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GSOE9758 Network System Architecture

Final Report

Title: Business Model, Architecture, and Evaluation of K&S Corporation Limited Company

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# Abstract

**This report consists of three parts. In the first part, we employ business canvas model to analyze some characteristics of K&S corporation limited company. Besides, we discuss the vision, goal, and requirements (VGR) in terms of this company. In the second part, capabilities and required component has been offered and it helped develop the ambitious requirements. Then we provide the architecture structure to summarize the deployment of those advanced technical components vividly. Finally, we give some reflection based on our learning on this project.**

**Keywords:** Business Canvas Model, VGR, Network Capabilities and Components, Architecture.

# Business Aspects

## General Background

Our company is Formed in 1945 through a partnership between Kain and Shelton that’s where our name K&S come from. In the Past 70 years, we have grown into one of Australia and New Zealand’s largest multi-modal providers.

Multimodal transport means that we distribute and deliver goods under a single contract, but with at least two different modes of transport. We provide road, rail and coastal sea forwarding in support of bulk loads and the delivery of integrated supply chain and we provide system solutions to our key customers.

We are also operating a comprehensive business matrix to cover different needs: K&S FREIGHTERS, KS Energy, Chemtrans for chemical, KS Bulk, DTM business logistics, heavy haulage and K&S Fuels.

We treat safety and innovation as our most important value, so we are also planning business revolution to adapt the situation of peri-covid era and to meet the requirement of increasing needs and higher standard. Besides the requirements of COVID safe delivery, we are also planning to adopt new technology to meet increasing needs in logistics. To maintain our high standard of safety and quality, we have set up detailed goals of internal upgrading.

## Business Canvas Model

The business canvas model has usually been introduced as a promising solution to logically describe company organization, systemically analyze current strategy as well as offer the future blueprint of companies [1]. Specifically, the business canvas model consists of nine segments to facilitate a brief but comprehensive description of a company from a different perspective. Therefore, this report would introduce those nine segments based on K&S corporation limited company, respectively. The business canvas model was illustrated in Table 1.

Table 1 Business Canvas Model [2].

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Business Model Canvas** | | | | | |
| **Key Partners**   * Government * Fuel providers * Retailers and bulk suppliers * Insurance company * Medical supplies * Auto service provider | **Key Activities**   * Bulk load * Energy/material * Warehousing * Supply chain * Import/Export | **Value Proposition**  General Values   * good brand reputation * convenience and reliability   Special Values   * risk reduction during the Covid-19 * environmental-friendly | | **Relationships**   * Supplier and demander * Customers service | **Customers**  Logistics Part  company related to:   * freighter * energy * chemtrans   Fuels Part   * airline * fuels   Rent Part  company related to:   * buildings * mining and resources |
| **Key Resources**   * Truck/rail/ship Fleet * 4552+ vehicles * Warehouse 2700+employees | **Channel**   * Physical store * Brand linkage * Customization promotion * Website |
| **Cost Structure**   |  |  | | --- | --- | | Supplier Expense | $4200.8M | | Employee expenses | $3314.8M | | Depreciation | $516.7M | | Miscellaneous | $96.8M | | | | **Revenue Streams**   |  |  | | --- | --- | | Logistics of services | $7900.7M | | Sale of goods | $307.4M | | Rental income | $41.2M | | | |

**Value Proposition**

The value proposition is the essential reason why customers turn to choose a company, the values proposition of K&S company is divided into two main categories.

(a) General Value Proposition

The first general value is good reputation, for example, K&S corporation limited company has been providing fuel and lubricant delivery services in Southeast Australia for nearly 60 years [3]. It is the only local fuel distribution in this region. Therefore, they hold a good brand reputation compared with other small companies which enables them to emerge as a promising and successful delivery company even under the negative influence of Covid-19. The second general value is convenience and reliability. For example, 24 hours services in the customer center are provided to satisfy any transportation orders. At the same time, the newest technologies, such as the modern fleet, are assigned with objections to reliable delivery [3].

(b) Special Value Proposition

Despite those general values, the development of this company highly depends on some special values. One is risk reduction during the Covid-19 pandemic, i.e., mandatory vaccination has been performed leading to zero employee Covid-19 cases. The stringent requirement in fighting Covid-19 provides a safety guarantee to customers. Besides, environmental-friendly logistics is another special value where this company exhibits lower energy consumption and carbon emission in their vehicles.

**Customer Segments**

According to the operation direction of this company, we categorize the consumers segments into three groups: logistics part, fuels part, and renting part. Firstly, logistic parts comprise the heart of revenue, which makes a significant contribution to their annual revenue. The common logistics customers include freighter companies, supermarkets such as Kmart, energy companies, and chemtrans companies [3]. For fuels parts, delivering fuels to some airline companies and the local drivers contribute to their secondary business. The third type of customer is about renting. They used to provide heavy cranes and related equipment to some building companies and mining companies.

**Revenue Streams**

In this company, the top three revenue includes logistics of services, which up to $583 million in 2021, sale of goods ($105 million), and an agency of some fuel sales ($120 million) [4]. Logistics businesses help this company survive well as its main revenue source. However, the logistics business declined significantly because of COVID-19, it is essential to imply some cost reduction policy to alleviate this situation.

**Channels**

In the past ten years, this company has focused on utilizing the physical store, brand linkage, and updating customization promotions to attract customers. However, with the development of technology, they evolve their offline channel into an online channel. Therefore, websites become a promising serving channel for future development.

**Customer Relationship**

K&S company presents a relationship as supplier and demander. Consumers offer their demands regarding logistics, fuels, or rent requirements, then these companies meet their requests. At the same time, this company also set increasing physical stores to provide the service and keep in contact with their consumers.

**Key Activities**

Our main business consists of bulk loading transport, delivery of energy and materials, warehousing, supply chain solution and logistics for import and export. We participate in a variety of market, some of them are manufacturers like Coca-Cola, some of them are demander of goods like Kmart, and we also offer service to material and chemical providers, energy companies. Of course, we have retail service for medium and small sized business. Besides the normal logistic business, we also lend our properties like warehouse and cars. To further increase the service quality, we are going to implant Big data analysis to our cloud center

**Key Resources**

Our Key resource is our transport fleet including more than Four Thousand Five Hundred vehicles and over seventeen hundred rail and sea containers. We also have 22 national depots and over one hundred and sixty thousand sqm of other state-based warehousing. Human resource is also critical to our business, we have two thousand seven hundred staff members with specialization in a broad range including: driving, auto mechanics, road planning, and architecture design.

**Partners**

Our long-term Strategic Partners include fuel providers, retailers and bulk suppliers. We have long-term and stable corporation with them, and we also have customized service for them like dedicated warehouse and trucks. We corporate with governments to build railway and acquire lands. They are often our key collaborator in the environment campaign. Service suppliers are also our long-term partner to ensure the safety and service quality. Such as Insurance company, medical supplies provider and Auto service provider.

**Cost Structure**

In terms of cost, as our main resources are human capital and transport fleet, the two major costs are Staff wages and supplier expense which are 4,000 million and 3,300 million respectively. Also, we are experiencing depreciation on physical assets each year. There are also some costs like financial costs and other costs, but they are much lower in numerical level.

## Vision, Goals, and Requirements

**Vision**

Be the tier one Australasia logistics corporation in the development and provision of specialist logistics solutions.

**Goals**

* Operating revenues return to pre-pandemic levels in 2022, increasing by 14.8%

The COVID-19 has had a devastating impact on the global tertiary sector. Due to this, our full year revenue declined by 12.9%. With the enactment of COVID policies and the support of government, the first goal is to increase our operating revenues back to pre-pandemic level, by 14.8%. We should try to broaden the sources of income and reduce expenditure, which includes the consolidation of departments, the enactment of pandemic countermeasure, the extension of our business scope and to secure our rail volumes, which is least affected by the Covid.

* Keep on promoting Logistics 4.0 in the following 5 years

The second goal is to promote Logistic 4.0 through industrial upgrading. Logistic 4.0 is defined as using the data and analytics collected by smart manufacturing to improve operation efficiency and performance. And it’s a part of the fourth industrial revolution. The technologies we put into use will play a very important role in increasing productivity, and this is also what our corporation will focus on in the coming time.

* Developing Green-logistics in the following 5 years, reduce emission load by 5% per year

Our last goal is to develop green logistics. Our commitment to the environment forms a key part of our corporate citizenship obligations and we are an industry leader in the field of reduced energy consumption and carbon emissions. In the following year we will still stick to environment.

**Requirements**

* Operating revenues return to pre-pandemic levels in 2022, increasing by 14.8%

- Department consolidation

- Enact pandemic countermeasure

- Extend business scope

- Secure parcels of rail volumes

* Keep on promoting Logistics 4.0 in the following 5 years

- Standardization and modularization of logistics industry

- Individuation and intellectualization of software and control system

- Digitization and automation based on intelligent sensors and products

- Digital Twin (AR, VR) to help product lifecycle management (PLM)

- Logistics optimization and decision support based on AI

- Human-machine Cooperation

* Developing Green-logistics in the following 5 years, reduce emission load by 5% per year

- Include eco-friendly criteria in your procurement policies

- Optimize transport fleet management

- Warehouse that follows sustainable construction and management standards

- Enable measures to reduce and recycle the waste produced

- Improve stock management and reverse logistics processes

# Architecture

## The road to Network Capabilities and Related Components

**Online System**

The first requirement is to establish an online transaction processing system. The online digital platform would attain numerous gains in canceling geometry barriers. On the one hand, business orders would not be limited by geometry location. On the other hand, cloud data stored in online system could be accessed from any sub-companies where accessible could financial records effectively avoid potential corruption. Cloud server, storage, IEEE 802.1 protocol, and computer hardware are significant components to construct this system.

**Advanced Traffic Management System**

The second requirement is to digitize management platform. K&S company needs to construct an advanced management system to provide environmental-friendly and efficient logistic services. Based on past location and routes data of vans and fleets, machine learning could compute the optimal delivery routes for each car and assign the suitable logistic tasks to each driver leading to lower fuel consumption. In addition, when each car offers instantaneous and accurate traffic information for the central management platform, this system can give accurate guidance and feedback to each car and then avoid some traffic congestion or terrible traffic accident. An advanced traffic management contains automatic vehicle location system (concluding GPS and RFID), electronic, sensors, wired and wireless communication devices, Cloud computing, machine learning, and WAVE Short Message Protocol.

**Warehouse Management System**

Wireless readers capture volume and dimensions, and send them to the WMS for processing, which provides real-time visibility into inventory levels. Stock levels are then updated automatically in the WMS for accurate inventory control. By combining sensors and WMS data with directional barcodes placed on the ceiling of the warehouse, we create an indoor GPS system, which can identify inefficiencies in AGV which include automatic guided cars, automatic pallet mover and transfer robot. Connected assets in a warehouse also enable predictive maintenance. By measuring the pressure and the temperature of the machine, the system can operate predictive maintenance analytics, schedule maintenance appointments and calculate the expected lifetime.

## Trade-offs

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# Reflection on the process

# Conclusions

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