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# A Position Paper on What is Supply

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**Description**

Supply is an important topic which needs to be well researched for providing insight about the needed characteristics for fulfilling the customer supply needs. Researched topics are mainly focused on specific features of supply. This research is aimed at providing an understanding of the supply characteristics relevant to the 21st century. In order to understand these characteristics, journal articles relevant to the topic were researched and analysed. The study resulted in collating a supply definition which incorporates the various views of supply identified in the research. The study also proposed a hypothetical supply model that supports the new definition. Having a clear understanding of what is supply in the 21st century is crucial in order to be able to fulfill the customer needs. The world is changing and the importance of sensing and responding to customer requirements is becoming crucial. Sourced supplies will need to meet the evolving supply requirements which include things such as minimum impact on the environment. It is these supply characteristics which will decide if future supplies are going to meet the customer requirements.

**Location**

iC - SBS Teaching Facility

# **A position paper on what is supply**

**Fadi Kotob**

## **ABSTRACT**

Supply is an important topic which needs to be well researched for providing insight about the needed characteristics for fulfilling the customer supply needs. Researched topics are mainly focused on specific features of supply. This research is aimed at providing an understanding of the supply characteristics relevant to the 21<sup>st</sup> century. In order to understand these characteristics, journal articles relevant to the topic were researched and analysed. The study resulted in collating a supply definition which incorporates the various views of supply identified in the research. The study also proposed a hypothetical supply model that supports the new definition. Having a clear understanding of what is supply in the 21<sup>st</sup> century is crucial in order to be able to fulfill the customer needs. The world is changing and the importance of sensing and responding to customer requirements is becoming crucial. Sourced supplies will need to meet the evolving supply requirements which include things such as minimum impact on the environment. It is these supply characteristics which will decide if future supplies are going to meet the customer requirements.

## **INTRODUCTION**

Over the years, many studies have been undertaken to study different features of supply. These studies have mainly been concerned with studying specific aspects of supply in relation to different industries and lacked the ability to holistically view supply in term of general features and characteristics. In an attempt to provide some basic understanding about the meaning of supply, a journal article research was undertaken to identify the main features that are associated with the term supply. These terms formed the base for understanding what supply really means without going into industry specific definitions.

The findings of this study generated what is considered to be a supply definition that has no relation to specific industries. As such, the study provided an analysis of supply in term of different characteristics identified as part of the supply research.

The importance of this study lies in the ability to define supply in term of general characteristics that applies to various industries. Understanding these characteristics will pave the way for creating a hypothetic supply model that could be applied to various industries and can be evolved to become industry specific. This will provide the needed directions in the quest for fulfilling the need for a sustainable supply. The limitation of this study is that it focused solely on a limited number of journals to identify the characteristics of supply including a recent cross-sectorial, cross-regional snapshot for understanding innovation readiness within the supply base. However, the research is mainly intended to collate a position about what is supply and as such, this research is appropriate for forming the needed view about supply.

## **Background To The Study And Research Categories**

The core information for this work was derived from researching recent journal articles from a number of well known databases such as Business Source Complete and Proquest Central.

The information was analysed to derive a clear understanding about various supply characteristics that could be used to form a hypothetic supply model. The research resulted in viewing supply in term of the following categories:

- Strategy

- Risks
- Customer Needs
- Human Supply
- Information Availability
- Pricing/Costs/profitability
- Capacity/Utilisation
- Planning
- Collaboration
- Capital
- Effectiveness
- Regulations/Policies
- Innovation

It should be noted that these categories were collated solely from the research undertaken and is assumed to be appropriate for forming an idea about what supply is. It is also worth noting that the definition of supply needs to be continuously evolved for meeting the changing customer supply requirements.

#### *Analysing Supply In Term Of Strategy*

The research showed that in order to successfully meet the supply needs, there need to be an alignment between a supply and an organisational strategy (Watts et al., 1992). For instance, a company such as ozsales.com.au looking to deliver high quality products at a fraction of the cost is unable to fulfill their demand using the existing supply channels. Rather, they acknowledge their difference and promise a delivery supplies within 7 to 21 days after the customer purchase (OZ Sales Delivery, 2011). Their competitive strategy is more concerned with on time delivery rather than delivery speed. Different elements impact strategy and the ability to efficiently deliver the needed supplies. These elements include capacity and capability, size of the supply base, collaboration and partnership, etc (Ahtonen & Virolainen 2009). This shows that supply planning is necessary to improve efficiency and increase competitiveness (Hardy, Stevenson & Godden 1992) which is supported by a web technology that meets the business needs and is necessary for helping organisations in meeting their strategic goals and staying in the business (Earl & Sampler, 1998). In this aspect of supply, it is necessary for the supply strategy to have clear suppliers target management measures in order to improve efficiency (Hardy, Stevenson & Godden 1992). Using supply aspects such as collaborative planning can support supply planning while decreasing the inventory in the supply network (Danese, 2011). This collaboration is a very important aspect of strategy as it impacts on both the upstream and downstream and could result in huge improvements and cost reductions in the supply network. In order for the collaboration to be successful, organisations will need to align their strategic objectives with those of their counterparts. This will help in building a long term strategic relationship that helps in reducing the supply base in addition to improving communication and the quality that a firm can deliver (Paulraj & Chen 2005). That quality improvement is key in today's' global marketplace where customers are consistently looking for more value (Styger, 2009). Most importantly, these strategies will be consistent across the board and will enable the supply community to compete effectively (Jeffrey, Mark & James 2003). As part of strategy, supply will also need to be protected by having diverse supply sources to protect against potential supply interruptions (Shin & Savage 2011). This is why strategically selecting suppliers is important for having an effective supply chain (Ku, Chang & Ho 2010). Choosing the right suppliers requires an alignment with the competitive goals of the organisation. A company seeking to consistently

deliver high quality products for instance could not compete by choosing the cheapest supplies that lack a high level of quality.

#### *Analysing Supply In Term Of Risks*

The research found that risks are an inherent part of supply which needs to be well managed. Failing to manage these risks will result in being unable to fulfil the customer needs which in turn would result in lost sales. The lost sales would result in cash flow issues which is the main driver for bankruptcy in organisations. As such, well management of supply risks is necessary to improve performance (Guinipero et al., 2005) and remain in the business. This and other supply problems are the result of bad supply management (Earl & Sampler 1998) and thus, the risks will need to be well managed in order to protect supplies. Failing to protect supplies will lead to disruptions which could potentially have a huge impact on prices and economies of different regions (Shin & Savage 2011). For example, the political instability in the Middle East is causing concerns for potential oil supply shortages in Australia. While this supply is not impacted at this stage, prices have been averaging \$1.40 between January and May 2011. This price seems to be overrated bearing in mind that the Australian dollar is at a all time high when compared to the USD. Having a diverse sources of supply offers a good protection against this risk, but will come at a cost.

#### *Analysing Supply In Term Of Customer Needs*

Fulfilling the customer requirements is the main driver for the need to secure supplies. As a result, it is important for supplies to be directed towards meeting the needs of customers who would be willing to pay a premium price for securing these supplies if they perceive them as superior in quality. This view is supported by the research stating the importance of giving customers what they want. If those needs are fulfilled, they can have a huge impact on the bottom line (Clemons, 2008) and would increase customer satisfaction. The location of supply communities is also impacted by customer demand (Jeffrey, Mark & James 2003).

#### *Analysing Supply In Term Of Human Aspect*

Human supply is a key aspect for fulfilling supply needs. Having the right people with the right skills is essential for organisations looking to become leaders in their field. Being leaders requires non-linear thinking which facilitates sensing and responding to a changing environment. In order to sense and respond, employees will need to have certain characteristics including openness to change and ability to generate innovative ideas. People with the right skills for instance are critical for developing a purchasing and supply proficiency (Feisel, Hartmann & Giunipero, 2011). The problem with supply is that organisations continuously resort to downsising as a response to a lack of demand. They fail to understand the long term impacts of these sometimes non-strategic downsising decisions. For instance, the research showed that downsising people in the technology field resulted in departments lacking people with the right skills for meeting the supply needs of other departments which in turn negatively impacted on the performance of organisations (Earl & Sampler, 1998). The output and supply inflation report from the Bank of England stated that the ability of meeting the supply needs in an economy depends on the growth of labour supply and productivity (Anonymous 2010). If demand is increasing and capacity in term of human supply is unavailable, organisations will be unable to fulfill the supply needs. They also stated that universities play a major role in fulfilling the organisations human supply. These institutions prepare and deliver people with the right skills who can enter the workforce when demand is not weak (Anonymous 2010).

### *Analysing Supply In Term Of Information Availability*

Information availability is a crucial aspect of supply that could lead to great efficiencies resulting from understanding customer needs and planning to have enough capacity for fulfilling those needs. Information availability could lead to heavily discounting products and supplies when alternatives are available and information about these alternatives is easily sourced by customers (Clemons, 2008). That could have a significant impact on both supply and demand. Information availability could also result in organisations changing their competitive strategy and on their supply side of things (Clemons, 2008). For instance, when there is a comparable product in the market, an organisation that solely competes on quality could find the necessity to add an additional layer in their competitive strategy and start competing on price. Competing on price could mean that the input supplies that are usually sourced to form part in the independent demand inventory might need to be replaced by cheaper parts in order to achieve a reduction in cost. The study of (Chiang & Feng, 2007) found that information availability and sharing has a higher benefit on the upstream rather than the downstream. While the downstream could still get benefits, these benefits are solely related to operational improvements. In order to achieve information availability, appropriate technology solutions will need to be implemented which facilitates the analysis of information relating to supply markets and trends (Feisel, Hartman & Giunipero, 2011). Other types of information availability and sharing like sales forecasts and promotions across members improve managing the supply needs (Danese, 2011). When the information is readily available to different tiers of the supply chain, the bullwhip effect could be minimised which will result in cost savings across the board. When that information sharing is unavailable or is inaccurate, the bullwhip effect will increase. For instance, inaccurate forecasting, sporadic ordering and unplanned material shortages are some of the main causes for the bullwhip effect (Jeffrey, Mark & James 2003). On the other hand, when selecting suppliers, organisations will need to think about the best way to protect supplies in the event of natural disasters while bearing in mind their supply strategies (Ku, Chang & Ho 2010). To complete this analysis, information is crucial for assessing the possibility of natural disasters in the area where suppliers are located. Other important information relates to the operational efficiency of these suppliers. Assessing the possibility of natural disasters is essential when aiming to protect and stabilise the long term sustainability of supply (Ku, Chang & Ho 2010).

### *Analysing Supply In Term Of Costs And Profitability*

When choosing where to source supplies from, cost has a huge impact on the selection decision. That decision is impacted by the business strategy which will have a direct influence on the price that organisations are willing to pay for securing customer supplies (Clemons, 2008). For instance, a restaurant looking to offer a second grade steak will select a different supply than restaurants looking to have a first grade steak. This is due to the price that these restaurants would be charging customers. For instance, Today Tonight 2011 ran a report about meat glue which showed suppliers stick together scraps of meat before selling them as prime cuts. This product while banned overseas is still allowed to be used in Australia. Top Cut Tender Plus who uses meat glue is or was until recently supplying meat to well know eateries such as Sizzlers, Jupiter, Lonestar and Outback Spectacular. While this meat is not a top quality product, well know organisations are willing to use the product for fulfilling the customer needs which confirms price as one of the main strategic aspects for organisations making supply decisions. Cost of supplies is also impacted by whether the economic situation is more suitable to sellers for instance

which directly impacts on the pricing of supplies (Feisel, Hartman & Giunipero, 2011). Another aspect that impacts pricing of supplies is the location from which supplies are being sourced which has a direct impact on costs. While supplies might be cheaper in different locations, the cost savings could be wiped out through an increase in transportation costs and thus the overall supply costs (Jayaswal, Jewkes & Ray, 2011). When trying to protect supplies, price is a very important aspect that influences these protection decisions (Hardy, Stevenson & Godden, 1992). When there are many suppliers available and companies are competing for the supply contract, cost is impacted through quantity discounts that are offered to gain these contracts (Burnetas, Gilbert & Smith, 2007). The price discounts could also be the result of internal supply policies (Louly & Dolgui 2011). For instance, companies could minimise holding and ordering costs resulting from the use of a continuous ordering system while building a short lead time with different suppliers. These short lead times would minimise the risks of being unable to fulfill the customer supply needs. Another internal aspect that impacts profitability is the percentage of utilisation within the supply base (Smith & Marco 2004). Low utilisation could result in customer price increases while organisations are trying to reduce operational costs (Smith & Marco 2004). Costs are also impacted by the level of collaboration between supply nodes. The lack of collaboration will result in a high lead time between the manufacturing and delivery of products to the shelves. The cost of such high lead time is estimated by (Jeffrey, Mark & James 2003) to be 100billion in the US alone. Another aspect that impacts the cost of supplies is disruptions which could increase prices and negatively impact the economies of different regions (Shin & Savage 2011). For example, the lack of oil supplies could result in a huge increase in petrol prices in different economies. These costs could negatively impact the amount of investments in different regions. Protecting supplies will minimise the impact of competition and price increases (Shin & Savage 2011). Implementing the right supply practices while maintaining diversity of the supply in the local level ensures a consistent, efficient and low cost supply (Stevulak & Campbell 2008).

#### *Analysing Supply In Term Of Capacity And Utilisation*

An important view of supply discussed in journals is when an increase in supply is not being met by an increase in demand and utilisation (Smith & Marco 2004). As such, costs are increasing as a result of having non productive resources where outputs are being produced by the system and having to be stored. That supply increase while not being used, provides an opportunity to increase utilisation (Smith & Marco 2004). The output and supply inflation report from the Bank of England stated that during the financial crisis for instance, effective supply capacity of the economy is likely to have declined from the beginning of the financial crisis (Anonymous 2010). However, supply did not decline which meant there is a large margin of spare capacity. They also explained that many companies decided not to permanently reduce their supply capacity during the crisis which gives them the ability to reinstate the additional capacity whenever needed (Anonymous 2010). This was a smart move as permanently reducing the ability to produce could have a long term and lasting effect on a firm's ability in meeting the increasing demand of customers. The research also showed that recessions have a long lasting effect on supply capacity of an economy (Benito et al. 2010) which might take an extended period of time until that capacity is fully utilised again. The supply movements may be influenced by the business cycle which could be measured by monitoring the performance of various quarters during the financial crisis (Benito et al. 2010). When

choosing a supplier, capacity is a key aspect that needs to be looked at (Ku, Chang & Ho 2010) in order to ensure the ability to fulfill the increasing customer supply needs.

#### *Analysing Supply In Term Of Planning*

Supply planning is another important aspect that impacts supply. The policies chosen (Louly & Dolgui 2011) for the supply would directly impact the efficiency of meeting the supply needs. For example, selecting a periodic versus a continuous ordering system (Louly & Dolgui 2011) would have a direct impact on how much supply is available within an organisation. Too much supply would result in inefficiencies in the way supply is being fulfilled. Planning supply could also help in protecting supply sources which would minimise the impact of price changes and protect supply for the long term (Shin & Savage 2011). Supply planning is an essential management tool which provides a response to the increasing trend towards improving efficiency and increasing competitiveness (Hardy, Stevenson & Godden, 1992)

#### *Analysing Supply In Term Of Collaboration*

The research showed that collaboration between different members of the supply nodes could result in great benefits on the supply side. A successful supply is existent when a community is working together for meeting the needs of the customer (Jeffrey, Mark & James 2003). Some of the benefits of collaboration include reducing costs, producing supplies that meet the customer needs and increasing profitability. For instance, reducing the manufacturing to shelve time would result in fresher products delivered to customers which would increase consumption (Jeffrey, Mark & James 2003)

#### *Analysing Supply In Term Of Capital*

Capital is a very important aspect that impacts on various areas of supply. Organisations are often aware of the improvements that they need to make in their supply, but, hold off on making any changes during slow times such as the financial crisis. While it would make sense to embark on improvement projects during slow times in order to be better equipped for meeting the customer needs during good times, companies select to hold off on any new investments during these times. This is mainly due to Senior Management decisions to protect the cash-flow in the short term. As shown in the inflation report from the Bank of England, this might not be a problem during good times where the growth of capital investments positively influence the availability of cash-flow and thus supply capacity (Anonymous 2010).

#### *Analysing Supply In Term Of Effectiveness*

While it is important to fulfill the supply needs, it is important for that fulfillment to be done in an effective manner. The effectiveness of supply is affected by the quality of supplies, its cost and the on time delivery which impacts on the final product and on the competitiveness of organisations (Ku, Chang & Ho 2010)

#### *Analysing Supply In Term Of Regulations And Policies*

Another important supply aspect identified in the research is the effects that regulations and policies have on how supply is being fulfilled. Local supply regulations have a direct impact on supply decisions. Saying that, those regulations might not be in line with the supply regulations that exist in the country where those supplies are meant for. For instance, gluing meet might be allowed as part of regulations in Australia while it causes a potential health risk for customers (Today Tonight, 2011). Many examples have surfaced of organisations using inappropriate means for fulfilling their supply needs. Who could forget the children which were previously used for producing Nike products? What about the Mattel recall due to

offshore outsourced companies using toxic paint on children's toys? While these practices are not acceptable in their home countries, these organisations have made decisions to fulfill their supply needs based on cost and the impact of these costs on the bottom line while sometimes the results are not intentional.

#### *Analysing Supply In Term Of Innovation*

Innovation is a very important aspect that affects supply. Using innovative technologies will help in increasing information availability about supply markets and trends (Feisel, Hartman & Giunipero, 2011) which is essential when making supply decisions. Furthermore, innovation will help in delivering new innovative and unique products which results in higher prices (Clemons, 2008).

#### **New Definition Of Supply**

From the research conducted and using the main supply themes identified, the following definition of supply was collated:

*Supply is about fulfilling the customer needs in an ethical manner that does not necessary mean following local regulations and policies. The characteristics of supply are derived from the competitive strategy of an organisation. That strategy has a direct impact on internal and external supply decisions including costs of supplies, capacity utilisation, capital investments and profitability of organisations. Achieving the effectiveness of supply fulfillment is supported by having on time information availability coupled with collaborative planning which is achieved by having the right human supply that could sense and respond to changing environments and deliver innovative supplies that are meeting the customer needs. Finally, it is about having the right risk management initiatives in order to have a long term sustainability of supply.*

#### **Research Gap**

In the quest to study and understand supply, the majority of journal articles concentrated mainly on the idea of supply in term of strategy and costs. This view is very important especially that strategy plays a major role when choosing a suitable supply.

While many other aspects of supply have been covered, the following gaps still exist:

1. The majority of supply journals were interested in studying supply in term of a specific area or topic. One of these topics for instance is about oil availability and the impact of unavailability on price and economies. Another topic is the impact of human unavailability on supply. While these topics are important, the research did not find journals aimed at identifying a holistic view of what supply really means. It seemed that there isn't a clear understanding of what supply as a topic really means. For instance, universities teaching project management are generally interested in teaching the general aspects and topics about project management. However, some of these topics might not be related to many industries. Think about the project management lesson that explains the different phases in a project. These phases are different from the phases followed in a software development project which includes testing, development, etc. Furthermore, the waterfall methodology taught in textbooks is often not followed when managing software projects. In order to gain the needed skills for managing software projects in an organisation, specific training is needed and is often offered for employees joining the organisation. The same approach should be available for supply. The research on the general context of supply is lacking and research is mainly directed towards

specific topics. Having a general understanding of supply could help pave the way for industry specific training on supply. A hypothetical model relating to the collated supply definition will be explained later. This model starts with the implementation of improvements within the internal business and linking that model to the big picture that includes various upstream and downstream tiers.

2. While the majority of topics concentrated on the operational side of supply, they failed to address a very important aspect of supply relating to capital availability during slow times. The financial crisis is a prime example where organisations minimise their investments which could be due to the lack of capital availability during slow times. While it is important to understand and improve the operational side of supply, it is also important to recognise the importance of capital supply availability during slow times which could pave the way for accomplishing a renewed competitive advantage during good times. This is a very important topic which should be well understood in order to quantify the benefits that organisations can achieve by continuing investments during slow times. These investments decisions are mainly influenced by Senior Management desire to protect their cash flow during slow times.
3. There is a lack of research looking at supply in terms of innovation. This is inappropriate especially when knowing that the delivery of innovative supplies is crucial for remaining or becoming competitive in the marketplace. The hypothetical model which will be explained next holistically links organisations with upstream and downstream tiers. To remain in the business for the long term, the model shows the importance of being agile which requires a strategy built on innovation while responding to the changing environment.
4. The topic of corporate social responsibility in terms of supply is not well covered. An organisation is in the business to make money. Some organisations look at corporate social responsibility as a cost rather than an opportunity to be different and be viewed as a responsible and ethical player in the marketplace. This is very important and as such, that aspect is important in the overall hypothetical supply model recommended. Recalls has and will continue to appear in this global marketplace. Organisations worldwide are competing globally where minimising costs is essential for remaining competitive. As such, some organisations as explained before follow unethical practices which cost less and decide to change these practices when they become public. While outsourcing is an easy way to pass the responsibility bucket, this practice could result in organisations losing their brand image where they become negatively perceived by the customer. Following the regulations and doing the right things are two totally different things. The decisions followed by organisations should be based on wanting to be socially responsible rather than wanting to reduce costs.

### **New Hypothetical Supply Model**

The recommended high level hypothetical supply model consists of four main pillars which can be viewed in figure 1. These four main pillars are People, Strategy/Supply Characteristics, Technology and Risk Management. These pillars were taken into perspective when developing the low level hypothetical supply model which can be viewed in figure 2.

The people pillar is the most important as people are the ones who will find the gap in the market and decide on the organisational competitive strategy. They are also the enablers of change and the driving force towards achieving the organisational goals. In summary, they form the organisational capability which is necessary for achieving the business goals. People will need to have a clear understanding not only of how they contribute to success but also, who they will interact with internally and externally for delivering that success. The study of Styger (2011) showed that only 10% of employees were able to name their first and second tier suppliers and that 90% of participants could not name a customer internally or externally.

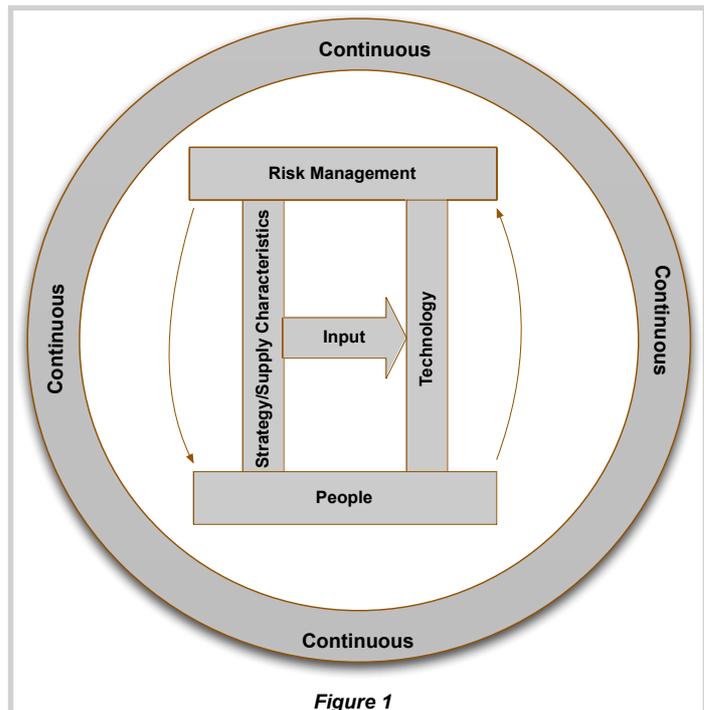


Figure 1

How could an organisation be able to compete in the long term if employees lack the understanding of the holistic view which makes them competitive? As Styger (2011) found, the supply chain has been viewed as trucks, stock movement, etc without thinking about people and education. That is the wrong perspective as organisations will need to employ the right people who can be retained for the long term. This can be achieved by having the following:

1. An organisational culture where employees are appreciated. This does not necessarily require a lot of money but rather building a vision that is shared by the organisation and where negativity is not accepted.
2. The second necessity for retaining people is by offering the education, training and potential for employees to grow within the organisation.

If these conditions are not met, people with the right skills could be recruited but not necessarily retained. Having the right people is essential for supporting the strategy where the organisation can sense and respond to the changing environment. These people will help in achieving internal efficiency improvements within the organisation and external improvements relating to how the organisation is being perceived.

These improvements are:

- Better understanding of customer requirements
- The ability to identify and implement organisational improvements which supports the strategy
- The ability to better manage projects and the impact of restructuring on culture
- Streamlining information sharing between various upstream and downstream stakeholders
- The implementation of corporate social responsibility initiatives due to become increasingly important in the next 10 years

The right people are very important and even more important than technology itself. The study of McCarter, Fawcett, & Magnan (2005) where 51 senior level supply chain

managers were interviewed supported the idea that technology is important, however, managers should take into consideration organisational culture and the education and training of employees to facilitate supply chain collaboration and success. The study concluded that people are vital to achieve supply chain success. However, that vitality is not being met by investing the same amount of time and money in building the skills of people (McCarter, Fawcett, & Magnan, 2005). The study stated that employees are the competitive weapon for the organisation which is overlooked. To retain people, the culture should be supported by senior management who empower people to experiment and take risks. The study found that the best supply chain companies blend continual education and training programs to instill a sense of purpose and vision. The importance of culture was also expressed in many other research journals such as House & Stank (2001), Lambert & Knemeyer (2004), Petersons (2002) & Robinsion et al. (2005). These journals discussed the importance of looking at the differences in organisational cultures when building alliances as these differences have a direct impact on potential success and failure. For instance, an organisation with a competitive strategy built on speed to market would be unable to achieve that strategy when partnering with an organisation where efficiency and speed are not deemed important. It is important to understand the cultural differences when building those long term relationships.

The Strategy/Supply Characteristics pillar is crucial for having clear organisational goals. These goals will impact on the pillars of people and technology. Furthermore, the type of strategy chosen while good in the short term, might lead to organisations going out of business in the long term. This is especially true where organisations are not being agile and thus not sensing and responding to changes in the environment. The strategy will also shape the business processes with low cost operations for instance looking to have streamlined and cost effective operations to remain competitive. The ability to measure these processes is crucial in order to ensure that the organisation is delivering its objectives. However, this is not the case in many occasions. The study of Styger (2011) showed that when participants were asked to differentiate their organisation by adopting business processes based on two out of the three performance indicators of Good, Fast and Cheap, 80.7% of participants had an element of good within their answer but were unable to specify by what measure. Having the right strategy supported by efficient processes and clear measures is necessary for selecting people with the right skills for delivering the strategy. It is important for strategy to include a method for sustaining supply in the event of materialised risks by having close collaboration with suppliers and implementing supplier duplication. These aspects will be discussed in the remaining pillars of technology and risk management.

The pillar of technology is concerned with building the needed technologies which require the following:

1. A clear strategy which supports sensing and responding to a changing environment
2. People with the right skills, experience and attitude (culture dependent) to deliver the needed solutions

From the recommended hypothetical model, technology solutions facilitate achieving the following:

1. Building an efficient interaction between the stores sales channel and customers

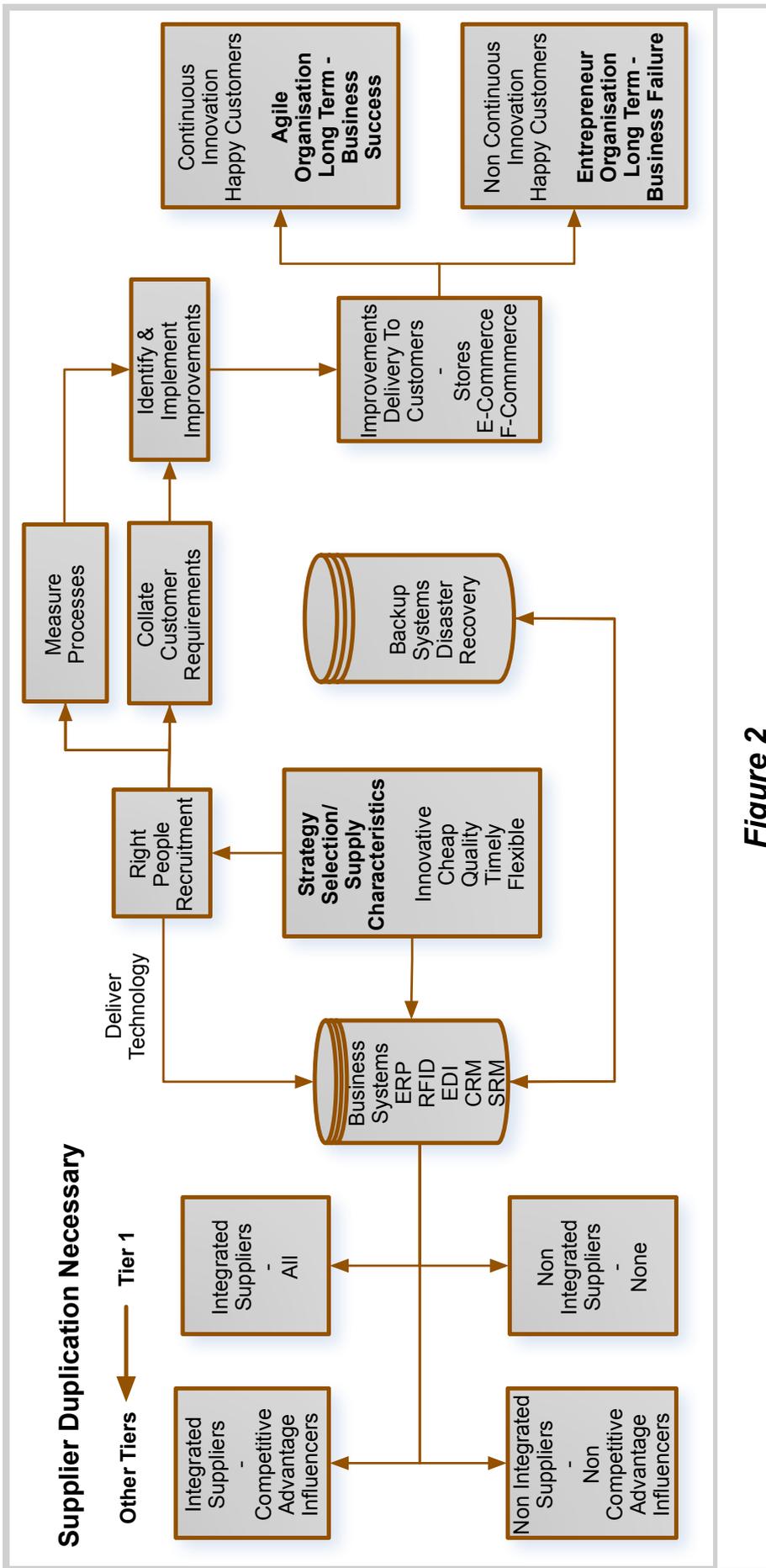
2. Creating the needed interaction between customers and the internet by using E-Commerce and F-Commerce (Social Networking Sales Channel)
3. Building company wide interactions using systems which are appropriate to the size of the organisation. Such systems include Oracle Financials versus MYOBE, ERP, CRM'S, etc
4. Protecting the sustainability of supply through appropriate backup and disaster recovery planning systems
5. Integrating systems with selected suppliers to achieve the potential collaboration benefits

This pillar will assist in delivering an efficient supply between upstream and downstream nodes. The view of Styger (2011) is that technology will not provide a competitive advantage. However, it is the lack of technology and formal business systems that will provide the first barrier of entry into supply networks following the global financial crisis. From the research, it is clear that the basic requirement for facilitating the collaboration between small suppliers and larger players is currently unavailable. For collaboration to be successful, information will need to be easily shared across supply members. With the current existence of many communication standards, standardisation to facilitate the entry of small players is not existent. Time should eliminate this barrier and make collaboration easier. In one of the five case studies conducted by Alkadi et al. (2003) where information technology was being adopted to improve the performance of the supply chain, there was a notion that "everything from supply chain management to customer satisfaction can be resolved using IT". This view was deemed inaccurate as can be seen from the following studies. While information technology is very important to improve the supply chain performance, it is only an enabler with bright and talented people needed for implementing the needed solutions. This view is supported by Kakati (2002) in their critical analysis of mass customisation in supply chains. The study showed that for managers to achieve the benefits of mass customisation, they must remember that "they are managing organisational change, not just technological change" which supports the view that there is a lot more than just technology. Another study that supports this view was conducted by Gunasekarana & Ngai (2005) which found that people issues must be considered when trying to sustain successful supply chain alliances. McCarter, Fawcett, & Magnan (2005) found that organisations should have a direct focus on culture, education and the need to educate people for facilitating the accomplishment of collaboration in supply. Research acknowledged the need to make quicker decisions which are supported by technology. For instance, Benders (2000) stated that with the acceleration of change, there need to be quicker decision making process. With this change, comes the need for information technology solutions which support this quick decision making need. However, the study confirmed the view that technology is only 1 pillar. The positive impact on a firm's performance can be supported by having the appropriate technology that is implemented with the right structure and culture.

Risk Management is the final pillar that lives in the centre of the Strategy/Supply Characteristics and Technology pillars. The main risk is related to technology. Delivering an efficient supply is dependent on the ability to resolve the inconsistency in the form of technology, information or the people using the systems. This view is expressed in different studies including Barrat (2004), Bender (2000) and Meredith et al. (1989). Regardless of how technologically advanced the supply chain alliance is, that alliance relies on people who manage and operate the flow of information and resources that is facilitated by technology (Constant et al., 1994) (Lee & Whang,

1994) (McKinnon et al., 2003). Another risk explained by Burnson (2011) stated that while it is impossible to predict all risks such as natural disasters and terrorism, considering these potential risks should be part of the foundations for setting up the strategic priorities instead of scrambling to make ill informed decisions when these risks materialise. Jane Fazzalari from JDA Software added that collaboration is necessary when organisations are engaging in long term relationships based on trust and transparency. That collaboration is likely to result in securing the constrained supply needed when risks materialise. Another risk which was explained by Kennedy (2011) is the reliance on single source suppliers in global supply chains which was deemed inappropriate. Furthermore, the question was raised about the impact of factors such as natural disasters and political instability on supplies. In order to protect supplies for the long term, having supplier duplication was presented as necessary in the hypothetical model.

The low level view of different aspects within the hypothetical model can be viewed in figure 2 on the following page. This low level view shows the interactions between the strategy, people and technology. It also shows how risks could be managed by implementing different features such as Technology Backup, Supplier Duplication, etc.



**Figure 2**

## CONCLUSION

This paper attempted to look at various supply researched journals with the aim to deliver a position paper on what supply is. In the majority of the identified journals, supply was looked at in terms of a specific industry. No studies were identified looking at the definition of supply with no relation to a specific industry.

The research resulted in looking at supply in term of the following 13 main themes.

- Strategy
- Risks
- Customer Needs
- Human Supply
- Information Availability
- Pricing/Costs/profitability
- Capacity/Utilisation
- Planning
- Collaboration
- Capital
- Effectiveness
- Regulations/Policies
- Innovation

The definition of supply resulting from this study is:

*Supply is about fulfilling the customer needs in an ethical manner that does not necessarily mean following local regulations and policies. The characteristics of supply are derived from the competitive strategy of an organisation. That strategy has a direct impact on internal and external supply decisions including costs of supplies, capacity utilisation, capital investments and profitability of organisations. Achieving the effectiveness of supply fulfillment is supported by having on time information availability coupled with collaborative planning which is achieved by having the right human supply that could sense and respond to changing environments and deliver innovative supplies that are meeting the customer needs. Finally, it is about having the right risk management initiatives in order to have a long term sustainability of supply.*

These characteristics were used to create a hypothetical low level supply model which incorporates the four pillars of Strategy/Supply Characteristics, People, Strategy and Risks.

## RECOMMENDATIONS FOR FURTHER WORK

While the research have helped in creating a new definition of supply and a hypothetical fully integrated supply model, more study is required in order for that model to incorporate any potential gaps. The recommended studies are related to the following:

1. Understanding the characteristics of a good culture where employees love the working environment and remain employed in the same organisation for the long term. The research should identify the right measures of a good culture and how this culture can be acquired. Most importantly, having an efficient supply model requires the implementation of new projects which often results in restructuring. The study should build a method for protecting a positive organisational culture while an organisation is restructuring to build a more efficient supply. This is the main challenge for retaining people who often leave an organisation when organisational change negatively impacts culture.

2. Studying the aspect of corporate social responsibility which is gaining an increasing importance in organisations. With the recent environmental report release showing the increasing importance of environmental actions to protect our environment, it is only a matter of time before all organisations will have to take into perspective how they are being perceived by customers in terms of social responsibility. As such, more research is needed to identify by what measures organisations will be measured and the impacts of these measures on the Australian economy especially when there is inequality in the environmental actions taken by various global economies.
3. Understanding the future role social networking is going to play in the environment where the interactions with direct customers and suppliers are increasing through the internet. While the use of E-Commerce is entrenched in the way business is being conducted, more study is needed to identify the impacts of social networking such as F-Commerce on organisations.
4. Researching how integrating systems could be made easier. This could help organisations maximise the benefits from close collaboration and partnership. The problem is that integration projects are increasing while costs are remaining high. There is a need for a global system which can be built on a worldwide recognised standard. Having this integrated system would enable smaller players to join the big game by paying a subscription fee instead of having to pay millions on dollars integration systems with a small number of organisations. These systems would become a worldwide standard which can enable smaller suppliers to reach a large number of global players. With SAP being a major player in the ERP market, it makes sense for the recommended system to be built on technology standards used by major players. These systems would be similar to the ones used in shipping organisations for transferring standard messages between ports. The outcome would result in collaboration initiatives becoming easier.

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