**Case Study Analysis of**

**Burlington Northern**

CIS 410-50

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**Executive Summary**

BN’s problem is more complex than answering the question, “would BN benefit from ARES implementation?”. The real question is, as an organization would BN be able to successfully implement, adopt, and run using this new system? I say, no. BN is not ready as an organization. Instead BN should pursue a cooperation with a trucking company or a merger.

Although implementing the ARES and LARS system could give BN a huge advantage in the freight industry, I do not think that BN’s leadership nor their workers are ready to adopt such changes. BN should not implement the ARES and LARS system, because:

1. BN’s senior leadership is not embracing the changes with the sort of enthusiasm needed to successfully implement and adopt a new system.
2. Every operation is done in a mechanical way (albeit poorly), reengineering a system that has been entrenched for nearly 80 years is not a good idea.
3. The project is too massive for such a company that hasn’t had to (ever?) adapt.

These reasons for not implementing the system are largely cultural and not really much to do with the ARES or LARS system at all. The system itself is actually quite a good investment, even though there is much uncertainty as to the estimated ROI.

*“Patterns of authority serve as points of resistance and coordinate activities by restricting activity in certain directions while encouraging it in others... When commands were issued from the top of the organization, they would travel throughout the organization in a precisely determined way to create a precisely determined effect.”*

**- Images of Organization, pp. 21**

This quote from Morgan reminds me that BN’s current executives weren’t the original group that spawned the idea of implementing LARS or ARES. They rather inherited the projects without fully investing themselves. BN’s top management are unknowingly the reason why this project would fail if attempted. Their lack of vision, decisiveness, and leadership into the new organizational culture that is required will resonate down through the organization. This will result in a system that is implemented halfheartedly and will waiver when expected roadblocks arise.

Short of replacing all senior management with a capable, confident, and committed leadership, BN’s only viable alternative is to seek out an alliance/merger with a trucking agency. Trucking is BN’s biggest threat, not Union Pacific. BN would be wise to remain relevant through offering their services to a trucking company where they struggle (large/heavy cross-country loads) in return for final destination door to door services. This could potentially improve both companies bottom lines and gain an industry advantage.

Although BN shouldn’t pursue ARES and LARS system implementations, it is still worth while to analyze why the system would have been worthwhile **-*IF-*** BN were actually ready as an organization (which they are not)

**Burlington Northern Mission Statement**

BN’s mission statement would something like the following:

*Our mission is to provide railroad transportation of goods, particularly coal and agriculture clients, that need freight transported in a safe, reliable, and punctual way.*

*“Defining your market to narrowly, known as ‘marketing myopia,’ can make it impossible to work out who your competitors are in terms of market need and opportunities”* **- Porter’s Five Forces - Strategy Skills, pp. 7**

The Importance of this quote cannot be over emphasized. BN wrongly assumes its greatest competition is Union Pacific, another rail company. Instead it is the new entrants into the freighting industry; trucking companies.

The above mission statement is one that is accurate, but also treading in marketing myopia territory. A mission statement that more effectively describes BN without alienating what they truly are is as follows.

*BN’s mission is to provide ~~railroad~~ transportation of freight from* ***any market*** *that would benefit from our safe, reliable, and punctual services.*

BN’s stakeholders

**Porter’s Five Forces**

Competition – the major direct competition for BN is other railroads, mainly Union Pacific. Union Pacific is considered a formidable competitor with greater rail capacity and more fuel efficiency. The competitive force is high. Major indirect competition are trucking companies.

Threat of New Entrants – Barriers to entry are substantial. The capital required to begin competing is high and capital intensive. The force of threat of new entrants is low.

Power of Suppliers – Suppliers of the railroad industry is low because the materials needed to create new rails (timber/steel) are common resources that many different suppliers can provide.

Threat of Substitute Products – The threat of substitutes comes in the form of any other type of cargo transportation. Planes and Trucks are the most likely threats and are gaining market share. Trucks are more versatile and have a 95% on time delivery compared to BN’s 75%. Trucks and Air freight are more able to grab markets that require JIT supply chain. The threat of substitute products is high.

Power of Customers – Certain customers provide most of BN revenue. Coal makes up the largest portion of BN’s revenue at ~32.6% in 1989. Powder River Basin makes up 90% of all coal revenue, so 29.34% of all revenue is produced from one customer. Power of Customers is extremely high.

**PESTLE Analysis**

Political – The Motor Carrier Act of 1980 created more freedom for trucking companies to set their own rates, putting pressure on rail companies. The Staggers Rail Act of 1980 gave them freedom to set rates and acquire other transportation means.

Environmental – the U.S. government is likely to enact the acid rain legislation which could raise demand for Powder River Basin’s coal.

Social – rail systems are long accepted technology and generally accepted and seen as non-disruptive.

Technology – Rail companies are using technology developed in the 1920’s. Communication is spotty, tracking is non-existent, and scheduling/task automation is not developed for rails. The technology of all of these exist for other products like the FAA and Airplanes but would need to be converted to railroad use.

Legal – nothing notable besides regulation of load sizes.

Economic – Trade with Pacific Rim countries could increase demand and make expansion along the western U.S. coast appealing. Trucking companies are becoming harder to compete with by offering cheap transportation of heavier loads with high reliability, although other rail companies remain the biggest threat to current markets.

**SWOT**

Strengths – BN has a large market share of the north, and mid-western united states rail transportation. Rail is more uniquely suited than other modes of transportation to move large/heavy loads.

Weakness – poor operations and scheduling. Cannot collect real-time data or communication from Locomotives. Low utilization of assets because of lack of information and operational control. Poor maintenance operations from lack of data and communication. Lots of wasted time and underutilization of assets.

Opportunities – To gain access to JIT supply chains through operation improvements in reliability. Have first mover advantage with a new ARES technology gaining larger market share and ROI. Ally with trucking a company(s) to perform long hauls with trucking companies performing the last leg to the customer’s door.

Threats – Trucking companies are becoming entrenched in commodities and time sensitive shipping operations. With fuel efficiency increasing coupled with reliability of shipments its current rail customers could be taken.

The most important factor to take into consideration from this SWOT analysis isn’t what BN is doing right or wrong, it isn’t even the opportunity of implementing new and exciting information systems and automation. It is instead the threat of trucking companies.

*“Your greatest threats are more likely to come from new emerging competitors or new technologies”* **- Porter’s Five Forces - Strategy Skills, p. 8**

BN cannot currently touch the currently claimed market share of trucking companies. They are ill equipped to compete, be more efficient, or provide personalized services better. Trucking companies are the driving *force* that will place BN on the growing list of companies that died and were replaced by more efficient technologies and services. BN should not underestimate the threat of an indirect competitor.

**Benefits of New Technologies**

The technologies and their expected Benefits are as follows.

|  |  |
| --- | --- |
| **Technology** | **Expectations** |
| ARES | Accidents would be lowered by a factor of 100 due to limiting human error.  Reduction in line-haul and terminal time by 7-8% (all else constant).  Reduce yard times by an avg. of 1 hr. and reduce missed connections by 15-17%. |
| Customer Service | A 1% increase in reliability would result in 4-5% revenue increase. |
| LARS | Savings of 3-5% are expected from improvement in departure delay, on-line delay, time off-line, maintenance man hours, and reduced repair severity. |
| Energy Management System & Pass Planning | EMS saw only 2% net fuel savings and increased running times. Meet/Pass Planner shed 21% of run times. Reliability increased and travel time Std. Dev decreased. 2.5% fuel consumption decrease. |

A line by line evaluation of net present value is as presented below.

|  |  |
| --- | --- |
| **Category** | **Present Value of Benefits** |
| Fuel | $ 52 million |
| Equipment | $ 81 million |
| Labor | $190 million |
| Trackside Equipment and Damage Prevention | $ 96 million |
| Enhanced Revenues | $199 million |
| **Totals** | **$618 million** |

**Costs of New Technologies**

The cost estimate of implementation of ARES is $360 million. The control center makes up $80 million. Data links are $80 million and would be required whether or not this project is pursued. On-board equipment is $200 million, making up the largest portion of the project. Of this $200 million, LARS makes up $35 million. To create the control center without on-board equipment and visa-versa would be pointless and a waste of resources. Either all three should be implemented or only the data links should be done, which would be required regardless. This is all under the assumption that system implementation is worthwhile, which it is not.

**Stakeholders and the Impact**

The stakeholders are many, but some of the key stakeholders and how this decision will affect them are as follows:

* The workers of BN – by aligning with a trucking company and not implementing the ARES or other new information systems they will be able to continue many of their current operations. They have a distinct interest in the success of BN’s strategic plans and would benefit from working with trucking companies.
* The stockholders who own shares of BN – BN has a responsibility to use their provided capital in a responsible way to their stockholders. Co-aligning with a trucking company will strengthen the market share and subsequently should increase the bottom line.
* Directors and Managers of BN – they are vested in seeing BN succeed. They are also interested in self-preservation through the success of BN. They are unprepared to lead an innovative transformation of BN and would be acting in the best interest of BN to not implement the ARES system.
* The US government - BN’s role in providing coal energy and the regulation of rail operations are of interest to the US government. Without BN’s infrastructure the transfer of coal to needing territories would put strain on utility companies and subsequently cities that depend on coal.
* Union Pacific and other rail companies that are direct competition – they are vested in what BN decides to do because they must remain competitive. Depending on BN’s actions they may be forced to adapt to remain competitive.
* Trucking and other freight companies that compete indirectly with BN – these companies are interested in the results of BN’s efforts because they whether they know it or not, they are competitors. And if BN does what I suggest and align with BN they will be able to work together to more effectively serve more customers more efficiently. BN would be able to handle large, heavy, and numerous payloads to major hubs and allow trucking companies to complete the final leg and bring the freight to their final destinations similar to spokes on a wheel.
* BN’s customers, especially Powder River Basin – these coal companies rely heavily on the continued services of BN because of the area they service and the ability of BN to carry their large/heavy loads for relatively cheap rates. If BN were to shut down, Powder River Basin would be forced to utilize another rail company, or another means of transport.
* Rockwell International - has a stake in BN buying its information systems to adapt for rail operations. This could be a large purchase order and service if it were to be successfully implemented at BN. If successful, other rails would likely have to follow suite to remain competitive, which would mean more revenue for Rockwell.

These stakeholders are all either directly or indirectly affected by the implementation of new systems and BN’s chosen path.

**Decision**

The numbers for continuing on with the ARES and LARS project is sound from an ideal perspective, but from the human perspective it should NOT be pursued.

*“As in the old classical theory, the basic assumption is that if you get the engineering right the human factor will fall into place. Needless to say, this is not always the case... The human factor often subverts the reengineering process, leading to massive failure rates.”* **- Images of Organization, pp. 22**

Although the benefits are apparent and costs manageable, this project should not proceed, because the upper management, and as a result the entire organization, is not ready to act with a full force of implementation. The opportunity to be a first mover and potentially gains an edge doesn’t outweigh the moral from the quote above.

The successful implementation of the system doesn’t guarantee the successful integration with the organization. An organization that has been doing the same thing since 1920 isn’t apt to change its ways quick enough to be successful... especially with the lack of decisiveness and leadership from current upper management.

The direction the company should take is outlined in the table below.

|  |  |  |
| --- | --- | --- |
| **Task** | **Concerning Situation** | **Suggestion** |
| Integrate Trucking Operations | Trucking has the unique ability to go door to door, cutting out locomotive freight from a large JIT market. | Incorporate trucking company’s into cross country hauls. Have trains work as major transportation of goods to major “hubs” and have trucks work as the final leg of the freight transportation. It would be profitable for both companies to share in cargo transport, trains doing the long/heavy legs, and trucks working the door to door logistics. |

If management and the human factor were not such an issue, the next best option would be to implement both the ARES and the LARS systems in multiple phases. The other implementations of various systems fall short of this phased approach. And ultimately this phased implementation approach falls short of seeking some sort of merger with a trucking company:

1. **To do nothing**
   1. This option is the safest short-term option. It offers the safety of the known. It wasn’t chosen because the current state of technology and operations was not safe or sustainable if the rail industry were to keep up with the growing threat of substitution by trucking. Cooperation with more technologically advanced companies, such as trucking companies, or modernizing their current operations with systems such as ARES would be required to remain relevant another 50 years.

*“Mechanistic approaches to organization work well only under conditions where machines work well.”* **- Images of Organization, pp. 27**

* 1. The above quote points out something interesting, but somewhat obvious. BN is a fairly mechanistic company. And they have operated fairly efficiently for decades. In fact, when they first started in the 1920’s it was top of the line in regard to efficiency. But when a company can only operate as the machine was designed and is resistant to change, they become prime candidates to being replaced by newer, more efficient technology. Newer mechanical organizations such as trucking companies are BN’s replacement if nothing is done.

1. **Implement the entire system companywide all at once.**
   1. This option wasn’t chosen because of the likelihood that software bugs would be present and costlier if implemented nationwide, all at one time. Testing in the Iron Range first gives the benefit of working out bugs and optimizing algorithms before further implementation.
2. **Implement the entire system over phases.**
   1. This option wasn’t chosen because even though the changes in the company wouldn’t be as drastic as an immediate implementation, it would still require too much from a human perspective. The lower level operational workers would not have the required support from management to successfully transition to an entirely new way of doing nearly every task. As Morgan points out:

*“Mechanistically structured organizations have great difficulty adapting to changing circumstances because they are designed to achieve predetermined goals; they are not designed for innovation.”* - **Images of Organization, pp. 22**

* 1. BN is not ready to innovate and change. BN is a mechanical organization where the mechanism is outdated and being replaced by trucking companies. The head of this mechanical company is leadership that is unable to lead the BN to a new era of doing things.

1. **Implement ATCS instead of ARES**
   1. The ARES was chosen over ATCS because although some aspects were similar to the ARES such as comparable locomotive position precision (+100 ft.), and similar cost for on-board equipment. It would be better in any regard.
   2. It is actually worse in the following ways: use UHF instead of VHF radio costing $146 vs $78 million which is overkill for communication capabilities. It uses transponders instead of GPS so is more susceptible to outages and doesn’t provide full safety benefits.