients, emergency rooms, technology and medical advancements. Making the sick and injured well again. When officials at Virginia Mason think of hospitals, they think of cars. A car manufacturing plant, to be exact. Beginning in 2000 the hospital's leaders looked at their infrastructure and saw it was designed around them, not the patient, said Dr. Gary Kaplan, Virginia Mason's chairman and chief executive officer. F or example, you hurry up and be on time, only to wait for the physician to see you. They began looking for a better way to improve quality, safety and patient satisfaction. After two years of searching, they discovered the Toyota Production System, also known as lean manufacturing. Developed in part by Japanese businessman Taiichi Ohno, the idea is to eliminate waste and defects in production. Virginia Mason has tailored the Japanese model to fit health care. Kaplan and other Virginia Mason managers took their first trip to Japan in 2002 where they visited manufacturing plants such as Toyota and Yamaha.

Nearly 200 employees have toured plants in Japan and a ninth trip is planned for this summer. While Virginia Mason couldn't say exactly how much they paid over the years to send the staff overseas, officials liken it to leadership training other companies pay for their employees. They say the benefits offset the costs. "'People are not cars' is very common for me to hear," Kaplan said. We get so wrapped up in the seriousness and specialness of health care, but we also have to open our eyes to other industries—we're way behind in information specialists and taking waste out of our process.

Toyota is obsessed with the customer and customer satisfaction . . . all those things Toyota was about was what we wanted." So what does that mean? There are seven wastes, according to the production system. One is wasting time, such as patients waiting for a doctor or for test results to come back. Others are inventory waste—having more materials and nformation than is necessary—and overproduction waste, producing more than is necessary. Take, for example, stockpiling brochures and pamphlets in storage closets. They take up space. There is wasted cost to make so many pamphlets that aren't needed. The hospital and all of its campuses in the Seattle area implemented a Kanban system, which

signals the need to restock. Kanban, which means “visual card” in Japanese, uses exactly that—a card put near the bottom of a pile of tongue dispensers, gauze strips or brochures, for example.

When a nurse or physician sees the card, he or she knows it’s time to refill. Supplies don’t run out, but they also aren’t over-ordered. The hospital created standardized instrument trays for surgeries and procedures, which saved several hundred dollars by no longer setting out extra instruments no one used. Unused but opened instruments have to be thrown away. I t takes a series of simple steps to make improvements, said Janine Wentworth, an administrative director who returned from a two-week trip to Japan last month. One example is the development of a flip chart showing the level of mobility in physical therapy patients. The chart shows the appropriate picture of what the patient can do, and each nurse or physician who comes in the room doesn’t have to waste time searching charts or asking questions.

Went worth also wants to implement a production plan to hire more staff before a shortage exists based on turnover rates on any given hospital floor. Another adaptation from the Toyota model is a patient safety alert system. At the manufacturing plant, if there’s a problem, the whole line is stopped and the problem is fixed immediately. Virginia Mason’s practice had been to identify and fix problems after the fact, perhaps leading to mistakes recurring many times before a solution was found. The alert system allows nurses and physicians to signal a problem when it happens and fix it immediately. Virginia Mason’s Kirkland site has about 10 alerts each day. The Kirkland campus implemented the Toyota model in 2003. They’ve reduced appointment and telephone delays by having medical assistants handle incoming calls, instead of medically untrained operators.

Also, instead of doctors waiting until the end of the day to go through a stack of patient records, they now write comments and recommendations immediately after seeing the patient before going to see the next one. The time saved increases the time a physician can spend with a patient. Dr. Kim Pittenger, medical director at Virginia Mason Kirkland, said most of the cost of medical care involves clogs in the flow of information—paper forms, lab results, phone messages, often leading to irritated patients. Working the backlog down costs more than if you never let things pile up in the first place, he said.

He said not everyone has agreed with the new system and a few physicians have left Virginia Mason because of it. “ To some it seems like obsessive-compulsive

disorder run amok, but it's part of a solution that eliminates mistakes," Pittenger said. Other hospitals, including Swedish Medical Center, have incorporated the lean system into parts of their operation. Virginia Mason said overall benefits include an 85 percent reduction in how long patients wait to get lab results back, and lowering inventory costs by $1 million. They've redesigned facilities to make patient and staff workflow more productive. The hospital reduced overtime and temporary labor expenses by $500,000 in one year and increased productivity by 93 percent. While direct cost savings aren't passed on to patients with the new system, less waiting, increased safety and more efficient care are.

Kaplan's vision is to have patients start their appointment in the parking garage with a smart card that triggers their entire appointment process. No more waiting rooms, just move directly from the garage to an examination room. Total flow—no waiting, no waste and it's all about the patient. "We have more than enough resources in health care," Kaplan said. "We just need to stop wasting it and only do what's appropriate and value-added and we'd save billions." Source: Cherie Black, "To Build a Better Hospital, Virginia Mason Takes Lessons from Toyota Plant," Seattle Post-Intelligencer, March 15, 2008. Copyright © 2008. Used with permission.

Questions:

1. What are the wastes identified by the hospital management in their health facility?
2. How approaches did the hospital management embrace to address these wastes using
3. Toyota way?
4. What are the similarities between the hospital and cars that made management adopt
5. Toyota way in improvement?
6. What is lean methodology and what are its principles? Does Lean affect performance? Is
7. there evidence from literature of its impact on performance, competitiveness and cost
8. reductions?

2. The Boeing Company

The Boeing Company, headquartered in Chicago, Illinois, is one of the two major producers of aircraft in the global market. The other major producer is European Airbus. Boeing produces three models in Everett, Washington: 747s, 767s, and 777s. The planes are all produced in the same building. At any one time, there may be as many as six planes in various stages of production. Obviously the building has to be fairly large to accommodate such a huge undertaking. In fact, the building is so large that it covers over 98 acres and it is four stories high, making it the largest building by volume in the world. It is so large that all of Disneyland would fit inside, and still leave about 15 acres for indoor parking! The windowless building has six huge doors along one side, each about 100 yards wide and 40 yards high (the size of a football field)—large enough to allow a completed airplane to pass through. Boeing sells airplanes to airlines and countries around the globe.

There isn't a set price for the planes; the actual price depends on what features the customer wants. Once the details have been settled and an order submitted, the customer requirements are sent to the design department. Design Designers formerly had to construct a mock-up to determine the exact dimensions of the plane and to identify any assembly problems that might occur. That required time, materials, labor, and space. Now they use computers (CAD) to design airplanes, avoiding the cost of the mock ups and shortening the development time. The Production Process Once designs have been completed and approved by the customer, production of the plane is scheduled, and parts and materials are ordered. Parts come to the plant by rail, airplane, and truck, and are delivered to the major assembly area of the plane they will be used for.

The parts are scheduled so they arrive at the plant just prior to when they will be used in assembly, and immediately moved to storage areas close to where they will be used. Time-phasing shipments to arrive as parts are needed helps to keep inventory investment low and avoids having to devote space to store parts that won't be used immediately. There is a trade off, though, because if any parts are missing or damaged and have to be reordered, that could cause production delays. When missing or defective parts are discovered, they are assigned priorities according to how critical the part is in terms of disruption of the flow of work. The parts with the highest priorities are assigned to expediters who determine the best way to replace the part. The expediters keep track of the progress of the parts and deliver them to the appropriate location as soon as they arrive. In the meantime, a portion of the work remains unfinished, awaiting the

replacement parts, and workers complete other portions of the assembly. If the supplier is unable to replace the part in a time frame that will not seriously delay assembly, as a last resort, Boeing has a machine shop that can make the necessary part. The partially assembled portions of the plane, and in later stages, the plane itself, move from station to station as the work progresses staying about five days at each station.

Giant overhead cranes are used to move large sections from one station to the next, although once the wheel assemblies have been installed, the plane is towed to the remaining stations. Finished planes are painted in one of two separate buildings. Painting usually adds 400 to 600 pounds to the weight of a plane. The painting process involves giving the airplane a negative charge and the paint a positive charge so that the paint will be attracted to the airplane. Testing and Quality Control Boeing has extensive quality control measures in place throughout the entire design and production process. Not only are there quality inspectors, individual employees inspect their own work and the work previously done by others on the plane. Buyers' inspectors also check on the quality of the work.

There are 60 test pilots who fly the planes. Formerly planes were tested to evaluate their flight worthiness in a wind tunnel, which required expensive testing and added considerably to product development time. Now new designs are tested using a computerized wind tunnel before production even begins, greatly reducing both time and cost. And in case you're wondering, the wings are fairly flexible; a typical wing can flap by as much as 22 feet before it will fracture. Re-engineering Boeing is re-engineering its business systems. A top priority is to upgrade its computer systems. This will provide better links to suppliers, provide more up-to-date information for materials management, and enable company representatives who are at customer sites to create a customized aircraft design on their laptop computer. Another aspect of the re engineering involves a shift to lean production. Key goals are to reduce production time and reduce inventory.

Boeing wants to reduce the time that a plane spends at each workstation from 5 days to 3 days, a reduction of 40 percent. Not only will that mean that customers can get their planes much sooner, it will also reduce labor costs and inventory costs, and improve cash flow. One part of this will be accomplished by moving toward late-stage customization, or delayed differentiation. That would mean standardizing the assembly of planes as long as possible before adding custom features. This, and other time-saving steps, will speed up production considerably, giving it a major competitive advantage. It also wants to reduce the tremendous

amount of inventory it carries (a 747 jumbo jet has about 6 million parts, including 3 million rivets). One part of the plan is to have suppliers do more pre-delivery work by assembling the parts into kits that are delivered directly to the staging area where they will be installed on the aircraft instead of delivering separate parts to inventory. That would cut down on inventory carrying costs and save time. Boeing is also hoping to reduce the number of suppliers it has, and to establish better links and cooperation from suppliers. Currently Boeing has about 3,500 suppliers. Compare that with GM's roughly 2,500 suppliers, and you get an idea of how large this number is.

Questions:

1. Analyze Boeing strategy in the location selection and layout of the venue where the airplanes are manufactured
2. What is the type of inventory management does Boeing embrace? How does Boeing manage its inventory? Why it is important to manage inventory?
3. Describe and critique the company's strategy to overcome delays in manufacturing.
4. What other strategies Boeing is planning to implement to cut cycle times?

3. Do Services have Different Characteristics than Goods?

NEPC Airlines was promoted by the Khemkas, the Chennai based Marwari business family. They took advantage of the second wave of liberalisation in the aviation sector in the early nineties, to venture into air transportation business. The NEPC group is still in the business of processed food (atta), wind power, textiles, etc. But they failed in their airline venture.

The aviation sector was opened up partly after the return of Mrs. Indira Gandhi to power in 1980. Feeder routes to small cities were charted and a separate airline, Vayudoot, was formed. By the nineties, private participation was allowed and a rash of smaller airlines came into the picture, plying through the feeder routes like Nagpur, Bhopal, Raipur, Jagdalpur, Goa, etc.

NEPC Airline had the Dornier aircrafts, which are small, seating about 25 people, with the luggage compartment designed in the snout. It flew short and non-metro destinations like Indore, Pune, Nagpur, Mysore, and the bigger cities of the south like Bangalore, Chennai, etc.

It came in the news by quickly taking over a few smaller airline companies, like East-West Airlines, Span airlines, etc. But the government restrictions, limiting its flights only on feeder (non-popular, giving connections to main airlines) routes, and intense competition brought down its operating margins.

But the biggest problem it faced was in getting the professionally trained personnel – flight, ground and marketing. It also never could position itself in the minds of the passengers vis-à-vis Jet airways, Modi-Luft (now defunct) and Air Sahara.

Questions:

1. Do services have different characteristics from goods?
2. Can you explain why, although NEPC was strong in goods, it failed in a service venture?