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CIS 410-50

Burlington Northern Use Case 1

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# Case Overview

**Brief:**

Burlington Northern is considering investing in a new railroad control system to completely overhaul their railroad operations. The intent of this case is to determine if the investment in development and deployment of their ARES system would be a beneficial business decision both short term and long term, or if there are alternative solutions that can supply a greater return on investment (ROI) holistically (Hertenstein, Kaplan)

**Proposed Solution:**

In addition to supporting general freight, ARES is also intended to streamline transport of

natural resources extracted from Burlington Northern land holdings (2). In terms of

technology, ARES is said to be based on concepts developed for the airline industry, and

relies on relatively accurate, but expensive GPS equipment (10, 12).

However, due to the technology available at the time, the system would require a large

investment in a physical communication network. The project also suffered from a fair

bit of scope creep, which expanded the project from a way to more accurately route and

track freight, into a complete re-imagination of how the entire business would run, with

specialized systems that would compute traffic plans in real time, as well as numerous

other functionality (11).

This scope creep peaked in 1990, with the project evolving to include the initial

scheduling goals, but also including an energy management system, a vehicle diagnostic

system, and an evolution of the original control software from the Iron range test (14).

Financial cost bloomed accordingly, with a minimum investment of 350 million dollars

for an entire rollout of the system alone, split between a control center, data link

infrastructure, and onboard overhauls. Even with the high expense, ARES was expected

to return a solid investment above 9% after-tax, and was generally considered a solid

investment. With the project evolving to include the first scheduling goals, but also including an energy management ow the entire business would run, with specialized systems that would compute traffic plans in real time, as well as numerous other functionality (11).

# Industry Competition Analysis

**Burlington Northern Information:**

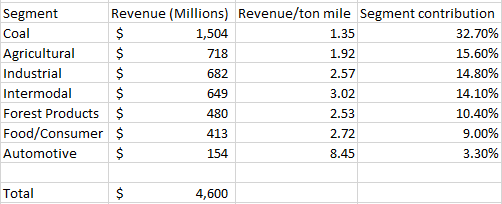
**Industry of operation:**

First and foremost, Burlington Northern is a railroad business. They hold vast amounts of land and resources, and extract and transport them for sales. Their primary segments in this industry include the mining, extraction, and transportation of coal, agricultural goods, industrial products, intermodal goods, lumber, food and consumer goods, and automotive products, and between all of these segments, coal is absolutely the largest source of revenue.

In general, the railroad industry has a history of mergers and consolidations between major railroad companies across the country for decades, and in addition to this amount of time spent, it is generally efficient in terms of moving cargo or transporting goods.

**Company effectiveness analysis:**

In 1989, Burlington Northern had total revenues of approximately 4.61 billion dollars, with expenses of around 3.95 billion. Their net income was approximately 243 million dollars. In addition, they hold 6.15 billion dollars in total assets, with 5.05 billion in liabilities, most of which is composed of current long-term debt, and deferred income tax. Their debt to stockholder equity ratio is roughly 4.7:1. Revenue contribution by segment is as follows for the fiscal year 1989:



The USDA notes that in 1980, Burlington Northern RR held 19% of the market for freight of grain, and based on previous data shared that number had a high percentage of growing, given how certificated of transportation for grain transit was implemented(4).

Burlington Northern, as stated above, operates freight for several industries, and offers contract service as well. Their on-time deliveries are fairly good for freight, in the 75-80 percent range, although this does not quite match the trucking industry (6).

Burlington Northern relies on having their cost of freight to be very low in comparison to competitors, coinciding with consistent deliveries, a vast variety of transit modes, as well as a very intricate and detailed supply chain management system. Lower cost is offered, and a very high rate of successful deliveries, and incorporation of various supply chains and transit modes, their network the process of how vehicles are selected seems to have a fuel economy and limits on planning, which could potentially lower costs further, and reduce cycle time, which is crucial to the success of their business. They also struggle with employees with accurate logging of information, which can be detrimental to the quality of the service ultimately (10).

**Five Forces Analysis:**

**Threat of new entry:**

The threat of new entry is fairly low in the railroad industry. Additionally, there is a substantial monetary and time intensive commitment required to build a railroad system which also deters new entrants. In terms of regulatory barriers, the Staggers Rail Act prohibited many of the barriers that prevented the industry from growing (6).

**Bargaining power of buyers:**

The bargaining power of buyers is contingent on the part of the industry. In the coal segment for example, the bulk of the business is limited to long-term agreements with many consumer companies (4). In Burlington Northern’s favor, eastern countries like China, Russia, Thailand are possible markets that can be exploited to expand their consumer base, and this would not have a substantial impact on their local customers.

**Threat of substitutes:**

Advantages of the substitutes are primarily in their flexibility and service quality. Trucking outshines in the service category due to the ability to be able to deliver a decent amount of products depending on what it is in a fair time directly to the supplier or a distribution plant which is time efficient, which in return is not really accessible or efficient by a train or railroad system (6).

**Bargaining power of suppliers:**

There was not much information about this, but it is reasonable to assume that the industry is susceptible to extreme changes in the price of fuel, locomotive equipment and parts. One thing that was brought to the attention was their rigorous maintenance schedule, with a 92-day maintenance period. If this problem takes place during a time where certain parts are having a malfunction or a supply chain issue, the effects that the downtime could have on Burlington Northern can be very detrimental to the overall company and prevent form profits from being made.

**Competition:**

Other railroads such as Union-Pacific have say over the resources they own and infrastructure they manage as well. Advantages in infrastructure can lead to advantages in competition, lowered costs, and expanded capacity for storage which is something that Burlington Northern is having trouble competing with (4).

# Overview of Stakeholders

**Business Stakeholders:**

**Burlington Northern**

If the ARES project goes the way it is intended to, the Burlington Northern plans to greatly profit over a period of time because of the lower costs, cycle time will be reduced by a great amount, and the service quality will be improved as well. Yet, it is important to note that the risk is fairly high and would be something that a company would have to take into consideration with such a great liability risk.

**Employees of Burlington Northern**

Based on the ARES project, it would encourage for additional personnel to be hired in positions of support, and would have some strong benefits in consistency of providing schedules, which could ultimately have an effect of the mood of workers which could net in positive employee turnover and could increase applications to work for the company. Coinciding with the previous sentence, safety would also be something that would be improved over time because the protocols would have to be updated to where people could be held safe and accountable based on where they work to increase functionality.

**Consumer Stakeholders:**

**Power Utilities & Coal Consumers:**

Consumers would receive help from the ARES system as it gives Burlington Northern to put more effort and time to supplying different organizations given thanks to the cycle times being lowered. Additionally, if the network capacity is improved, Burlington Northern would be allowed to cater to foreign markets more efficiently.

**Consumers of Perishable and Sensitive Goods (6):**

Having a low shelf-life of these products can make them susceptible to delays, even with an air-conditioned car or cars which is why this category of cargo is incredibly sensitive to time. Having the right tools to transport these goods more efficiently would be alternative to trucking or moving goods through automobiles. Since things like electronics are very fragile, if there was a way to ship these through a railroad system safely, it would tremendously lower shipping costs for the consumer and supplier and it could improve on safety and maintenance stemming from the newly implemented ARES system.

**Competitive Stakeholders:**

**Other Rail-Freight Companies:**

ARES would allow for Burlington Northern to bring in a greater amount of market share and help build relationships with the customers as a whole. This would cause other railroad companies to start building wholesome relationships with their customers thus enhancing the user experience tenfold. With this being said, the implications it has could be tremendous with allowing for Burlington Northern to expand their organization into the west while other companies struggle to keep their presence known.

**Truck Freight:**

If the trucking industry were to be cannibalized with things such as a higher quality and a higher percentage of reliability, the effects on the competitiveness of the industry would be very negative. Yet it is important to note that local services potentially may have an up rise in their business, especially if Burlington Northern builds relationships with their customers.

# Potential Alternative Solutions

**Alternative One: Partial Rollout of ARES (24-27):**

**Alternative overview:**

A partial cut of the whole ARES system could allow Burlington Northern to receive benefits of the system which would allow for changes to be made in the most crucial parts, which would target the routes that include the cycle time being reduced heavily and having the tracking capabilities be better as well. This would also allow a compromise of market share.

**Potential business impact:**

Energy management systems and LARS could be done away with, which could ultimately reduce how difficult the system is, and since the cost would be reduced on the system, the return on investment would likely skyrocket allowing for those funds to be placed where they are most needed without adding anything new.

**Consequences for stakeholders:**

Correlating with the impact that would be on the business side of things, the impact for stakeholders would also have a similar version of these benefits as well. Any employee buyout would be smaller perhaps, but the increase in working would provide more consistent scheduling and worktime. Consumers of products that navigate routs that have been operated with the new ARES system, would experience benefits similar to the full ARES rollout but would leave other customers to have a similar amount of increased time spend on the ARES line and increasing overall market share battling with other freight providers.

**Alternative Two: Reduce Scope, Invest in Infrastructure/Expansion.**

**Alternative overview:**

The goal of this alternative solution is to still use the ARES system, but to have scale it back and use a simpler version that would require less money and less work on the infrastructure and upgrades. Through building this type of ARES system to keep records of location, would still allow substantial improvements in planning efficiency. To complement this, instead of making routes to avoid down or wait time, things such as doubling the width of the tracks could be truly groundbreaking to reduce delays. Leftover or excess funds could be used to pay for liabilities, or a number of other things that needs attention in making Burlington Northern more modernized and efficient in the short term and long term.

**Potential business impact:**

One of the advantages of this alternative solution is that advancements are created by just planning and execution of specific ARES functionality only. Burlington Northern could see benefits in places that would give them and help them to help provide their client base with better things, services improvement, and reducing the cycle time.

**Consequences for stakeholders:**

This solution has a broad impact range. Burlington Northern will be better able to compete in a variety of circumstances, particularly against other rail lines, employees will be less likely to be laid off in a buy-out, and reduced cycle times will improve service to customers. In addition to this, it would allow for the system to be easily and readily accessible and could be set up fairly easily.

**Alternative Three: Do Nothing:**

**Alternative overview:**

The do nothing option would be a safe option given that other things happen as well. From changing nothing about their infrastructure, Burlington Northern, wouldn’t be in a different place than which they are in now.

**Potential business impact:**

Currently, Burlington Northern could potentially see positive levels of financial wealth, but it would also be limiting to the expansion by not allowing them to have investment opportunities that could improve their service or expand their business as a whole. After some time, other railroad companies may grow in ways that would put Burlington Northern down under basically surpassing them. Additionally, the conservative approach would be to take time and use that for improvement upon the business. By doing nothing, different liabilities and other things limiting from growing can be paid down rapidly, and the stock price could be raise and a emergency reserve fund could be created.

**Consequences for stakeholders:**

In various ways, the relationship with the stakeholders could be in such a way that they are currently, for the moment at hand. Employees would continue to be on an on-call schedule, and those rotations would stay the same, and other railroad industries would probably continue to improve in every aspect to better serve their customers holistically.

# Selected Option & Reasoning

**Selected Option: Reduce Scope, Invest in Infrastructure/Expansion**

Having this option would help give benefits without replacing the entire existing system. It is ideal, as it would allow Burlington Northern to make a sound business decision in expanding for future transporting needs and encouraging healthy competition against other railroad companies. While it would not be as powerful at planning routes efficiently, it would give most of the benefits without making a use of GPS, but incorporating some of the technology that is already used such as those in streetlights, or maybe a magnetic coil that has sensors that can communicate with the system letting it know the positioning of a cart and the speed as which it is going.

**Rejected Option: Do Nothing:**

This option is one of the worst ones because if Burlington Northern does nothing, their competitors will surpass them and it may be impossible for them to come back. The innovation that the competitors may have can be so great it would be a tremendous price for Burlington Norther to come back from. Given that Burlington Northern would remain profitable, the lack of improving on the system would potentially cause consumers to lose interest for Burlington Northern and look for business elsewhere.

**Rejected Option: Partial Rollout of ARES:**

This is a better option, a solid plan if you will, but it has somethings that would hold it back from being as great as it could potentially be. It would definitely be less expensive, than the full rollout of the ARES system, but the smaller cost would be better for the management side of things. Where it could be lacking in places, is while it could allow Burlington Northern to contest from a higher position, their improved infrastructure would draw in more business which could be a good thing, but it would then prove to keep pushing the infrastructure to a level in which it is not capable of going just yet.

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