GORDON INSTITUTE
OF BUSINESS SCIENCE
University of Pretoria

THE VIABILITY OF ON-DEMAND AIR TRAVEL IN DYNAMIC MARKETS

Martyn Redelinghuys

20111887

A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration.

7 November 2012

Abstract

Business travel has become a considerable part of the daily lives of scarce human resources. Adding to the frustration is the requirement to travel with the current available modes of transport in developing countries, which effectively create a constraint in the ability of scarce human resources to apply their limited time more effectively.

This study seeked to understand how and why business travel impacts the productivity of scarce human capital as well as how alternative methods of travel can contribute to increased productivity. In the study the researcher aimed to determine if an on-demand air travel service could be viable in a dynamic market such as South Africa and if so, what value a successful implementation will add to a company and the country.

The research was conducted by making use of a descriptive quantitative study over two populations namely business travellers and aircraft pilots. This allowed the researcher to answer the three research questions that were identified.

The study has found that not only productivity, but also the work-life balance of scarce human capital is affected negatively by the requirement to conduct business travel. It was also found that on-demand air travel could soon be a viable alternative mode of transport in dynamic markets, which would contribute to improved productivity levels of scarce human capital. This in turn will stimulate company growth and ultimately increase the overall economic growth of the country.

Keywords

On-demand air travel

Air taxi

Productivity

Human capital

Economic growth

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

MARTYN REDELINGHUYS

7 November 2012

DATE

Acknowledgements

To my wife Nelia, thank you so much for your motivation, understanding and support throughout the MBA. I am tremendously thankful and truly appreciate all your effort for being there, when I could not.

To my son Sebastian, you have your dad back now and I can't wait to spend more time with you and your brother that will be born soon.

My supervisor Dr. Pieter Pretorius, thank you for your advice and guidance throughout this research. I especially appreciated and learned from the systematic way in which you approach research.

Table of Contents

List of Tables

List of Figures

Chapter 1 – Introduction to Research Problem

In this chapter the research study on the viability of on-demand air travel in dynamic markets will be introduced. The chapter will first explain the background of the research problem, where after the research problem itself will be introduced. A discussion around the research objectives will follow and the chapter will close with the context in which this research will take place.

1.1 Background

It is well known that the typical goal of developing countries is to achieve above average levels of economic growth in order to close the gap between themselves and developed countries.

There are various debates and theories on what drives economic growth. Taylor & Plummer (2003) argues that there are two main sets of processes that serve as local economic drivers. Firstly it is the magnitude of “local human resources” they have in place (education, skills and knowledge of its population) and secondly there is the local presence of an “enterprise culture” built on technological leadership. It was also found that technological leadership is positively associated with persistence in innovation; additionally, leadership in one market can also be used to systematically innovate in another market (Fontana & Moriniello, 2010).

Economic growth facilitates job creation and higher standards of living for all citizens. Goal achievement, or the extent to which economic growth is taking place, is measured by means of tracking changes in real growth domestic product (real GDP) of the country. Economists generally single out five important sources of growth: growth-compatible institutions; capital accumulation-investment in productive capacity; available resources; technological development and entrepreneurship (Colander, 2009). Mills (1952) argued that growth is best defined as an increase in the

effectiveness with which available resources are utilised, focusing on available resources and then specifically on human capital as a scarce resource.

From the discussion above it can thus be deducted that the availability of educated and skilled human capital is indeed one of the key drivers of economic growth. These type of human resources are however a very scarce type of resource, even more so in the case of dynamic markets such as South Africa.

Service companies are therefore occupying an increasingly significant place as drivers of economic growth (Kianto, Hurmelinna-Laukkanen & Ritala, 2010). It is thus important to ensure that scarce resources are utilised as effectively as possible to ensure better economic growth.

1.2 Research problem statement

The requirement to travel with the available mode of transport in developing countries is a constraint in the ability of scarce resources to apply their limited time more effectively.

Warr & Aures (2012) argues that future economic growth will be increasingly driven by information and communications technologies (ICT). ICT is also becoming increasingly more available on mobile platforms with the use of 3G connectivity, satellite usage and by means of cloud computing. Moving away from “self driving” solutions like cars, towards a “being driven” solution like trains and planes will thus become much more attractive in the near future as it will allow scarce resources to make better use of their limited time.

Invariably the requirement to travel will occupy some of an individual’s time, but in the case of a scarce resource it is even more important to limit travelling time. Since scarce resources are required to travel more often, they have even less time available to be productive in applying their scarce skills. Scarce resource individuals are also often required to travel longer distances, distances that is deemed too time consuming by car, but not feasible by commercial scheduled flights from major airports. One of the factors that therefore inhibit the ability of scarce resources to utilise their time more effectively is the requirement to travel for work. It can then be said that the mode of

transport commonly available to scarce resources plays a significant role in how effective their time can be applied. This then have a negative impact on the overall time available from scarce resources, thus increasing the constraint on the system or country by further limiting the already limited time from scarce resources as contributor of economic growth.

In terms of operational effectiveness, the scarce resources will tend to be the constraint of the system, where the system in this case would be the entity that facilitates economic growth. Ultimately, the ineffective utilisation of human capital as a driver of growth will play a significant role in limiting a country from achieving its goal of economic growth.

This problem is even more frustrating to individual companies, as they typically have limited specialised resources available that often need to travel long distances to fulfill company needs. The overall scarcity of highly skilled individuals is the reason why this limited pool of resources needs to travel in order to service various areas in the country. Digital communication tools such as Skype and other communication methods can be used to a limited extend, but are often not sufficient. An example of this would be where a specialised engineer needs to consult with a remotely situated processing plant and can only do so upon physical inspection of the current situation at that plant. Solving this problem will not only allow the company to experience better growth, it will also allow them a competitive edge in terms of their competitiveness.

It is believed that a solution to this problem will enable more effective use of scarce resources' time and as a result contribute positively to better economic growth of companies and of the country.

1.3 Research objective

The objectives of the research are to:

i. Better understand what the impact is that travel requirements have on scarce human resources.
ii. Determine how and if an alternative mode of transport in the form of air transportation would be feasible as a solution to the research problem in a dynamic market such as South Africa.

iii. Establish how such a solution would contribute to the economic growth of companies and the country.

This study will investigate how a very specific form of air transportation called on-demand air travel (ODAT) could contribute to solving the research problem. The effective introduction of on-demand air travel could potentially make a significant contribution to the productivity of scarce resources. The concept of an ODAT service could also be described as an air taxi and essentially would be able to provide passengers with near-on-demand transportation from the airfield / airport nearest to the passenger's travel point of origin, to an airfield / airport nearest to the passenger's point of destination (Mane & Crossley, 2009). The concept of ODAT will be able to shorten the door to door travel time considerably by means of eliminating the need to travel from large airports. These large airports are often much further away from passenger's origin than their local airfield and also introduce additional delays due to logistical requirements such as parking, security clearance, and aeroplane boarding as well as subsequent stopovers due to the typical hub and spoke network of large airlines. The concept of ODAT will be further discussed during the literature review.

The study will focus on ODAT in dynamic markets, of which South Africa is an example. Although it might be ideal in future to have an ODAT service available nationally to everyone at anytime, this study will only focus on company supplied ODAT and what the benefits will be as a result of such alternative mode of transport.

Chapter 2 – Literature Review

In this chapter we will revisit the research problem by viewing it from within the context of the current available academic literature. At first we will look at defining dynamic markets and how it relates to developing countries, whereafter we will review the growth drivers and challenges in these markets also reviewing human capital as driver.

Next we will focus on road travel and the impact that travel requirements have on productivity of employees in companies as well as on the productivity of countries. We will then introduce air travel as mode of transport and focus on the current trends and developments in the on-demand air travel (ODAT) services arena as well as the small aircraft transportation system (SATS).

We will then conclude this chapter by reviewing the importance of technological adoption in developing countries and applying the above mentioned discussion on production and capacity as well as systems theory illustrating the need for this research.

2.1 Dynamic Markets

Developing countries goes through constant change in their quest to become developed countries. These countries need to be dynamic in both adapting and responding to the ever constant changes within their environment. Dr. Lyle White defines dynamic markets as markets that encompass a broad range of countries which exhibit exciting economic growth prospects. These are countries that have undergone significant political, social and cultural change and show encouraging signs of innovation along with policy and institutional developments to address the voids and complexities prevalent in these markets (Makura, 2012). One can thus argue that developing countries need to be agile in their response to change in order to enhance their ability to grow, effectively they need to be a dynamic market. Successful management teams in dynamic markets need to be able to quickly respond to the unexpected; this requires a good understanding and ability to deal with political, social and cultural issues.

2.2 Growth challenges and drivers of growth in dynamic markets

Economists generally evaluate growth capacity by means of evaluating *potential output* - the highest amount of output an economy can produce from existing production processes and resources. The theory also states that long-run growth occurs when the economy produces more goods and services from existing production processes and resources (Colander, 2009). This long-run growth is needed as most developing countries had at some stage been colonies of developed countries and it will take a considerable amount of time for these ex-colonies to recover from the typical exploitation that took place during that time. The speed or effectiveness of recovery or the growth rate differs for each developing country as each have a unique set of challenges which may be affected by political, social, leadership, environmental and a range of other issues.

In an attempt to take a universal approach to the analysis of growth in developing countries, Cuong Le, Tu-AnhManh-Hung & Thai Bao (2010) have defined the three stages of economic growth in developing countries as follows:

First stage – the country concentrates on the production of consumption goods.
Second stage – the country must import both physical capital and new technology capital to produce consumption goods and new technology.
Third stage – the country must import capital and invest in the training and education of highly skilled labour.

If one take South Africa as an example it can be argued that they are somewhere between the second and third stage currently. Developing countries must therefore choose between investing in technological capital or in human capital, depending on the growth stage they are in (Colander, 2009).

Taylor and Plummer (2003) goes further and argue that there are two sets of processes that serve as the main drivers of economic growth. One being the local presence of an “enterprise culture”, built principally on technological leaderships but with an element of local enterprise integration. The other process being the magnitude of “local human resources” that are in place – the education, skills and knowledge of the population.

From the discussion above it can be seen that resources are almost always limited and it should be the goal of every developing country to apply their resources (physical and human capital) effectively in order to achieve maximum levels of growth. Along the growth path of developing countries there is a time when investment in human capital replaces physical capital as the main engine of growth (Cuong et al., 2010). It is at this stage where human capital as driver of economic growth in dynamic markets should be applied effectively. Higher productivity of the limited supply of human capital will then result in increased levels of economic growth.

2.3 Human capital as driver of economic growth in dynamic markets

Human capital has been defined as a unique set of expertise, skills and knowledge that are contained within the workforce of an organisation (Van Assen, Van den Berg & Pietersma, 2009). Similarly human capital has been defined by the United Nations (1997) as “productive wealth embodied in labour, skills and knowledge” while the Organisation for Economic Co-operation and Development describe it as “the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being” (OECD, 2001).

One form of human capital is the actual physical work done by people. Ayres & Warr (2005) stated the importance to emphasise that physical work is a well defined concept from thermodynamics and physics and it must be distinguished from the term as it is used in ordinary language, where ‘work’ is generally what people do to earn a living. The relationship between potential work and actual work is what is important when evaluating human capital. The ratio of actual work to potential work can be interpreted as the *thermodynamic efficiency* with which the economy converts resource inputs into finished materials and service. Enabling human capital to align their actual work output to that of potential work will therefore increase the thermodynamic efficiency and ultimately enhance growth.

In evaluating the productivity of human capital, it has been found that poor health is among the principal decrements to productivity in a given workforce. This often cost companies up to three times more than the subsidised employee health care in terms of illness-related absenteeism, presenteeism, and short-term disability. Presenteeism

itself could be defined as a person being at work, but not actually busy with work related activities. In a more formal manner presenteeism can be defined as "the measurable extent to which health symptoms, conditions and diseases adversely affect the work productivity of individuals who chose to remain at work" (Chapman, 2005).

It was furthermore found that as the stress level of employees increased, so did workplace productivity loss (VanWormer, et al., 2011). Absenteeism is easy to detect and measure because the person did not show up for work, but presenteeism is much more difficult to detect because the employee is *at* work, but *out of the work, thus* hurting on-the-job performance. A study has found that presenteeism alone results in U.S. companies losing over $150 billion a year, which is much more than absenteeism does (Hemp, 2004). This presenteeism also affects the overall growth of countries because (eg. in the case of the U.S) the efficiencies goes down as a result of the $150 billion loss, resulting in overall reduced growth rates when comparing with the country's potential growth rate.

One could now argue that the requirement to travel long(er) distances for work is a form of presenteeism, because it directly affects the overall productivity of an employee. Technically the employee is at work whilst travelling, but s/he is not performing any constructive work and therefore productivity is reduced. The requirement to travel also indirectly affects the overall wellbeing of employees as they have less time available for exercise, possibly less chance of eating healthy and less time to spend with their family resulting in an imbalanced lifestyle.

In terms of the importance of human capital as growth driver it should be argued that human capital is the economic driver that is not only responsible for developing new technology but also for effectively implementing the technology. It is the human capital of a company and country that steers such entity towards increased levels of productivity and ultimately growth.

2.4 Road travel

There have been much debate and research in the area of road travel. Generally one automatically assumes road travel refers to motor vehicles with four wheels, however in

many developing countries the two wheel motorcycle is a very popular mode of transport. Road travel by means of a motorised vehicle is becoming more affordable and thus more popular to a large number of people worldwide. This has a secondary effect in that roads have become much more congested and also much more unsafe. This is especially true for dynamic markets or developing countries. A study by Kopits & Cropper (2005) has found that the road death rate is projected to rise to approximately 2 per 10,000 persons in developing countries by 2020 compared to less than 1 per 10,000 persons in developed countries for the same year. The fatality rates for dynamic markets such as China and India are expected to increase by 92% and 147% respectively over the next 20 years (Kopits & Cropper, 2005). The World Health Organisation has predicted that traffic fatalities will be the sixth leading cause of death worldwide and the second leading cause of disability-adjusted life-years lost in developing countries by the year 2020 (Murray & Lopez, 1996). In their growth model, Kopits & Cropper's predicts that by 2020 the global automobile fleet would reach 1.47 billion vehicles (Kopits & Cropper, 2005).

From a company's perspective the traffic congestion and increased safety risk is also a major concern. The World Bank Group has conducted a study regarding how improved corporate policies should be developed in order to address the preventable risk factors that are experienced as a result of road travel. With 70% of their 16,000 employees that travel to developing countries frequently, the road safety issue is of great concern to the company. South Africa is rated third on the top 10 highest risk countries as perceived by business travellers of the World Bank Group. Contributors to the high accident rate in developing countries includes: lack of driver attention, aggressive driving, speeding and lack of concentration including tiredness and cell phone usage (Goldoni Laestadius, Selod, Jian, Dimberg & Bliss, 2011).

The increasing number of motor vehicles on the roads in developing countries therefore contribute to the concerning number of road accidents and fatalities. As countries develop, more people will also be able to afford motor vehicles, which will lead to even higher congestion on the roads, more stress and frustration to the driver, increased levels of tiredness and ultimately a decrease in overall productivity. It is therefore of the highest importance to explore alternative methods of travel in developing countries, especially for the business traveller who, although indirectly, is an important contributor to economic growth.

2.5 The impact of travel on productivity

Commuting is a general requirement for the day to day operations of most individuals which includes scarce resources. Commuting can make out a considerable amount of an individual's available hours in a day. This study will however not focus on the day to day commuting requirements as it can be argued that the individual had a choice of where to live and work as well as what amount of time s/he is prepared to allocate to commuting and effectively loose in personal productivity. The focus of this research will be on additional travel requirements of scarce resources. This will include the requirement to travel for events such as branch/plant-visits, meetings and conferences which, although may occur on a regular basis, is not considered as an everyday requirement.

The value of travel time is defined as the ratio of the marginal utilities of time and money, where the marginal utility of time is determined by the opportunity cost of time spent travelling and the actual disutility of time spent travelling (Wardman, 2004). It is important to note the role that mode of transport plays in determining the productivity, or lack thereof, of an individual whilst travelling. A self driven private vehicle as mode of transport might allow less productivity of the individual than when compared to being driven by a taxi cab or flown by an aircraft. Schwenzger (2010) argues that productivity whilst driving a vehicle can be rated at a mere 10% as the resource would be able to safely perform only limited work related tasks such as brainstorming, preparing or limited phone calls. On the other hand, productivity whilst on an ODAT flight can increase to as much as 72% as the individual does not have to concentrate on the road (Schwenzger, 2010).

2.6 Air travel as mode of transport

As the cost of air travel is becoming more affordable to the average citizen, air travel as a mode of transport is becoming very popular. Air transport forecasts predict an average growth of 3.6% per year between 2002 and 2020 for international air travel in Europe. This rapid air traffic growth has resulted in severe congestion and delay problems at airports which, in turn, have also self-constrained air transport growth. The congestion and delay problems are expected to further deteriorate when considering that over half of Europe's 50 largest airports have already reached or is close to

reaching their saturation points. Some of the methods used currently in demand management of primary airports include slot trading and slot auctions as well as discriminating pricing for various times of the day, but even with these methods congestion continues to be problematic. Governments around the world are failing to invest adequately and on a timely basis in their airports and the current demand management models will not be able to accommodate the predicted growth, thus alternative methods needs to be investigated (Madas & Zografos, 2008).

Vowles (2009) states that Air travel or transportation can be divided into three sections namely: Airports, Airlines and Aircrafts.

Airports are important components of not only the air transport network but, in urban systems also serve as growth poles. It is found that airports accounted for more than $500 billion of economic activity in the U.S. in 2001 and usually fall into one of two categories; primary and secondary airports. Primary airports are traditionally larger and accommodate higher traffic volumes as well as international flights, but often have the disadvantages of congestion and delays. Secondary airports are often located in the same metropolitan region as primary airports but they mostly accommodate the low cost airlines, are less congested and offer airlines a more cost effective alternative.

Airlines exist in various forms across the world, ranging from traditional large carriers to low cost airlines as well as charter companies. Most airlines (with the exception of charter companies) make use of hub and spoke networks to serve their clients. Although these networks allow a higher frequency of flights to more areas, delays and transfers are frustrating and the required origin and destination of passengers are often still widely removed from where the hub and spoke network terminates. This problem is solved partly by charter companies, but at a significantly higher tariff.

Aircrafts have developed much from the first DC3's in 1935 that was only able to carry 30 passengers at 350km/h over a maximum distance of 500km, to today's Airbus A-380 that can carry 550+ passengers at 980km/h over a range of 14800km. It is interesting to note that the London-Cape town route originally had as many as 27 stops and took nearly 11 days, where today the two cities are connected with a non-stop flight taking less than 12 hours. Aircrafts and the technology around it have therefore developed tremendously and continue to do so in order to address the various requirements of air travel around the world.

2.7 On-demand air travel (ODAT)

An ODAT service is where smaller aircrafts are used to transport individuals or small groups of passengers directly to their destination by making use of smaller airports or airfields closer to their point of origin and destinations, thereby reducing the door-to-door travel time of the passengers.

The Federal Aviation Administration (FAA) of America allows operation of ODAT also known as air taxi services under Federal Aviation Regulation (FAR) part 135, which allows for single pilot operations in many situations (Mane & Crossley, 2009). The aircraft classes considered for ODAT services are single engine piston, twin piston, twin turboprop, very light jet (VLJ), and small & medium business jets. Typical aircrafts that are deemed feasible for ODAT operations include, Cirrus SR22; Seneca V; KingAir C90B; Eclipse 500; Citation CJ2, XLS and X. Mane & Crossley (2009) found in their study that for ODAT the three aircrafts of choice would be the Cirrus SR22, Seneca V and VLJ (Eclipse 500) due to the most effective range and travel time advantages.

The latest developments around avionics and airplane manufacturing have brought about a new technology called the very light jet (VLJ), also known as the microjet. According to NASA's definition of a VLJ it should weigh less than 10,000 pounds, carry up to 5 passengers and be operated with a single pilot (Espinoza, Garcia, Goycoolea, Nemhauser & Savelsbergh, 2008). Other qualities of the VLJ include the ability to land at much shorter runways, travel at speeds of up to 722 km/h, reach altitudes of between 19000 and 41000 feet and priced at a third of conventional business jets, with prices starting at around $1,200,000. It is stated that there are 3400 under-utilised non-towered and non-radar airports in the United States that would be suitable for these new generation VLJ's (Baxley, Williams, Consiglio, Adams, & Abbott, 2008).

Previous to the notion of ODAT, a concept called fractional management company (FMC) allowed for a form of personal air travel. Although not quite a true ODAT service, it allows users to purchase part of an aircraft according to the number of flying hours they require annually (Lee, Bass, Patek, & Boyd, 2008). FMC will then schedule the aircraft according to the demand of their customers as established a day or two before the required flight. This model is not feasible for a large portion of the demand group, as often the individuals do not have the capital outlay to become a fractional owner, even though they may be able to afford the equivalent of an ODAT ticket.

Although presently large sums of money have been invested in research to determine a workable model for the small aircraft transportation system, the concept of ODAT has not yet been adapted as a true alternative to the large carriers. ODAT, in a limited sense, does however exist in the form of private/corporate jets, fractional ownership operations and privately owned general aviation aircraft (Peeta, Paz & De Lautentis, 2008). These three categories are all used on an on-demand basis, but they are all fairly expensive and often from the older generation aircrafts that typically require longer runways.

2.8 Small aircraft transportation system (SATS)

The basis of ODAT is to make use of underutilised airports and airfields around a country to be able to get passengers closer to their origins and destinations. As a result of the under utilisation of these airfields, they are typically not manned or controlled as the amount of traffic do not justify having an air traffic controller. However, in order to have a successful, safe environment in which an ODAT service can take place, various systems and technology will be required. The small aircraft transportation system will be the proposed basis upon which an on-demand air travel service can be established.

The concept called small aircraft transportation system (SATS) was introduced into the United States of America in a partnership between NASA Langley Research Center, the Federal Aviation Administration, and the National Consortium for Aviation Mobility (Valasek, 2006). The long term vision of SATS is to promote an affordable on-demand transportation system which not only increases the utilisation of regional airports and small passenger aircrafts, but also reliably serve demand in a profitable fashion (Ferrel, Carney, and Winter, 2011).

The National Aeronautics and Space Administration (NASA) have conducted a research program between 2001 and 2005 to the value of $69 million to investigate the viability of a nationwide SATS program. This research had a vision of developing a new mode of transportation; allowing individuals to avoid overly congested interstate highways and inefficiently scheduled air carriers by creating an infrastructure of small aircrafts that could provide access to more communities in less time. The SATS program had a large focus on how traffic would be directed at airports where there are

no traffic control services, in essence, no air traffic control officers. Their proposal is the electronic automated control of air traffic around a specific aerodrome. Aircraft will then be accommodated based on the aircraft speed, rather than sequence of arrival. New technology will be deployed at the aerodrome as well as in the aircrafts to facilitate the automatic air traffic control. This control as well as GPS based guiding systems will allow for safe commuting even in sub-optimal flying conditions.

2.9 Developing countries and the need for technological adoption

To be able to achieve increased levels of growth in developing countries, it is important to continuously increase productivity and efficiencies in which goods are produced. One way of achieving this is by means of deploying new technologies. These technologies do not necessarily need to be developed from within a developing country itself; it can merely be the importation of new technologies that are already effective in developed countries to allow the developing country to increase economic growth. How well these technologies can be used is affected by the level of human capital in the developing country (Mastromarco & Ghosh, 2009).

It has therefore been argued that human capital plays an important role in growth, because human capital can help in explaining an economy's capacity to absorb new technologies (Kneller & Stevens, 2006). Empirical studies have found that human capital plays a role in economic growth by helping in the adoption of technology from abroad and in creating the appropriate domestic technology (Benhabib & Spiegel, 1994).

For individual companies the choice to invest in technology might be an easier one as they are able to directly measure the benefit from the investment in the new technology, but on a national level it becomes a bit more difficult as results are not immediately measurable. An example of this would be where the question is asked: Should government invest in upgrading airports and airfields around the country with new technology in order to increase safety and efficiencies in air-travel within the country? This is not an easy decision as it will be difficult to measure if this investment in technology immediately adds to the growth of the country. To be able to achieve increased safety in air travel around the country, this investment will need to stretch over government and privately owned airfields. In the case of private airfields it might

be argued that this government investment benefits the private airfield owner more than the country as a whole. However, over time this investment might be one of the pillars that help sustain the increased growth rates of the country.

In a study by Mastromarco & Ghosh (2009) they conclude that the positive effects of multinational firms on the productivity of developing countries are not direct, but through human capital. It was also found that the absorptive capacity of each country provides a useful explanation for the differences in productivity of different countries. Governments in developing countries should also facilitate the process of international technology transfer by encouraging the establishment of the necessary infrastructure and by providing incentives to support the development of domestic innovative capabilities.

In developing countries where high levels of human capital are scarce, it is therefore important to implement the correct technologies, as the effectiveness of these technologies will be a function of the human capital that implemented them. The correct technologies will not only help to enable scarce human capital to apply their time more effectively, but should also assist in increasing the available human capital in the country due to better levels of economic growth that creates more opportunities for increasing the levels of human capital.

2.10 Systems Theory

The evaluation on the viability of on-demand air travel in dynamic markets will be conducted based on systems theory that views each aspect of the system as an integral part of the success of such a system. In systems theory strategy and tactics exist at each level of the organisation. Strategy can be defined as simply the desired effect and tactics is how to achieve such desired effect. And although it is important to recognise the differences between the various functions that make up an ODAT business, it is important to rebuild these parts back into a whole as that is the way businesses functions (Hill, 2000). The theory further states that it is of critical importance to link marketing and operations in a company's strategy as essentially they are two sides of the same coin that constitute the basic task in any business. A study by Kaps, Gardner & Hartung (2001) found that one of the key reasons why ODAT has not really evolved as much as expected is the lack of knowledge about ODAT. It was

found that travel agencies are not sufficiently informed, educated and knowledgeable of charter services products and practices. This then results in agents not able to recommend the ODAT service to customers. When asked if charter companies have contacted them in regards with ODAT services, 95% of travel agencies responded negatively (Kaps et al., 2001). The literature thus indicates that there seems to be a disconnect between marketing and operations of ODAT service companies.

2.11 Production and capacity planning theory

An extremely important aspect in the success of an ODAT service will be the capacity planning of the system. Capacity is the ability to accommodate, and capacity planning describes a broad range of activities that aims to create and maintain customer serving resources as well as creating the ability to adjust the level of resourcing as required (Schonberger & Knod, 1997). ODAT can be defined as a service entity, and this results in the inability to store capacity, for example if the service or capacity of the resource is not used for an hour it cannot be recovered. A chase-demand strategy might be applicable as it would be easier to add capacity on an ad-hoc basis by hiring additional aircrafts and pilots than to permanently carry this capacity and not fully utilise it. ODAT makes use of a very universal skill set that any pilot should have in order to maintain his/her pilot's license. The skills are therefore not particular to the business, but rather to the industry, which makes it feasible to contract additional pilots in for short periods as required. The availability of many small aircrafts as hire and fly aircrafts will also allow for a chase-demand strategy that will lease additional aircrafts when demand is up and then lay off when demand is poor (Schonberger & Knod,1997). This said however, it is important to have the basic capacity planning accurate to ensure minimal operating costs as adding capacity on an ad-hoc basis may come at a high price.

2.12 Chapter Summary

In this chapter we have defined dynamic markets as developing countries that exhibit exciting economic growth prospects. When we looked at what drives growth in developing countries we have found that although each country have a unique combination of economic drivers that determines the success in the growth rate of the country, some of the most common drivers include physical capital, new technology

and human capital. We then focused on human capital as an economic driver and found that increased productivity of human capital will lead to higher growth rates, but due to the various forms of presenteeism, optimal productivity of human capital cannot yet be achieved. In the evaluation of road travel and the impact of travel on productivity it was seen that roads will get more congested and unsafe towards 2020 and the requirement to travel for business by road puts a productivity burden on scarce human capital that typically only allow productivity rates of 10% whilst driving.

Air travel has developed tremendously since its introduction in 1935 and became a very popular mode of transport, so much so that large airports in Europe and other areas are already reaching full capacity. Although air travel allows much better productivity rates of human capital (up to 72%), the requirement to arrive two hours in advance often at an airport far from your origin or destination as well as the delays experienced as a result of these congested airports again start to influence productivity of human capital negatively. We then introduced ODAT, which in theory will solve many of the delays currently experienced as it is an origin to destination air service that happens on demand, thus typically no delays are expected. This ODAT service will however require technology to control the current uncontrolled airfields and this can be found in the automated SATS system. Finally we stated the importance of adapting technology from developed countries to allow developing countries to grow faster and concluded the chapter by explaining how this study will fit into systems as well as production and capacity planning theory.

Chapter 3 – Research Questions

This chapter will introduce the three research questions that this study aims to answer.

3.1 Researcher's aim

In this study the researcher aims to explore the possibility that on-demand air travel (ODAT), supported by the small aircraft transportation system (SATS), could make a positive contribution to improving the productivity of scarce resources. If ODAT can increase the productivity of scare resources, the result may be an enhanced overall capability of the organisation to grow and be economically successful. Subsequently when companies grow and become more successful, their contribution towards GDP growth of the country would be higher. This in turn will bring the country closer to its goal of higher growth rates in order to be able to catch up with developed countries.

In order to understand what is required to make an ODAT service successful, it is important to define the order qualifiers (OQ) for ODAT. An order qualifier in the ODAT context are those characteristics that will allow an ODAT service to compete in the air travel market, thus the minimum requirements for ODAT to be viewed by the customer as a potential supplier of air travel services. An order winner (OW) can be described as the characteristics of the ODAT service which will make the customer choose a specific ODAT offering over another air travel service (Hill, 2000).

Mane & Crossley (2007) argues that in order for an ODAT service to succeed the ticket price must be set high enough to cover operating expenses and low enough to attract a significant number of passengers. Keeping operational costs low will be a crucial contributor to the potential success of an ODAT service, especially in the case where passengers require air travel services from an origin that is not the destination of the previous passenger. In these situations it would be required to perform non-revenue generating reposition flights to accommodate the new passenger (Mane & Crossley, 2007).

3.2 Research questions

Research Question 1: *What are the order qualifiers and order winners for an ODAT service?*

Research Question 2: *What value would ODAT add to a company if such a service can be successfully implemented?*

Research Question 3: *What are the contributors and inhibitors for successfully establishing an ODAT service in Southern Africa?*

Chapter 4 – Research Methodology

The purpose of this chapter is to take the reader through the full design and data collection process that has taken place as a result of this research project. First the research and sampling methods as well as the reasons for choosing them are discussed. The data collection and analysis are then discussed before concluding the with the identified research limitations.

4.1 Research method

The concept of air travel as an alternative to road travel and the impact on productivity is not a new field of study and various forms of exploratory research have been conducted in the past. The current form of ODAT is close to being a reality in some developed markets, such as the United States of America and a descriptive quantitative study would allow for describing the viability of ODAT in dynamic markets, such as South Africa.

This study was therefore designed as a descriptive quantitative study that focused on both the demand and supply sides of ODAT in dynamic markets. It is important to look at the demand as well as supply side in order to really understand if an ODAT service would be viable in dynamic markets.

A quantitative method is chosen as this research aims at describing the characteristics of ODAT in dynamic markets and quantitative descriptive research can tell us a lot about the world around us (Saunders & Lewis, 2012).

4.2 Unit of analysis and scope of research

The focus of the study was to determine if ODAT would be viable in dynamic markets and if ODAT will improve the productivity of scarce human capital. Thus the unit of analysis that were used was the individual or scarce human resource in both the

demand and supply groups. The reason for this choice is that the individual behaviour had to be analysed to determine the demand and supply, as well as the challenges around ODAT. Therefore the individual as unit of analysis was preferred.

With a specific focus on dynamic markets, it was decided that the scope of this study would be limited to the southern African market as the market is large enough to serve as a proxy for dynamic markets in general. As a result, the southern African market was considered to be a good model to describe the dynamics and challenges around the concept of ODAT in dynamic markets.

4.3 Population

There were two different populations defined for this study, as we had interest in researching both the demand and supply side of ODAT.

The demand side population were defined as scarce human resource individuals who need to do frequent business travel within southern Africa. These individuals might work for organisations that have their own fleet of aircraft, but typically don't have access to them as the aircraft are typically reserved for top management only.

The population for the supply side of this research were defined as South African pilot license holders as well as aircraft charter companies and individuals that are knowledgeable about the air travel market within southern Africa.

In both aforementioned cases a complete list of each population could not be obtained and therefore we have selected to make use of non-probability sampling methods (Saunders & Lewis, 2012).

4.4 Sampling method

On the demand side a mixed sampling method was used. It consisted of non-probability snowball and convenience sampling methods. The first group of samples on the demand side were reached through networks and colleagues that met the sample criteria. Due to the difficulty of identifying members of the stated population, the second group of samples on the demand side were introduced and reached through snowball

sampling in which subsequent sample members were identified by earlier sample members (Saunders & Lewis, 2012).

On the supply side a self-selection sampling method was used. In this method potential participants were reached using electronic media. In this specific case the very active and arguably leading aviation forum in South Africa was used, namely www.avcom.co.za . It is however important to realise that those who self-select to be members of your sample often do so because they have strong feelings or opinions about this research topic and as a result the sample might not be representative of the population (Saunders & Lewis, 2012). It is furthermore important to evaluate the geographic applicability of the respondents as the internet is global and might easily attract unwanted responses.

4.5 Sample size

A sample size of 80 was targeted for each of the two populations. This sample size was expected to be large enough to fulfil the research objectives and allow the researcher to answer the stated research questions. A larger sample size might offer the advantage of more available data which could potentially allow better insight into and description of the environment of air travel in southern Africa, but due to the limited time and budget for this research the chosen size were deemed acceptable.

A response rate on the demand side of between 40% and 50% was expected and factored into the amount of direct requests to complete the questionnaire. Furthermore it was expected at the time that the snowball sampling will contribute positively in increasing the sample size, however no specific number could be guaranteed.

With the self-selection sampling method used on the supply side an actual response rate is hard to measure as often one won't know how many people have read or seen the request for completing the survey. Based on typical web response rates, a response rate of between 2% and 12% was envisaged for this survey. The invitation for the survey was however designed in a manner which would allow the researcher to be able to measure the amount of possible respondents that viewed the invitation. This was accomplished by placing the request for completing the survey within its own topic on the forum, which allowed tracking of how many possible respondents actually opened that topic to view the request.

The sample size in both the populations could comfortably be administered via the research instrument which is discussed in the next section.

4.6 Research instrument and design

The research instrument was in the form of an online self administered questionnaire. The two questionnaires, one for the demand side and the other for the supply side, were designed in terms of the research objectives.

The demand side questionnaire was designed in three sections; in the first section the current impact of travel requirements on productivity is evaluated, the researcher then asked questions around the possibility of implementing an ODAT service as an alternative solution to the current modes of travel and finally in the third section the possible results and benefits from a potential successful ODAT implementation are explored.

The supply side questionnaire also comprised of three sections; section one looked at the climate and current trends in the air charter market. In section two the questions revolved around the pilot's perspective on aircrafts, airfields and technology required for implementing an ODAT service. The questionnaire then concludes in section three focusing on the feasibility of ODAT in South Africa.

The initial sections of both the questionnaires introduced the respondents to the research question as well as the concept of ODAT and the expected time required for completing the questionnaire. It was also stated that the questionnaire is completely voluntary, the respondents can withdraw at any time and that all data will be kept confidential.

For both these questionnaires there has been a progress bar on top of the page to allow the respondent to track his/her progress on completing the questionnaire. Each question had clear instructions to guide the respondent in understanding and completing the question successfully.

After completing the design of the questionnaires, a small test group of 6 respondents were requested to complete the questionnaires online in order to determine the effectiveness of the questionnaires in answering the research questions. These test

respondents consisted of fellow MBA students, South African pilots and scarce human capital doing frequent business travel. The very valuable feedback was evaluated and incorporated into the final questionnaires that were used for the study.

4.7 Data collection

All data was collected and stored through a web based survey solution called Survey Monkey. Due to the different sampling methods used for the demand and supply side questionnaires, the method of initiating the data collection also differed.

For the demand side survey, colleagues and friends directly known to the researcher were identified and contacted via a personalised e-mail. These emails were administered through the web based survey solutions company which allowed the tracking of responses from invited respondents; this also had the further advantage of sending a reminder email only to the invitees that did not respond yet. In addition to these invitees and by means of the snowball sampling method certain respondents were requested to also invite other potential respondents that also met the sample criteria in order to increase the sample size.

The invitation to complete the supply side survey was posted on the online aviation forum as discussed earlier. A new topic post were made in each of the most active sub forums in order to attract the highest amount of respondents. Using a forum of which the researcher is also a member had the additional advantages of allowing the researcher to respond to questions and lead a discussion with respondents around the survey. Not only did this discussion bring additional insight into the matter around a possible ODAT service, it also raised awareness and created interest in completing the survey which in turn resulted into a larger sample.

4.8 Process of data analysis

All data were collected from the web based survey solution at the end of the data collection period. At the same time the status on the number of requests and actual respondents were recorded in order to be able to calculate the effective response rate for each questionnaire. On the demand side the number of direct requests was

captured on the web based survey solution and on the supply side the total number of views in the two sub forums.

In preparation for the analysis all data have been downloaded in an analytical software usable data matrix format. The data from both the questionnaires were then cleaned by removing all invalid data entries. All categorical data were coded and where applicable also ranked. Before the final data analysis all data were checked for illegitimate codes and illogical relationships.

4.9 Research limitations

The self selecting sampling method might have introduced a biased response, as in this case of the supply side most of the pilot's license holders would typically be over enthusiastic about flying and aircraft related activities.
Due to limited funding for this research and the difficulty in identifying members of the stated population, a true probability sample could not be used and thus no inferences to the population as a whole can be made as the research is not representative of the population.

The area of ODAT is still under-researched and by using a quantitative method, the opportunity to find out more about the background of the problem as with a qualitative study will be forgone.

Potential respondents that do not have access to a computer and internet were naturally excluded from the survey as all data collection took place online. This limitation was deemed acceptable as those individuals would fall outside the target population.

Given the limitations of the study as stated above, it was expected that the chosen method would however have been able to provide enough reliable data to answer the research questions.

This chapter introduced the research methodology and will serve as the basis on which further discussion around the results will take place in Chapter 5 and Chapter 6.

Chapter 5 – Results

This chapter will provide the results as obtained from the two sets of questionnaires that were completed. First the results from the demand side will be presented and thereafter the results from the supply side.

5.1 Demand side results

The request to complete the demand side survey was send to 91 potential respondents and 57 completed the survey resulting in a response rate of 62.6%. There was also an open survey that could be completed by additional respondents that were referred by the original 91 potential respondents. This snowball method resulted in an additional 11 respondents bringing the total number of completed questionnaires to 68 and resulted in an effective response rate of 66.6%. A summary of the respondent types is given in Figure 5.1 and it can be seen that the majority of respondents fall in the age group 30-39.

On Demand Air Travel - Customer Side							
Individual Information							
Gender	Male	Female	Response Count				
	48	15	63				
Age group	20-29	30-39	40-49	50-59	60+	Response Count	
	7	37	14	5	0	63	
# of employees in your company	0-9	10-99	100-499	500-10000	10000-49999	50000+	Response Count
	5	9	12	16	13	7	62
Industry	Mining	Services	Consulting	Manufacturing	Small business	Other	Response Count
	23	13	11	2	2	12	63
						answered question	63
						skipped question	5

Figure 5. 1 – Respondent demographics

5.1.1 Current travel trends and impact on productivity

The questionnaire first looked at the amount of hours and distances the respondents travel per week. Table 5.1 shows that the average respondent travels 7.7 hours per week over a distance of 436 km, getting reimbursed at an average rate of R4.70 per kilometre. The results also revealed that for 68.3% of respondents the stated business travel is further than 50km away from their offices.

Variable	Label	N	Mean	Std Dev	Minimum	Maximum
Q3	Time(hrs)	61	7.71	7.09		30.00
Q4	Distance(km)	61	436.26	406.79	0	2000.00
Q17	Reimbursement(R)	57	4.71	12.91	0	100.00

Table 5. 1 – Business travel Time, Distance and Reimbursement

The conditions in which the above mentioned business travel takes place include travelling during the dark on average 1.3 times a week and 15.9% of respondents said they are often late due to the unpredictability of traffic on the road.

Pearson Correlation Coefficients, N = 61 Prob > |r| under H0: Rho=0		
	Time	Distance
Q3 Time Q3	1.0000	0.5252 <.0001
Q4 Distance Q4	0.5252 <.0001	1.0000

Table 5. 2 – Correlation between Time and Distance

With time and distance having separate units, a unitless correlation test were conducted in order to determine the relationship between these two variables (Albright, Winston & Zappe, 2009). Table 5.2 shows that there exists a meaningful positive correlation of 0.525 between the time and distance variables as introduced in Table 5.1.

In Table 5.3 we see the top 15 most frequently travelled to towns that amounts to 65.07% of the overall towns reported. A complete list of all the typical towns and cities the respondents travel to is available in Appendix C. The remaining towns had less than four counts per town and make out the other 34.93% of responses.

OBSERVATION	TOWN / CITY	COUNT	PERCENT
1	JHB	20	9.57
2	Rustenburg	15	7.18
3	Cape Town	12	5.74
4	Durban	12	5.74
5	Polokwane	11	5.26
6	Nelspruit	9	4.31
7	Northam	9	4.31
8	Pretoria	8	3.83
9	Thabazimbi	8	3.83
10	Mokopane	7	3.35
11	Lydenburg	6	2.87
12	Bloemfontein	5	2.39
13	East London	5	2.39
14	Steelpoort	5	2.39
15	Kathu	4	1.91
16	*Other*	*	*34.93*

Table 5. 3 – Top 15 most travelled to towns

Scheduled flights are however available to some of the destinations mentioned in Table 5.3 and detail around the towns that are not serviced will be discussed in Chapter 6.

When looking at productivity one will find that there are various factors that could influence an individual's productivity, both directly and indirectly and therefore respondents were asked to state how they perceive the impact that the factors in Table 5.4 have on their personal productivity.

FACTOR	IMPACT
Sleeping out	Although it depends on the nature and duration of the actual business, typically distances of 350km and more would result into the respondent sleeping over at his/her destination.
Being away from home (incl. Sleeping out)	82.3% of respondents replied that being away from home for long hours have a negative impact on their overall productivity.
Separate travel arrangements	Typically two or more people from the same office travel to the same business meeting in separate vehicles, where travelling together could have increased productivity. – Some companies however do not allow two or more managers to travel together.
Unhealthy eating habits	87.1% of respondents said that they eat fast- and often unhealthy food whilst travelling

Table 5. 4 – Impact on productivity

5.1.2 Safety

Three specific questions were asked around the safety of road travel and the results were as follows:

Only 35% of companies have a policy against travelling after night fall, the remaining 65% of companies allow their employees to do business travel at any time. Some companies do advise not to travel after dark, although it's not formally forbidden. Other companies again allow night travel on highways only.

We have found that only 36% of the respondents consider travelling by road as a safe enough method of travelling while the remaining 64% said that they consider air travel to be safer.

Eight (12.9%) out of the sixty-two respondents said that they have had a large motor vehicle accident that impacted their productivity by more than one day.

5.1.3 Important factors in business travel – conventional travel methods

In order to understand how respondents value certain items around business travel, they have been requested to rate each of the four factors in Figure 5.2 below on a six point Likert scale. The Likert scale were chosen from one to six in order to not allow the middle as an average answer, the respondent had to actively choose between unimportant and important when it came to the third and fourth rating on the scale which is also known as the forced choice method.

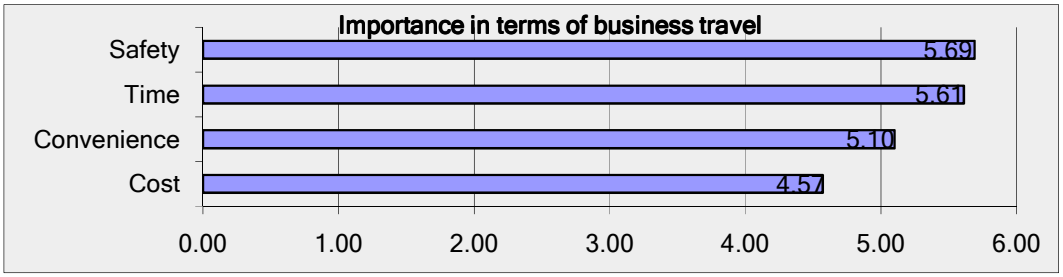

Figure 5. 2 – Factor importance rating in terms of business travel

The nonparametric Friedman two-way analysis was conducted on the data in Figure 5.2 to determine if a significant difference exists between the four factors: convenience, safety, cost and time as can be found in Table 5.5. The Friedman two-way analysis of

variance is the appropriate test to use when several ordinal level measures need to be compared to one another (Diamantopoulos & Schlegelmilch, 2000).

VARIABLE NUMBER	VARIABLE NAME	MEAN	STANDARD DEVIATION
3	Safety	5.69 [a]	0.67
1	Time	5.61 [a]	0.53
4	Convenience	5.10 [b]	0.75
2	Cost	4.57 [b]	1.16
Means with different superscripts differ significantly on the 5% level.			

Table 5. 5 - Friedman two-way analysis of variance test results

The Friedman test produced a P-value < 0.0001 stating that meaningful differences at the 1% level exist between at least two of the factors, thus the model will be a good approximation at the researchers' chosen 5% level. These differences exist between variable three and four, three and two, one and four as well as one and two. In other words the respondents viewed safety and time as equally important and convenience as equal to cost. Thus on average safety and time is viewed as more important than convenience and cost.

5.1.4 Important factors in business travel – when considering ODAT

At first the respondents were asked about some of the reasons why they might not want to make use of traditional and low cost air travel, the results are presented in Figure 5.3.

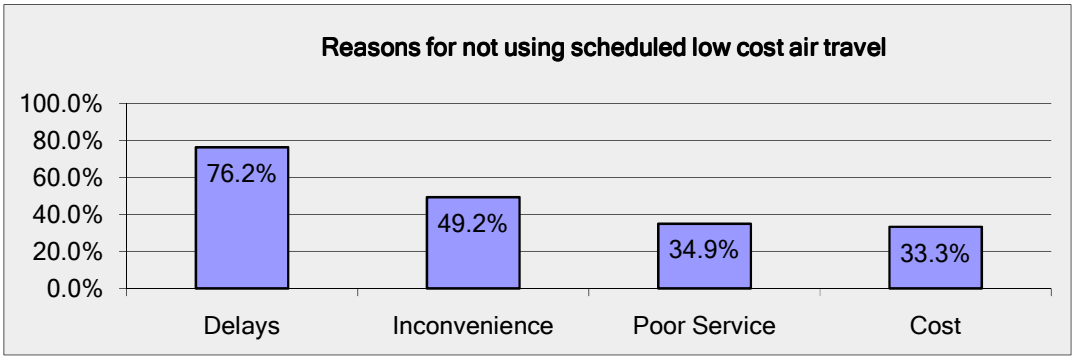

Figure 5. 3 – Reasons for not using traditional air travel

It is clear from the data in Figure 5.3 that delays are the most common reason for not using traditional air travel. Additional comments on why respondents will not make use of traditional air travel are presented in Table 5.6.

Additional Comments – Not using traditional air travel
"It takes a lot of time to travel to the main airports from where low cost carriers fly. Also, the destination airport is removed quite a distance from my final destination."
"If it is quicker or more convenient I will drive."
"Typically the time it takes to get to the airport, be there in advance for check in etc. takes almost just as long as driving."
"Safety of planes in low cost air travel?"
"Arrange for transport to remote sites."
"Low cost air travel will give me motion sickness, as I am not used to flying and inevitably most flying for business purposes will not be in the early morning or late afternoon."
"Doesn't go where I want to go - smaller towns"

Table 5. 6 – Additional comments on reasons for not using traditional air travel

The respondents were then asked why they would prefer to use ODAT above traditional air travel by rating the three factors on a 3 point Likert scale. After applying the Friedman two-way analysis of variance test to the results in Table 5.7 it was found that a significant difference between variable two and three as well as variable one and three exists at the 5% level. Arriving closer to destination and the convenience of ODAT is thus the main reasons why respondents will choose ODAT above traditional air travel.

VARIABLE NUMBER	VARIABLE NAME	MEAN	STANDARD DEVIATION
2	Arriving closer to destination	2.52 [a]	0.57
1	Convenience	2.42 [a]	0.56
3	Better service	2.05 [b]	0.61
Means with different superscripts differ significantly on the 5% level.			

Table 5. 7 – Rank ordered reasons for preferring ODAT

It is also interesting to note in Table 5.8 that although some respondents would enjoy the flexibility of ODAT, other felt that ODAT would not work nor be cost effective or green.

Additional Comments
"Flexibility is lost by not having a vehicle at your destination"
"Scheduled air travel is not reliable; ODAT will impossibly be reliable / cost effective. Bad carbon footprint per passenger mile"
"Time and convenience is important to me"

Table 5. 8 – Additional comments on why ODAT would be preferred

With the focus of the study on the ODAT environment which will typically make use of small 2-12 seater aircraft, the respondents were then asked if they would actually be prepared to fly in these small planes. Figure 5.4 shows that a 74.6% majority of respondents indicated that they would be willing to fly in 2-12 seater aircraft.

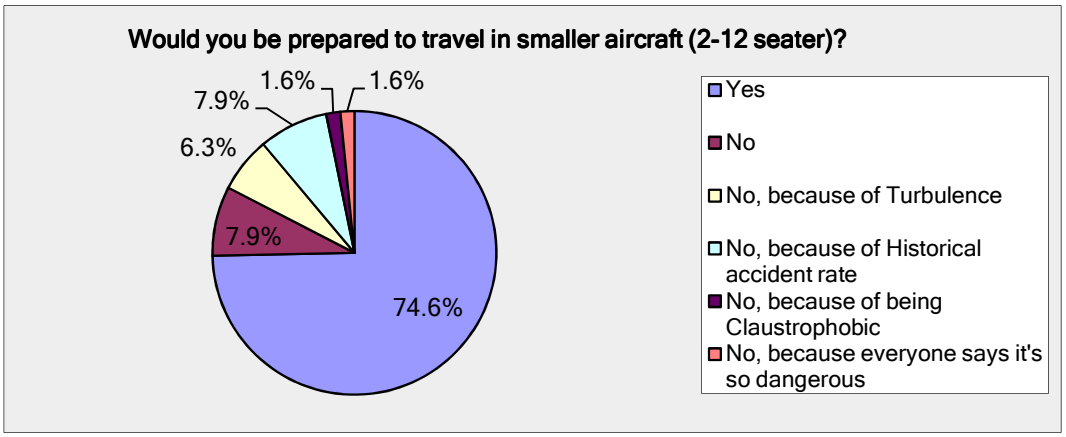

Figure 5. 4 – Willingness to fly in smaller aircraft

Table 5.9 shares some additional comments of respondents regarding their willingness to travel in small aircraft and it should be noted that some respondents feel that the policies, costs and the lack of transport at the destination airport will have a secondary effect on the willingness to travel with small aircraft.

Additional comments
"My experience of small aircrafts has been horrible."
"I am a pilot and own my aircraft but the Company policy forbids me travelling in it."
"Costs may be much higher"
"Northern Cape - Sishen uses 12 seater planes. Choice is limited."
"How would you get from the airfield to your required place of business?"
"If it is available and convenient and required. It removes the flexibility of having your own transport at the destination."

Table 5. 9 – Additional comments on travelling in 2-12 seater plane

The respondents were asked what the minimum expectations would be from an on demand air travel service. Table 5.10 shows the results and it can be seen that an on-board toilet and light refreshments such as drinks and snacks are much more important to respondents than food.

OBSERVATION	Minimum expectations from ODAT	COUNT	PERCENT
1	On-board Toilet	39	45.35
2	Refreshments	38	44.19
3	Food	9	10.47

Table 5. 10 – Minimum expectations from ODAT

Table 5.11 shows the additional comments from respondents in regards to their minimum expectations from an ODAT service.

Additional comments
"a Safe flight"
"Something to amuse me while waiting for delayed flights"
"Convenience and time saving"
"Depends on the length of the flight"
"On time arrival/departure"
"Get you there and back in good time"

Table 5. 11 – Additional comments on the minimum expectation from ODAT

When asked about the importance of being able to work whilst flying, only 56% of respondents indicated that it is important to them. However when asked what they would require in the plane in order to be productive (see Figure 5.5 below), 61 respondents rated the importance of a working tray, power source and internet connectivity on average as a 7 on the 10 point Likert scale. The Friedman test produced a P-value of 0.472 which indicate that no significant differences exist between the three variables and can thus be seen as equally important.

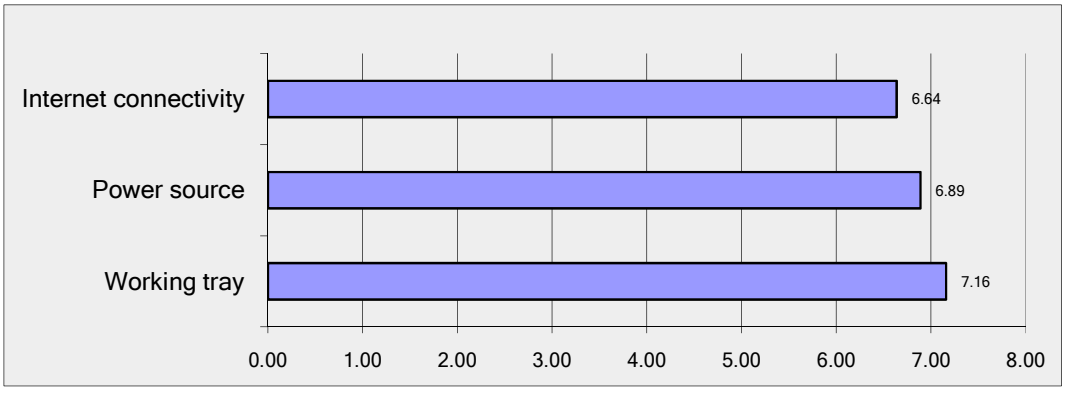

Figure 5. 5 – Minimum requirements to enable productivity in plane

5.1.5 General perception on the possible results of an ODAT service.

The last section of the demand side questionnaire focused on what the possible increase in productivity and improvement in work-life balance might be if an ODAT service can be implemented successfully.

Figure 5.6 shows only 54.8% of respondents believed that they would be more productive whilst travelling as a result of making use of ODAT, however 90.3% responded that their overall day would be more productive due to spending less time travelling.

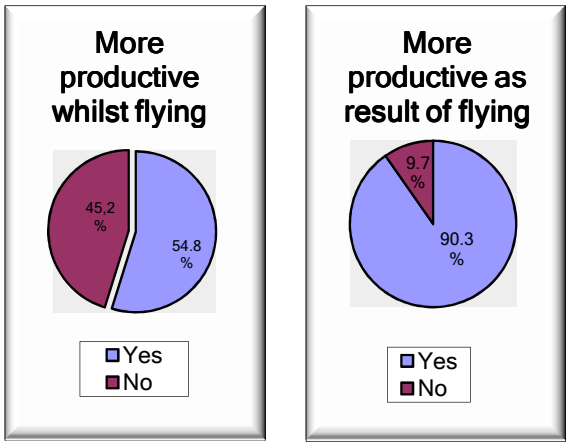

Figure 5. 6 – Possibilities on productivity increase

Additional qualitative information that came from the respondents in terms of working in the plane included factors such as the typical small confined space and the presence of turbulence in small aircraft that would make it challenging to do productive work whilst travelling with ODAT. One of the respondent's arguments was that while one might be able to work on the aircraft, you lose the ability to take phone calls during the flight which again have a negative impact on the individuals' productivity whilst travelling.

In terms of overall increased productivity, some of the remaining 9.7% respondents argued that highways are generally open and that traffic delays are experienced in cities, thus one would still experience delays by having to travel from the airfield to your meeting place in the city. Additional to this, at some of the larger airfields, the air traffic procedure to get airborne also adds to the delay in some instances and the benefit of flying would typically only be experienced when travelling further than 350km. In the cases where one have to hire a car at the destination it will add additional costs and time to travelling with ODAT or in the alternative case where you don't hire a car, it will

impact on your flexibility. However, 90.3% of the respondents felt they would still experience an increase in overall productivity if they were able to travel by means of an ODAT service.

A portion of the questions focused on how some respondents will make use of the time saved as a result of using ODAT and especially how that might help in improving their work-life balance. In Figure 5.7 it is seen that 81% of respondents said that they would experience less stress whilst travelling with ODAT than when having to drive themselves by car, the remaining 19% argued that flying in itself is stressful and combined to that there is the stress of getting to and from the airfield in time. On the other hand 98.4% said that as a result of travelling with ODAT they would feel more refreshed after travelling which in turn will enable them to deliver better quality work. The last chart in Figure 5.7 shows that as much as 57.4% of the respondents indicated that they would be using some of the additional time to exercise, whilst other respondents felt that they would rather use the additional time to spend with the family.

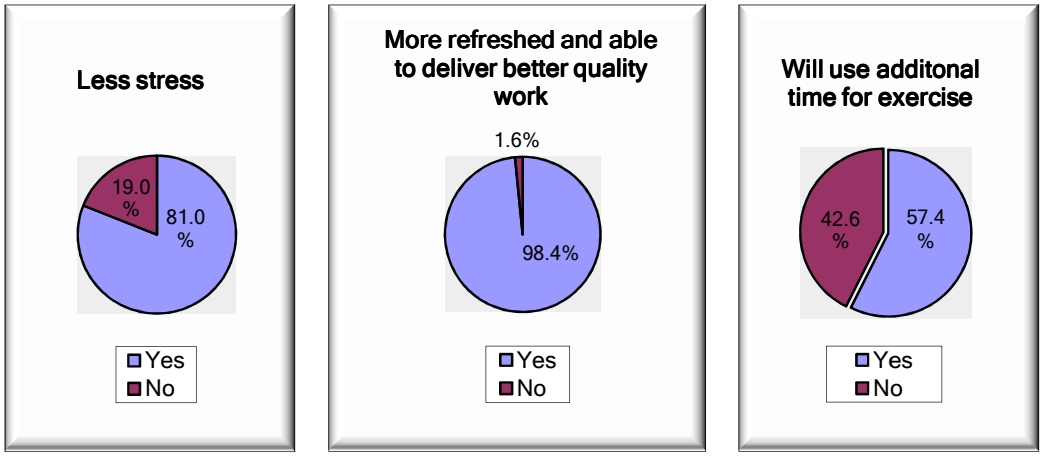

Figure 5. 7 – Application of saved time

The demand side questionnaire is concluded with the question around what premium the respondents would be prepared to pay for an ODAT service in relation to normal cost when travelling by car. Figure 5.8 shows the results and it is interesting to note that overall 85.9% of respondents are willing to pay more for ODAT and 59.7% said that they would be prepared to pay as much as 30-50% more to be able to travel by ODAT.

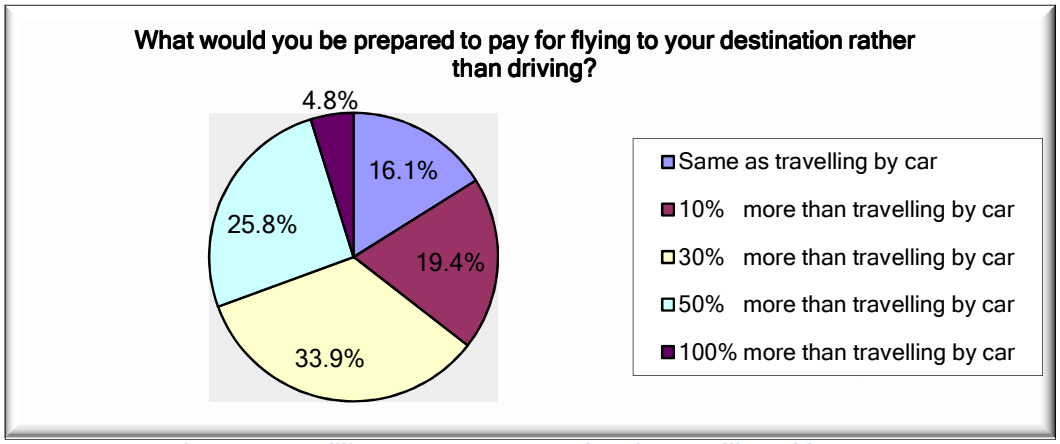

Figure 5. 8 – Willingness to pay a premium for travelling with ODAT.

The researcher found it important to determine if a respondent thought their answers through and if they would actually commit to using the service once it is available. The chosen method to test this was to determine if there is a relationship between respondents being prepared to pay more for ODAT and their evaluation of productivity improvement whilst travelling and over all. The statistical test was the Fishers exact test, which is the preferred test in cases where n is small or where the expected frequencies under H_0 are not at least 5 (Steyn, Smit, Du Toit & Strasheim, 1999).

Scenario 1 : Improved productivity whilst travelling (Q24) vs. Willingness to pay premium(Q29)

Q24(Q24)		Q29(29)					
		0	10	30	50	100	Total
1	Frequency	2	8	13	9	2	34
	Row Pct	5.88	23.53	38.24	26.47	5.88	55.74
2	Frequency	8	4	8	6	1	27
	Row Pct	29.63	14.81	29.63	22.22	3.70	44.26
Total		10	12	21	15	3	61
		16.39	19.67	34.43	24.59	4.92	100

Scenario 2 : Overall Improved productivity (Q25) vs. Willingness to pay premium(Q29)

Q25(Q25)		Q29(29)					
		0	10	30	50	100	Total
1	Frequency	9	11	19	13	3	55
	Row Pct	16.36	20.00	34.55	23.64	5.45	90.16
2	Frequency	1	1	2	2	0	6
	Row Pct	16.67	16.67	33.33	33.33	0.00	9.84
Total		10	12	21	15	3	61
		16.39	19.67	34.43	24.59	4.92	100

Fisher's Exact Test

	Scenario 1	Scenario 2
Pr <= P	0.1725	>0.9999

Table 5. 12 – Two way table with Fishers exact test

In both cases of Table 5.12 above the chi-square test was not applicable because of low frequencies in some cells.

Both scenarios were tested, first comparing the scenario of improved productivity whilst travelling with the willingness to pay more and then comparing the scenario of overall productivity improvement with the willingness to pay more. In both these cases as can be seen from Table 5.12, the Fishers exact test returned a P value greater than 0.05. It can therefore be concluded that no statistical significant relationship exists between the improvement in productivity and willingness to pay more for an ODAT service.

Thus it is not possible to say that respondents that indicated ODAT would increase their productivity would necessarily be using the service.

5.2 Supply side results

The second questionnaire was developed to try and establish what the current conditions in the aviation market are and if an ODAT could be implemented in a dynamic market such as South Africa. This second questionnaire is then also referred to as the supply side questionnaire.

In terms of the response rate the researcher was able to track the number of possible respondents that viewed the request for completing the survey by making use of tracking the number of clicks on the topic. There were 555 views in the general aviation forum and 783 views in the classified forum, bringing the total views to 1338. It should be noted that the possibility exist that the same potential respondent viewed the request in both forums, which will lower the number of 1338, however for the purpose of determining the response rate in this particular case it was not taken into account. The number of completed questionnaires amounted to 83, giving an overall internet response rate of 6% which is in line with typical web response rates as discussed in Chapter 4. It must be stated that not all respondents answered all the questions, which in one case resulted in a question with only 16 responses, however on average 49 respondents answered all questions.

5.2.1 Current air charter market

This first section of the questionnaire looked at the current air charter market and what the typical trends are in terms of air charter travelling arrangements as well as aircraft and pilot capacity in the current market.

It was found that business travellers that do make use of air charters to travel for business do so primarily because of the increased levels of productivity and convenience. As can be seen in Figure 5.9, both factors are rated high on the six point Likert scale without significant difference between the two.

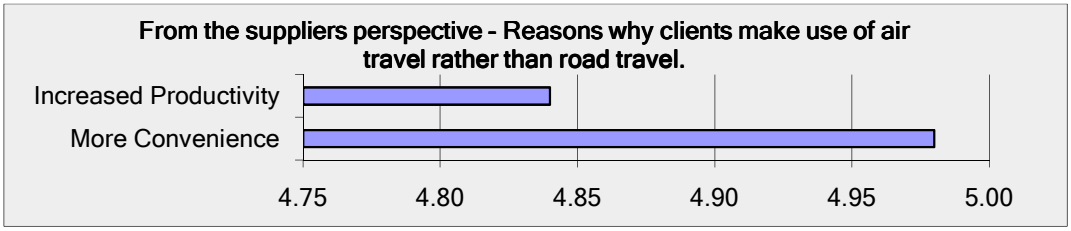

Figure 5. 9 – Reasons for making use of air travel

It is however not only the current clients that would like to make use of air charter services, 60% of the respondents indicated that they get between one and five requests per month from business people that would like to make use of charter services but then simply can't afford it. The question was also asked if the respondents ever get requests from business travellers to share aircrafts and 16 of the 47 respondents for this question indicated that they do get that request at an average rate of 3.18 times per month.

The next step was to determine what the capacity and utilisation of pilots and aircrafts are in the current air charter market. The question around pilot capacity were asked with the assumption that a typical month consist of 180 hours where 100 hours is allowed for flying and the remaining 80 hours for flight planning, aircraft preparation and maintenance. It was found that on average 25.5 hours or a quarter of the commercial pilot's available 100 flying hours are not utilised and 30.1 hours (37.6%) of their planning hours are not utilised on a monthly basis, which give an indication of the additional capacity of the commercial pilots in this survey. The question around the utilisation of aircrafts took into account both the private and commercial aircraft responses that revealed a monthly average of only 30% utilisation based on a possible 10 hours a day availability.

5.2.2 Pilots perspective of airfields, aircrafts and technology in South Africa

This section was added to the questionnaire in order to try and understand the flying environment in South Africa. The respondents were asked if they feel that most airfields in South Africa are safe to fly to under three types of conditions: visual flying rules (VFR) by day; VFR by night and instrument flying rules (IFR).

VARIABLE NUMBER	VARIABLE NAME	MEAN	STANDARD DEVIATION
1	VFR by day	4.69 [a]	0.90
2	VFR by night	3.19 [a]	1.23
3	IFR	2.88 [b]	1.32
Means with different superscripts differ significantly on the 5% level.			

Table 5. 13 – Safety of airfields in South Africa

Table 5.13 shows that the respondents on average rated the airfields under VFR by day as a 4.69 on a six point Likert scale and a 3.19 under VFR by night conditions. The Friedman two-way analysis test of variance produced a p-value < 0.001 which indicate there are significant differences between at least two variables. These differences at the chosen 5% level occurs between variable 1 and 3, as well as variable 2 and 3, which shows that the respondents believe under IFR conditions the airfields are not considered safe.

As can be seen in Figure 5.10, the majority of respondents did however indicate that they would be prepared to pilot a 2-12 seater aircraft to most of the airfields around South Africa with only 4.2% that would not be prepared to fly to the airfields as described.

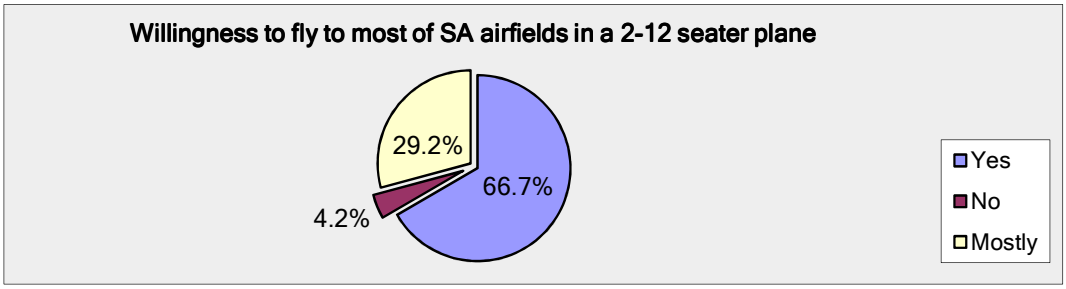

Figure 5. 10 – Willingness to fly to majority of SA airfields in a 2-12 seater plane

A summary of the reason that has been given on why some airfields are considered to be unsafe are shown in Table 5.14

Airfields considered unsafe due to:
"Runways not maintained"
"Short runways and overhead power lines"
"Overall poor security of aircraft and people at airfield"
"Weather patterns around the airfield"
"Pedestrians running across runway during landing"

Table 5. 14 – Reasons given for unsafe airfields

It is interesting to note that the supply side respondents considered none of the top ten airfields that were described in Table 5.3 as unsafe.

The respondents were then asked to give their opinion on the affordability of ODAT to different customers and rate it on a six point Likert scale. In Figure 5.11 it can be seen that the respondents believed that business and private business customers are the most likely groups that would be able to afford ODAT in the current market with the available types of small aircraft. That said, both factors still yield a low number in terms of the six point scale.

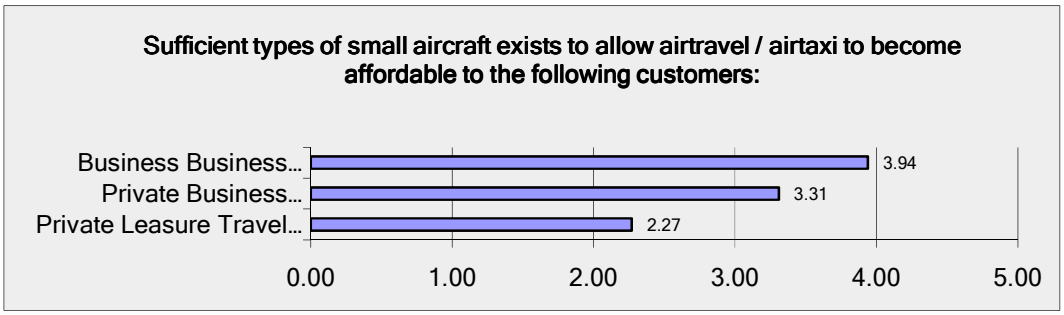

Figure 5. 11 – Affordability to different types of customers

The qualitative information that came from the question around affordability indicated that serious business people can't afford any delays as a result of weather and other issues normally associated with small aircrafts. Additional to this, it was stated that if non-type certified aircraft (NTCA) can be used for commercial operations then chartered air travel may become less expensive. NTCA are aircrafts of which the manufacturer did not seek type approval from the Civil Aviation Authority. These aircraft also typically require less stringent maintenance procedures.

5.2.3 The possible results of an ODAT service in South Africa

The last section of the supplier survey focused on what the viability of an ODAT service will look like from a supplier's perspective. The supply side respondents were asked if they believe the customers will perceive good value from an ODAT service. The results are presented in Figure 5.12.

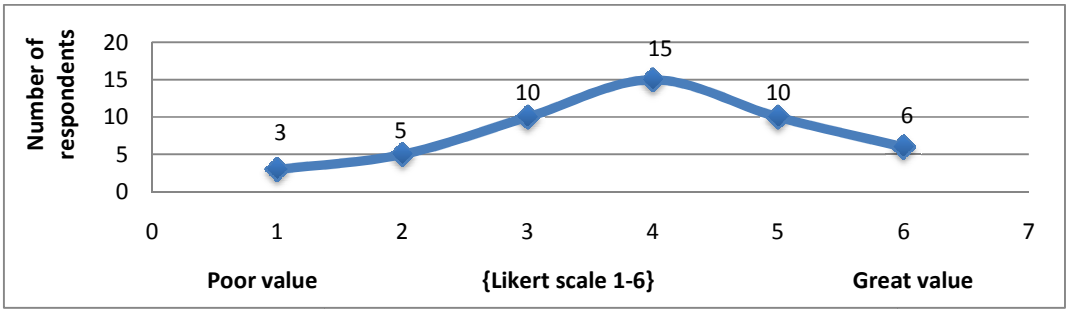

Figure 5. 12 – Value perception from an ODAT service

One of the key obstacles is empty repositioning flights. The respondents were asked if they believe the empty flights will be a major problem to the profitability of ODAT and the results show that the average rating was 5.06 on a six point Likert scale, indicating that the respondents believe the empty repositioning flights will certainly produce a major problem to the profitability and cost of ODAT.

In terms of the adoption of the ODAT concept and the technology around it, the respondents were asked if they believe that smaller companies will also adapt to the ODAT concept once they see the success that larger companies achieve by making use of ODAT. It was found that 49% of respondents said "yes" with a further 37% that responded "maybe". The respondents were also asked if they believe that the government and/or air traffic and navigation services (ATNS) would be willing to invest in installing the required technology at more of the small airfields as they become popular destinations for ODAT flights. An overwhelming 63% of respondents answered "no" with a further 22% that said "maybe".

The questionnaire is concluded with two questions around sufficient demand and the willingness of suppliers to enter the market of ODAT. The results showed that 43% of respondents were of the opinion that sufficient demand exists and 29% said that they are not sure. Finally as much as 60% of respondents indicated that they would actually enter the market of ODAT as a supplier.

Lastly a Fisher's exact test was conducted to determine if there exist a relationship between the belief that there is sufficient demand for an ODAT service and the supplier's willingness to enter the ODAT market. As shown in Figure 5.13 the statistical tests returned a P-value smaller than 0.05 which indicates that a meaningful relationship exists between the two factors at the 5% level.

Sufficient demand(Q18) vs. Entering the ODAT market(Q19)					
Q18(Q18)		Q19(19)			
		1	2	4	Total
1	Frequency	15	3	1	19
	Row Pct	78.95	15.79	5.26	40.43
2	Frequency	4	8	2	14
	Row Pct	28.57	57.14	14.29	29.79
6	Frequency	9	1	4	14
	Row Pct	64.29	7.14	28.57	29.79
Total		28	12	7	47
		59.57	25.53	14.89	100
Fisher's Exact Test					
Table Probability(P)		0.0000199			
Pr <= P		0.0054			

Figure 5. 13 – Fishers exact test for demand and supply

From Figure 5.13 it can thus be concluded that respondents who believe there is sufficient demand for an ODAT service will typically also be willing to enter the market as a supplier.

This chapter presented the results as obtained from the demand and supply side questionnaires. The data were further analysed by making use of specific statistical test in order to better understand the impact of the results. A detailed discussion around the results will be conducted in Chapter 6.

Chapter 6 – Discussion of Results

In this chapter the results as presented in Chapter 5 will be discussed. The discussion will be presented in light of the literature review from Chapter 2 as well as the research objectives in Chapter 3. Each research question will be discussed in a separate section.

6.1 Research Question 1

What are the order qualifiers and order winners for an ODAT service?

6.1.1 Order qualifiers

The first order qualifier would be that the ODAT service should fly to the destinations where the respondents need to travel to for work and meetings. The data in Table 5.3 shows the most travelled to towns and Table 6.1 below show the top 5 towns that are currently not serviced by larger airlines. All five of these towns have well maintained tarred runways, with the exception of Northam that has a gravel runway but it is well maintained.

	TOWN / CITY	COUNT	PERCENT	AIRFIELD ID	RUNWAY		
					LENGTH	TYPE	LIGHTS
2	Rustenburg	15	7.18	FARG	1225m	Tar	Yes
5	Polokwane	11	5.26	FAPI	2200m	Tar	Yes
6	Nelspruit	9	4.31	FANS	1042m	Tar	Yes
7	Northam	9	4.31	MAWALA	1070m	Gravel	No
8	Pretoria	8	3.83	FAWB	1828m	Tar	Yes

Table 6. 1 – Top 5 towns not serviced by larger airlines

All five the runways are in excess of 1000m in length, which will be able to accommodate most 2-12 seater aircraft to land there. Furthermore four out of the five runways are also equipped with runway lights, which will enable VFR by night

operations. The literature by Mane & Crossley (2009) suggest the Cirrus SR22, Seneca V and VLJ (Eclipse 500) as three of the most ideal aircraft for ODAT service, due to their effective range and travel time value advantages. It can therefore be concluded that these popular airfield destinations in South Africa would be able to accommodate the three most ideal air taxi aircraft types.

The next order qualifier is that all ODAT operations should be conducted in a safe and professional manner that instils confidence in the client. The data in section 5.1.2 of Chapter 5 indicate 64% of respondents believe that air travel is safer than road travel, which suggest that this particular order qualifier would be met if an ODAT service were implemented.

One other very important order qualifier would be the willingness of passengers to fly in small 2-12 seater aircraft. Smaller aircrafts are more susceptible to turbulence than large aircrafts that are used in low cost airlines, and certain passengers might experience turbulence in a small aircraft as uncomfortable. The data in Figure 5.4 shows that only 74.6% of respondents would be prepared to fly in small 2-12 seater aircraft, which reduce the potential market by 25.4%. Therefore the willingness to fly in small aircrafts would be an order qualifier that might have a significant impact on the viability of an ODAT service in dynamic markets.

The last order qualifier is affordability or costs. Although the data in Figure 5.2 shows that of the four factors, costs were rated as the least important, it still scored a 4.57 out of a possible 6, thus an effective 76% importance rating. This finding is in line with the literature by Mane & Crossley (2007), which suggest that for an ODAT service to succeed the prices must be high enough to cover operating expenses and low enough to attract a significant number of passengers. It can therefore be concluded that affordability is an important order qualifier and in order to be considered as a viable alternative solution, ODAT would have to be relatively affordable.

6.1.2 Order winners

For a service to be winning orders, the service should be offered in such a manner that it would be superior to the alternative in one or more ways. When reviewing the data in Figure 5.3, the number one reason why respondents do not want to make use of traditional / low cost airlines is the delays that are experienced with them. The first

important order winner would therefore be to get the ODAT flights to depart and arrive on time and to have the check in procedure as cumbersome and quick as possible.

Another order winner will be the ability to fly on-demand. This will allow a passenger to depart and return at a flexible time chosen by the passenger, allowing for example an earlier / later return flight and not be dependent on a scheduled flight. The data in Figure 5.2 shows that time is the second most important factor in terms of business travel with a 5.61 rating on the six-point Likert scale. Thus the ability to fly on-demand will allow the passenger to save time, which will result in an order winner for the ODAT service when a passenger need to choose a mode of travel.

Then a last order winner would be the fact that respondents would be arriving closer to their destination as well as be closer to their departure airfield when making use of ODAT. The data in Table 5.7 shows the number one reason for respondents wanting to make use of ODAT is to arrive closer to their destinations. This has a dual advantage because not only will it result in time saving, it will also eliminate some of the frustration of having to drive hundreds of kilometres from a domestic airport to the respondent's destination. Some respondents did however feel that some of the flexibility of arriving closer and travel on-demand is lost by not having a vehicle at the destination, even if the final destination is just 5km removed from the destination airfield. This can however be addressed by the ODAT company offering a complete service which might include transport at the destination, thus arriving closer to the destination would be an order winner for ODAT service.

6.2 Research Question 2

What value would ODAT add to the company and the country if ODAT can be implemented successfully?

When looking at the value that the question refers to, it is both the financial as well as non-financial benefits. Wardman (2004) defines the value of travel time as the ratio of the marginal utilities of time and money, where the marginal utility of time is determined by the opportunity cost of time spent travelling and the actual disutility of time spent travelling. From a company's perspective, three of the most challenging factors are to

contain cost, increase productivity as well as employee safety and well-being. All three of these factors are value drivers and will be discussed.

6.2.1 Value of Costs

Travel costs when making use of ODAT might be viewed as increasing, but when viewed in relation to the reduced travel time and overall increased productivity, the increase might be justifiable. The data in Figure 5.2 and Figure 5.8 suggest that costs are very important to the demand side respondents, but the respondents are nevertheless still prepared to pay a premium in order to make use of ODAT. The data in Figure 5.11 show that the supply side respondents felt that businesses paying for employee's business travel would be the most likely group to be able to afford ODAT with the current available aircraft. It is believed that as technology advance and aircrafts can be operated less expensively, the users of ODAT would also expand, hopefully to the point where a private individual travelling for private purposes would be able to afford the service. The data in Table 5.4 also shows that typically two or more people travel to the same meeting in separate vehicles, which creates a further opportunity for cost reduction by flying together. This might be a significant saving because if a week's travel is shared between two employees, it may save the company as much as 463km x R 4.71 = R 2180 based on the averages in Table 5.1.

From the literature Mane & Crossley (2007) states that the ticket prices of ODAT have to be low enough to attract sufficient customers. The literature in § 2.6 of Chapter 2 also suggest that the smaller airfields would allow ODAT service providers to reduce ticket costs as a result of significant reduced airfield fees in comparison with the large airports.

Based then on the evaluation of the supply and demand side respondents as well as the literature, it can be concluded that costs will not be a major concern in terms of added value. The overall added value will outweigh the immediate seemingly high cost component.

6.2.2 Value of increased productivity

The major benefit of ODAT to companies will be the increased productivity of their scarce human capital. This will however not only benefit the company, but in the long run also benefit the country. Colander (2009) states that long-run growth occurs when the economy produces more goods and services from existing production processes and resources.

From the data in Table 5.1 it is seen that the average respondent travel 463 km in 7.7 hours every week. This results in an average speed of 60.1 km/h. There might still be some delays in getting to and from the airfield, but by making use of ODAT it should be possible to at least double the average speed given the performance of the aircrafts that were discussed by Mane & Crossley (2009). These aircraft could travel between 343km/h and 685km/h, which would results in halving the travel time. If this is achieved, the average scarce resource should have an additional 3 hours and 51 minutes available per week.

The data further shows in Figure 5.6 that only 54.8% of respondents felt that they would be more productive whilst flying, stating that the confined space and turbulence would make it difficult to be productive in small planes. This is somewhat in contradiction to Schwenzger's (2010) finding that ODAT can increase productivity to as much as 72% whilst travelling. However when it comes to overall productivity increase, the data shows that 90.3% of respondents believe their productivity will increase when making use of ODAT. Based on the literature and data, it can therefore be concluded that there will be an increase in productivity when making use of ODAT.

In Figure 5.7 the data show that 81% of respondents indicated that they would experience less stress flying, than when having to drive themselves. This in itself will improve productivity based on the literature by VanWormer et al. (2011) where they have found that as the stress level of employees increased, so did the workplace productivity decrease. It can therefore be argued that the inverse would also be true, whereas when stress levels decrease, productivity will increase. We could therefore conclude that with 81% of respondents indicating they will experience less stress, the productivity of these respondents will increase, resulting in more scarce resources of the company having increased productivity levels.

Quality of work is an important aspect for companies. The data from the questionnaire around quality of work is presented in Figure 5.7. A remarkable 98.4% of respondents indicated that they believe the ability to make use of ODAT will allow them to arrive at meetings and work much more refreshed and that in itself will enable them to deliver better quality of work. This in turn will make the employee more valuable to the company given the increased quality of work.

It is thus clear that ODAT will contribute positively to an increase in productivity of employees. With human capital defined in the literature as a unique set of expertise, skills and knowledge that are contained within the workforce of an organisation (Van Assen et al., 2009), it is of extreme importance that a company do as much as possible to increase the productivity of their scarce human capital.

6.2.3 Value of employee safety and well-being

The safety of employees are typically referred to as extremely important to companies, as employees are often the livelihood of the company and very difficult to replace. Employees themself also value safety highly as is evident in the data presented in Table 5.5 which shows safety as the number one factor when evaluating business travel.

Referring to the data in § 5.1.2, it is however interesting to note that only 35% of companies have any policy against driving at night, whilst 64% of respondents considered air travel as safer than road travel. The literature shows that the roads in developing countries are typically more dangerous than those of developed countries. Kopits & Cropper (2005) found that 2 per 10,000 persons in developed countries would die in a road accident in developing countries by 2020, compared to less than 1 per 10,000 persons in developed countries. Goldoni et al., (2011) argues that some of the typical reasons for this high accident rate in developing countries include: a lack of driver attention, aggressive driving, speeding and lack of concentration including tiredness and cell phone usage. Additional to the reasons above, a road accident would typically involve two or more vehicles of which only one of the drivers would be the cause of the accident. In air travel however it is rare that one aircraft would cause the accident of another, therefore it can be argued that ODAT in this respect would be safer than road travel. The data is however in line with the literature and it can be

concluded that ODAT will add value to the company by improving the safety of employees.

Employee well-being is another contributing factor of productivity. In this case well-being refers to both the physical and emotional well-being of an employee. The data in Table 5.4 showed 82.3% of respondents indicated that being away from home for long hours have a negative impact on their productivity. The data also showed that some concerns exist around eating fast food and not being able to exercise. The respondents in Figure 5.7 indicated that if they would be able to make use of ODAT, 57.4% of them would use some of the saved time to exercise. The assumption is also made that if less time is spend on the road, there will be less opportunity to buy fast food and more opportunity to prepare healthy food at home.

It can be concluded then that not only will the physical well-being of employees increase due to better eating habits and more exercise, the emotional well being will also increase as employees would have to sleep out less, be home more and establishing a better overall work-life balance. A balanced employee would be of high value to the company as such an employee would be able to continuously meet the every day challenges in the work environment much better than an un balanced employee.

The successful implementation of an ODAT service could thus be of high value to the company by resulting in increased productivity, improved safety and better work-life balance. These benefits that the company will experience will also eventually flow over to the country as the country as a whole would be able to produce more.

6.3 Research Question 3

What are the contributors and inhibitors for successfully establishing an ODAT service in Southern Africa?

6.3.1 Contributors

The first contributor is that inherently the demand for air service exists. Data from the supply side questionnaire showed that 60% of charter companies get requests monthly

for air charters at lower rates and some businessmen even request to share aircrafts. As soon as the service thus can be offered at a reduced rate, there would be sufficient demand taking up the service.

The next contributor would be availability of aircrafts to be able to offer the service. The data in section 5.2.1 showed that on average aircrafts are only used 30% of the time, which relate to 3 hours per day. The remaining hours of the day the aircrafts can be available for other applications such as ODAT service. This availability can therefore be utilised on a hire and fly basis which will allow for a chase-demand strategy that will lease additional aircrafts when demand is up and then lay off when demand is poor (Schonberger & Knod,1997).

Another contributor is the availability of pilots, the data showed that currently 25.2% of commercial pilot's available 100 flying hours per month are not utilised. These are the figures for working pilots, there are also many more commercial pilots that hold the qualification but have not yet found a position as a commercial pilot. As a result of the limited opportunities, young commercial pilots are often willing to work for a much reduced salary in order to build more flying hours that would hopefully land them a captain seat at a large airline one day.

Looking at the typical towns the respondents travel to, as presented in Table 6.1, each of these towns offers a well maintained airfield that can accommodate a typical ODAT aircraft. In general most towns have an airfield or access to an airfield within 50km.

The last contributor is that 83.9% of respondents are currently prepared to pay a premium to be able to make use of ODAT. This will assist in enabling the establishment of an ODAT as customers are already willing to pay more, as long as they get the convenience and advantages that ODAT offers.

6.3.2 Inhibitors

The first and arguably largest inhibitor would be weather conditions and navigation equipment at the smaller airfields. Small aircraft are much more susceptible to poor weather conditions and no aircraft can land without the proper navigation equipment available at the airfield. Currently none of the top five towns as described in Table 6.1 has the necessary navigation equipment that would allow an aircraft to land during IFR

conditions. The big debate around the technology and equipment currently is, who should pay for procuring and installing the needed equipment. The data from section 5.2.3 shows that the majority of respondents believe that the government will not invest in the required technology at smaller airfields. This is in line with the literature by Madas & Zografos (2008) that stated governments around the world are failing to invest adequately and on a timely basis in their airports. Furthermore in Table 5.13, the supply side respondents confirmed the airfields as being unsafe in IFR conditions. One of the respondents also replied that serious business people cannot afford any delays and the weather might play a significant role in being on time. In this case it can therefore be concluded that up until such time that the equipment is available at the smaller airfields, various delays and diversions can be expected as a result of unexpected weather conditions.

When looking at Figure 5.11, it should be noted that another inhibiter is costs. Although the customers are prepared to pay a premium, tickets prices must still be low enough to attract sufficient customers. In order to make the ODAT service work, it must not only be affordable to businesses or private individuals travelling for business, it should also be affordable to the private individual travelling for leisure. Based on the data in Figure 5.8, affordability in this case can be defined at a price of between 30% and 50% more than road travel. This price will not only attract 59.7% of the respondents, but could potentially also allow ODAT service companies to make enough profit to be sustainable. At the average reimbursement rate of R4.71 as mentioned in Table 5.1, a one way road trip between Rustenburg and Polokwane will amount to R4.71 x 360km = R1692 which excludes any toll fees. From the data it can then be concluded that one of the requirements for ODAT to be viable, is to have a one way ticket price for a typical ODAT flight between Rustenburg and Polokwane at around the R 2538 mark after the 50% premium was added.

Empty repositioning flights might be another inhibitor to successfully establish an ODAT service. The data in section 5.2.3 shows that with an average rating of 5.06 on a six point Likert scale, respondents felt strongly about the large issues and challenges that empty repositioning flights would add. The alternative would be to wait at the destination airfield, but that again negatively impacts the utilisation of the aircraft as well as the productivity of the pilot for the duration of the clients meeting. The empty repositioning flights may therefore be an inhibitor to the successful establishment of an ODAT service.

The literature by Ferrel et al., (2011) shows that in the United States, NASA have invested heavily in the SATS system and their long term strategy is to promote an affordable on-demand transportation system which increases the utilisation of regional airports and small passenger aircrafts, as well as reliably serve demand in a profitable fashion. In South Africa and arguably in many other developing countries, there are not such investments into small airfields and might delay the establishment of a true ODAT service for some period to come.

Lastly the supply side data in section 5.2.3 showed that only 49% of respondents believe that if large companies adapt to ODAT, smaller companies will follow. This might be partly as a result of the overall lack of knowledge about ODAT. The literature by Kaps et al. (2001) found that one of the key reasons why ODAT has not really evolved as much as expected is the lack of knowledge about ODAT.

6.4 Chapter summary

In this chapter the three research questions were discussed. It was found that in order for ODAT to be considered as an alternative mode of transport, not only should the customer be willing to fly in small aircrafts but ODAT should also offer a safe, affordable service that fly to the destinations the customer would like to travel to. Order winners included the ability to fly on-demand without experiencing any delays. In the second research question the added value to the company and country were discussed and it was found that ODAT will make a positive contribution to productivity, safety and the well being of employees. The chapter then concluded with the discussion around the contributors and inhibitors that would allow the establishment of a successful ODAT service in a dynamic country such as South Africa. The final conclusion will be made in Chapter 7.

Chapter 7 – Conclusion

The study evaluated the possible reasons for the time constraints that scarce resources experience as a result of business travel and how that influences their productivity. This was done by answering the three research questions which allowed the researcher to make the recommendations and conclusion that now follows.

7.1 Recommendation to stakeholders

Organisations have a lot to benefit from a more productive workforce that enables companies to grow. As described in the report, travel time and the overall well-being of scarce human capital are key contributors to increased productivity. Alternative faster and often safer travel methods, of which ODAT is one example, could play a significant role in future productivity. It is therefore important for companies to be open to new trends and technologies that could facilitate these increased growth levels.

Governments and countries will also benefit from increased company growth levels as that would enable increased levels of overall economic growth of the country. It is thus important for governments to strategically invest in airports and perhaps more so in airfields to ensure that adequate infrastructure is available to enable near future economic growth of the country.

7.2 Recommendation for future research

It is recommended that the sample for future studies of this nature is expanded into a medium to large true probability sample that will enable the researcher to make accurate inferences.

It is also recommended to conduct qualitative research on governments' role and their long term strategy with regards to air travel and more specifically ODAT in South Africa as this might add good insights into the future of air travel in typical dynamic markets.

The final recommendation for future research is to do a study of the trends in new and innovative communications technologies. Advanced communication technologies could in future potentially reduce the need to travel for business, which might have an impact on the viability of on-demand air travel.

7.3 Conclusion

The study has provided a window onto the current business travel trends in South Africa. It showed how the requirement to travel for business prevents scarce human capital to effectively apply their limited time. It was also found that being away from home and family negatively influence the overall well-being of human capital and result in reduced productivity. Reduced productivity could also be viewed as not reaching the full potential of productivity and will inevitably impact the growth of companies. Not only is the company impacted by the slow growth, it also has the secondary effect of impacting the overall economic growth of the country.

Looking at the typical growth rates of dynamic markets and taking into account the increasing affordability of motor vehicles and the growing popularity of traditional air travel, it can be expected that in the future congestion will play a major role on the roads as well as at the major airports. It is therefore important to explore alternative modes of transport that can serve as a solution to the growing levels of congestion.

This study also evaluated if on-demand air travel could potentially be a viable alternative to traditional air travel and the results indeed indicated that ODAT have the potential to play a positive role in alleviating some of the challenges around business travel in dynamic markets.

There are however certain challenges around ODAT that first have to be overcome before a truly successful ODAT service can be established in dynamic markets such as South Africa. The most important challenge to address is the issue of weather conditions and the most logical solution currently seems to be the installation of the

correct technology at the smaller airfields which would allow operations even in very low visibility conditions. The second challenge is that the cost of travelling with small 2-12 seater aircraft would have to get to around 130% - 150% of road travel costs. Lastly last challenge is the issue around transport from and to the destination airfield that would have to be solved.

In dynamic markets the governments don't always have the capital or won't commit the capital to investment in airfields and airports. This alone is however not a guarantee for success, as many air taxi services in developed countries failed during the economic downturn of 2008, even though governments were investing in small airfields.

The literature showed that governments of developed countries are prepared to invest in research and development as well as implementation of technology to support ODAT services, however even in developed countries ODAT is not really taking off yet. The concept of an air taxi service has in the past been referred to as "a Great idea at the wrong time" and the findings from this study tend to be in line with this statement.

This study therefore concludes that ODAT can possibly be viable in South Africa and other dynamic markets once at least the aforementioned challenges are addressed. ODAT will facilitate a more efficient travelling method which in turn will allow scarce human capital to apply their time more effectively to be able to ultimately increase their personal productivity. This will not only stimulate company growth but will subsequently also contribute to the country's overall economic growth.

References

Albright, S.C., Winston, W.L., & Zappe, C.J. (2009). *Data analysis & decision making* (3rd revised ed.). USA: South Western College Pub.

Ayres, R. U., & Warr, B. (2005). Accounting for growth: the role of physical work. *Structural Change & Economic Dynamics*, 16(2), 181-209. doi:10.1016/j.strueco.2003.10.003

Baxley, B. T., Williams, D., Consiglio, M., Adams, C., & Abbott, T. (2008). Small aircraft transportation system, higher volume operations concept and research summary. *Journal of Aircraft, 45*(6), 1825-1825.

Benhabib, J., & Spiegel, M. (1994). The role of human capital in economic development: Evidence from aggregate cross-country data. *Journal of Monetary Economics, 34*(2), 143–173.

Chapman, L. S. (2005). Presenteeism and its Role in Worksite Health Promotion. *American Journal Of Health Promotion, 19*(4), 1-8.

Colander, D.C. (2009). *Macroeconomics* (8th ed.). Middlebury College: McGraw-Hill Irwin.

Cuong Le, V., Tu-Anh, N., Manh-Hung, N., & Thai Bao, L. (2010). New Technology, Human Capital and Growth in a Developing Country. *Mathematical Population Studies, 17*(4), 215-241. Doi:10.1080/08898480.2010.514852

Diamantopoulos, A., & Schlegelmilch, B. (2000). *Taking the fear out of data analysis*. England: Thomson Learning.

Espinoza, D., Garcia, R., Goycoolea, M., Nemhauser, C. L., & Savelsbergh, M. W. P. (2008). Per-seat, on-demand air transportation part I: Problem description and an integer multicommodity flow model. *Transportation Science, 42*(3), 263-278.

Ferrel, S., Carney,T., & Winter,R. (2011). Risk Perception Analysis of a Small Aircraft Transportation System. *Journal of Aviation Technology and Engineering, 1*(1), 35-41. doi:10.5703/1288284314634

Fontana, R., & Moriniello, D. (2010). Technological leadership and innovation persistence: empirical evidence. *International J.A. Schumpeter Society Conference* 21-24 June 2012.

Goldoni Laestadius, J., Selod, A., Jian, Y., Dimberg, L., & Bliss, A. G. (2011). Can Business Road Travel Be Safe? Experience of an International Organization. *Journal Of Travel Medicine*, 18(2), 73-79. doi:10.1111/j.1708-8305.2010.00491.x

Hemp, P. (2004). Presenteeism: at work-but out of it. *Harvard Business Review*, *82*, 49–58.

Hill, T. (2000). *Operations Management – Strategic Context and Managerial Analysis*. Hapmshire: Palgrave. pp 25-52.

Kaps, R.W., Gardner, R.C., & Hartung, J.W. (2001). Air charter – The business airline of the future…but, does the business traveller know?. *Journal of Air Transportation World Wide, 6*(2), 93-116.

Kianto, A., Hurmelinna-Laukkanen, P., & Ritala, P. (2010). Intellectual capital in service- and product-oriented companies. *Journal of Intellectual Capital*, *11*(3), 305-325

Kneller, R., & Stevens, P. (2006). Frontier technology and absorptive capacity: Evidence from OECD manufacturing industries. *Oxford Bulletin of Economics and Statistics, 68*(1), 1–21.

Kopits, E., & Cropper, M. (2005). Traffic fatalities and economic growth. Accident Analysis & Prevention, 37(1), 169-178. doi:10.1016/j.aap.2004.04.006

Lee, D. W., Bass, E. J., Patek, S. D., & Boyd, J. A. (2008). A traffic engineering model for air taxi services. *Transportation Research: Part E, 44*(6), 1139-1161. doi:10.1016/j.tre.2007.10.004

Madas, M. A., & Zografos, K. G. (2008). Airport capacity vs. demand: Mismatch or mismanagement?. *Transportation Research Part A: Policy & Practice, 42*(1), 203-226. doi:10.1016/j.tra.2007.08.002

Makura, M.(2012). *Going Global: Insights from South Africa's top companies*. Johannesburg: MME Media.

Mane, M., & Crossley, W. (2007, September). An Approach to Predict Impact of Demand Acceptance on Air Taxi Operations. AIAA-2007-7787, *Proceedings of the 7th AIAA Aviation Technology Integration and Operations Conference*, Belfast, Norhtern Ireland, UK.

Mane, M., & Crossley, W. (2009). Importance of Aircraft Type and Operational Factors for Air Taxi Cost Feasibility. *Journal of Aircraft, 46*(4), 1222-1230.

Mastromarco, C., & Ghosh, S. (2009). Foreign Capital, Human Capital, and Efficiency:

A Stochastic Frontier Analysis for Developing Countries. *World Development, 37*(2), 489-502. doi:10.1016/j.worlddev.2008.05.009

Mills, F.C. (1952). The American Economic Review. *Proceedings of the Sixty-fourth Annual Meeting of the American Economic Association*, *42*(2), pp 545-557

Murray, C., & Lopez, A. (1996). *The Global Burden of Disease*. *Harvard Press*, Cambridge, MA.

OECD. (2001). The Well-being of Nations: the Role of Human and Social Capital. *OECD*. Paris

Peeta, S., Paz, A., & De Laurentis, D. (2008). Stated preference analysis of a new very light jet based on-demand air service. *Transportation Research Part A: Policy & Practice, 42*(4), 629-645. doi:10.1016/j.tra.2008.01.021

Saunders, M., Lewis, P. (2012). *Doing research in business & management*. England: Persons Education Limited.

Schonberger, R.J., & Knod, E.M. (1997). *Operations Management: Customer-Focused Principles*. 6th Edition. IRWIN. pp 226-265.

Schweinzger, C.G. (2010). Small Aircraft Transportation Viability. *College of Technology Directed Projects. Paper 3.* Purdue: e-Pubs.

Steyn, A.G.W., Smit, C.F., Du Toit, S.H.C., & Strasheim, C. (1999). *Modern statistics in practice*, 3rd edition. RSA:Van Schaik.

Taylor, M., & Plummer, P. (2003). Promoting local economic growth: the role of entrepreneurship and human capital. *Education+Training, 45*(8), 558-563. doi:10.1108/00400910310508946

United Nations. (1997). Glossary of environment statistics. *Studies in Methods, Series F, 67*, United Nations, New York.

Valasek, J. (2006). Introduction: Small aircraft transportation system high volume operations. *Journal of Aircraft, 43*(6), 1655-1655. doi:10.2514/1.26455

Van Assen, M., Van den Berg, G., Pietersma, P. (2009). Strategic human capital planning. *Key Management Models 2nd edition (pp. 60-63).* United Kingdom: Pearson Education.

VanWormer, J. J., Fyfe-Johnson, A. L., Boucher, J. L., Johnson, P., Britt, H. R.,

Thygeson, N., & Dusek, J. A. (2011). Stress and Workplace Productivity Loss in the Heart of New Ulm Project. *Journal Of Occupational & Environmental Medicine, 53*(10), 1106-1109. doi:10.1097/JOM.0b013e318229ab18

Vowles, T.M. (2009). Aviation. *University of Northern Colorado,* Greeley, CO, USA.

Wardman, M. (2004). Public transport values of time. *Transport Policy*, *11*(4), 363-377.

Warr, B., & Ayres, R.U. (2012). Useful work and information as drivers of economic growth. *Ecological Economics, 73* 93-102. doi:10.1016/jecolecon.2011.09.006

Appendix A – Demand side questionnaire

On Demand Air Travel - Customer Side

Introduction

1. As part of my MBA through GIBS, I am doing research on what the impact of business travel methods are on the productivity of employees. You are asked to complete this survey to help us better understand the impact of business travel on productivity. Your participation is voluntary and the survey should take no longer than 10 minutes. You can withdraw at anytime during the survey without penalty. All data collected during this survey will be kept confidential. By completing the survey, you indicate that you voluntarily participate in this research. If you have any concerns you are welcome to contact me or my supervisor on the contact details below.

Researcher:
Martyn Redelinghuys
martynr@angloplat.com

Research Supervisor:
Dr. Pieter Pretorius
pretoriusp@gibs.co.za

☐ I agree to take part

☐ I do not agree to take part

Page 1

On Demand Air Travel - Customer Side

Impact of travel requirements on productivity

In the first section we look at how business travel requirements impact the productivity of individuals

2. Individual Information

	Gender	Age group	# of employees in your company	Industry
Please select				

Other (please specify)

3. How many hours per week do you travel for business? (excluding hours to work & back, also excluding international travel)

Business travel hours per week

4. How many kilometres do you travel per week for Business? (travelling by car, excluding km to work & back)

Business travel Km per week

5. Is your business travel typically further than a radius of 50km from your normal work / office?

- [ ] Yes
- [ ] No

Optional Comments

6. How many people from your office location typically travel to the same business meeting away from the office in separate vehicles?

Number of travellers to same meeting / location

7. Which km distance of travel will typically cause you to sleep over at your destination?

Distances greater than _____km

Additional Comments

On Demand Air Travel - Customer Side

8. Please name the town(s) closest to the destinations you frequently travel to for business.

Town 1
Town 2
Town 3
Town 4
Town 5
Town 6

9. Does your company have any policies against business travel by car at night? (after sunset and before sunrise)

- ◯ Yes
- ◯ No

Comments

10. How often do you travel in the dark (after sunset and before sunrise) for business?

Times per week
Comments

11. How often do you arrive late at meetings due to the unpredictability of traffic on your way to the meeting? (Please tick one)

- ◯ Never late - I rather spend time waiting at place of appointment
- ◯ Seldom late - I estimate probability and arrive in close proximity of meeting time
- ◯ Often late - I try to estimate probability but cant account for the unforeseen
- ◯ Always late - It is impossible to be on time with the traffic as it is in the country

Other (please specify)

12. Would you consider travelling by car on SA roads as safe enough? Or would you consider air travel to be safer?

- ◯ Road travel is safe enough
- ◯ I prefer air travel

Optional Comments

On Demand Air Travel - Customer Side

13. Have you ever had a large motor vehicle accident while travelling for business that impacted your productivity by more than 1 day?

◯ Yes

◯ No

Comments

14. Do you eat fast food / unhealthy food when travelling long distances?

◯ Yes

◯ No

Comments

15. Do you believe being away from home for long hours (incl. sleeping out) have an effect on your overall productivity due to work/life balance, family issues?

◯ Yes

◯ No

Additional Comments

16. Rate the importance to you as employee of each of the following factors in terms of business travel.

	Totally unimportant	Unimportant	Somewhat unimportant	Somewhat important	Important	Highly important
Time	◯	◯	◯	◯	◯	◯
Cost	◯	◯	◯	◯	◯	◯
Safety	◯	◯	◯	◯	◯	◯
Convenience	◯	◯	◯	◯	◯	◯

Other (please specify)

17. What is the typical reimbursement for business travel per kilometre at your company? (example type 3.05 for a rate of R3.05/km)

Rand/km reimbursement

On Demand Air Travel - Customer Side

The Possible Solutions

In the next section we will explore the impact of possible solutions

18. Which of the following factors would make you NOT USE traditional air travel / low cost air travel? (Please tick one or more)

- [ ] Delays
- [ ] Cost
- [ ] Poor Service
- [ ] Inconvenience

Add other reasons

19. Would you be prepared to travel in smaller aircraft (2-12 seater)? If not, please state why.

- ◯ Yes
- ◯ No
- ◯ No, because of Turbulence
- ◯ No, because of Historical accident rate
- ◯ No, because of being Claustrophobic
- ◯ No, because everyone says it's so dangerous

Other reasons

20. What would make you prefer On Demand Air Travel (ODAT) above traditional low cost airline flights?

	Unimportant	Important	Highly important
Convenience	◯	◯	◯
Arriving closer to destination	◯	◯	◯
Better Service	◯	◯	◯

Other (please specify)

Page 5

On Demand Air Travel - Customer Side

21. Is it important to you to be able to work whilst flying (e.g. Laptop / Writing)?

- ◯ Yes
- ◯ No

Other (please specify)

22. What would be your minimum expectation from ODAT? (please tick one or more)

- ☐ Refreshments
- ☐ Food
- ☐ On-board Toilet

Other Expectations

23. What would you require in the plane to be productive? (please rate each from 0-10)

	1. Least important	2.	3.	4.	5.	6.	7.	8.	9.	10.Highly Important
Working tray	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯
Power source	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯
Internet connectivity	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯

Other (please specify)

On Demand Air Travel - Customer Side

Possible Results of ODAT

In this 3rd and last section, we will explore what the results of an ODAT solution might be.

24. Do you believe flying as a passenger in a small plane would allow you to be more productive whilst travelling? (If "No", please specify one or more reasons in the comment box)

◯ Yes

◯ No

Comments

25. On any given day, would the fact that you travel approximately 3 times faster in the plane than by car allow you to have more available time and be more productive on that day?

◯ Yes

◯ No

Optional Comments

26. If you required less time for travelling, would you use some of the available time to exercise?

◯ Yes

◯ No

Optional Comments

27. Do you believe that if you are flown to your destination you would experience less stress?

◯ Yes

◯ No

If No, please state why

On Demand Air Travel - Customer Side

28. Would a short flight compared to a long drive allow you to feel more refreshed and able to deliver better quality work?

- ◯ Yes
- ◯ No

Optional Comments

29. What would you be prepared to pay for flying to your destination rather than driving?

- ◯ Same as travelling by car
- ◯ 10% more than travelling by car
- ◯ 30% more than travelling by car
- ◯ 50% more than travelling by car
- ◯ 100% more than travelling by car

Other payment options

Appendix B – Supply side questionnaire

On Demand Air Travel - Supplier

Introduction

1. As part of my MBA through GIBS, I am doing research on what the impact of business travel methods are on the productivity of employees. I am doing two surveys, one for the Demand side and this one for the Supply side. You are asked to complete this survey to help us better understand if an On Demand Air Travel (ODAT) service will contribute to improving productivity in the work environment. ODAT can also be described as an "Air Taxi Service" which will allow a private / business individual to travel more directly to his/her destination. This will be achieved by making use of smaller airfields close to their origins and destinations. Your participation is voluntary and the survey should take no longer than 5 minutes. You can withdraw at anytime during the survey without penalty. All data collected during this survey will be kept confidential. By completing the survey, you indicate that you voluntarily participate in this research. If you have any concerns you are welcome to contact me or my supervisor on the contact details below.

Researcher:
Martyn Redelinghuys
martynr@angloplat.com

Research Supervisor:
Dr. Pieter Pretorius
pretoriusp@gibs.co.za

☐ I agree to take part

☐ I do not agree to take part

2. Individual Information

	Gender & Pilot Type	Age group	# of flying hours as pilot	I am a
Please select				

Other comments

3. As a pilot, how many hours do you fly per month for business. (this includes the PPL/CPL flying oneself for business as well as the CPL flying 1-11 passengers for business)

	Flying oneself around (hrs)	Flying passengers around (hrs)
Flying hours per month		

Optional Comments

Page 1

On Demand Air Travel - Supplier

1. Current Air Charter Market

There are three sections in this survey. This first section focuses on the current market as experienced by Air Charter Companies and Commercial pilots. Individuals that are not part of a charter company are also welcome to complete this section if they feel they have sufficient knowledge of the current market.

4. Do you get many business travelers that would like to make use of charters but simply can't afford it (how many per month?)

	Request	Frequency (per month)
Charter request		

Other comments

5. Do you ever get requests from different business travelers to share an aircraft? (Please select an answer in all 3 drop-down menus)

	Number of request	Per	Frequency
Share requests			

Other (please specify)

6. In your opinion, please rate why your clients make use of air travel rather than road travel.

	1. (not important)	2.	3.	4.	5.	6. (extremely important)
More Convenience	◯	◯	◯	◯	◯	◯
Increased Productivity	◯	◯	◯	◯	◯	◯

Other Reasons

7. If we define the working hours of a commercial pilot as 180 hrs per month, which consist of 100 hrs for flying and 80 hrs for planning and other tasks. On average, how many hours per pilot are NOT utilized each month?

	Flying hours NOT used	Other hours NOT used
Hours NOT utilized per month		

Other (please specify)

On Demand Air Travel - Supplier

8. Please state the utilisation percentage of your aircraft or the aircrafts you have access to. (Eg. An 80% utilisation would relate to the aircraft being used for 8 hrs out of an available 10 hrs per day.)

	Utilisation (%)
Please select average utilisation	

Optional Comments:

On Demand Air Travel - Supplier

2. Pilot's perspective

This second section looks at the Pilots perspective of Airfields, Aircraft and Technology in South Africa

9. Do you believe that most airfields around South Africa are safe for use? (Please rate each condition)

	Completely disagree	Disagree	Disagree somewhat	Agree somewhat	Agree	Absolutely agree
Safe under VFR conditions	◯	◯	◯	◯	◯	◯
Safe under VFR by night conditions	◯	◯	◯	◯	◯	◯
Safe under IFR conditions	◯	◯	◯	◯	◯	◯

Other comments

10. Would you be prepared to fly to most of these SA airfields in a 2-12 seater plane?

◯ Yes

◯ No

◯ Mostly

Reason (If answer is No)

11. Please name the airfield(s) you would NOT fly to. (Reasons can include: weather patterns, runway condition, Aircraft and personal safety issues etc.)

a) Airfield 1

a) Reason for 1

b) Airfield 2

b) Reason for 2

c) Airfield 3

c) Reason for 3

d) Airfield 4

d) Reason for 4

On Demand Air Travel - Supplier

12. Do you believe that sufficient types of small aircraft exists to allow airtravel/airtaxi to become affordable to the following customers:

	1 No, too expensive	2.	3	4.	5	6 Yes, affordable
Private Leasure Travel Customer	◯	◯	◯	◯	◯	◯
Private Business Travel Customer	◯	◯	◯	◯	◯	◯
Business Business Travel Customer	◯	◯	◯	◯	◯	◯

Other (please specify)

13. Do you believe the technology exist to allow higher volume traffic in smaller airfields. (example automated air traffic control able to direct more than 2 planes into an unmanned airfield)

	No	Yes
Technology available	◯	◯

Other comments

On Demand Air Travel - Supplier

3. ODAT

This third and last section is about the feasibility of On Demand Air Travel (ODAT)

14. Do you believe the customer will percieve good value from the consept of ODAT?

	1.Poor Value	2.	3.	4.	5.	6.Great Value
ODAT as valuable	◯	◯	◯	◯	◯	◯

Other (please specify)

15. Do you believe that "empty" repositioning flights are a major problem to the profitability of ODAT?

	1. No Problem	2.	3.	4.	5.	6. Major Problem
Problem	◯	◯	◯	◯	◯	◯

Other (please specify)

16. Do you think if a few large companies adapt to ODAT, other smaller companies will also consider ODAT ?

	Adoption
Please select one	

Other (please specify)

17. Do you believe as a result of ODAT developing that ATNS / the government will invest in better navigation systems for small airfields?

	Invest
Please select	

Additional Comments

18. Do you believe there is sufficient demand to justify an airtaxi service in SA (1-11 passengers per flight)?

	Sufficient Demand
Please select	

Other (please specify)

19. Would you enter the market of ODAT? If not, please state why.

	Enter ODAT
Please select	

Other (please specify)

Appendix C – Business destinations

Observation	TOWN / CITY	COUNT	PERCENT
1	JHB	20	9.56938
2	Rustenburg	15	7.17703
3	Cape Town	12	5.74163
4	Durban	12	5.74163
5	Polokwane	11	5.26316
6	Nelspruit	9	4.30622
7	Northam	9	4.30622
8	Pretoria	8	3.82775
9	Thabazimbi	8	3.82775
10	Mokopane	7	3.34928
11	Lydenburg	6	2.87081
12	Bloemfontein	5	2.39234
13	East London	5	2.39234
14	Steelpoort	5	2.39234
15	Kathu	4	1.91388
16	Port Elizabeth	3	1.43541
17	Postmasburg	3	1.43541
18	Potchefstroom	3	1.43541
19	Witbank	3	1.43541
20	Benoni	2	0.95694
21	Johannesburg	2	0.95694
22	Kimberley	2	0.95694

Observation	TOWN / CITY	COUNT	PERCENT
23	Lephalale	2	0.95694
24	Middelburg	2	0.95694
25	Port Shepstone	2	0.95694
26	Springs	2	0.95694
27	Umtata	2	0.95694
28	Alberton	1	0.47847
29	Aliwal North	1	0.47847
30	Amstetten, Austria	1	0.47847
31	Bela Bela	1	0.47847
32	Bethlehem	1	0.47847
33	Boksburg	1	0.47847
34	Boshoek	1	0.47847
35	Brits	1	0.47847
36	Bronkhorstspruit	1	0.47847
37	Burgersfort	1	0.47847
38	Butterworth	1	0.47847
39	Cape town	1	0.47847
40	Centurion	1	0.47847
41	George	1	0.47847
42	Germiston	1	0.47847
43	Grahamstown	1	0.47847
44	Gweru	1	0.47847
45	Harrysmith	1	0.47847
46	Hoedspruit	1	0.47847
47	Klerksdorp	1	0.47847
48	Kriel	1	0.47847

Observation	TOWN / CITY	COUNT	PERCENT
49	Mafikeng	1	0.47847
50	Magaliesburg	1	0.47847
51	Maputo	1	0.47847
52	Maseru	1	0.47847
53	Mashishing	1	0.47847
54	Newcastle	1	0.47847
55	Peddie	1	0.47847
56	Pietermaritzburg	1	0.47847
57	Pietersburg	1	0.47847
58	Pilanesberg	1	0.47847
59	Pretoria North	1	0.47847
60	QWA QWA	1	0.47847
61	Queenstown	1	0.47847
62	Richardsbay	1	0.47847
63	Sasolburg	1	0.47847
64	Secunda	1	0.47847
65	Standerton	1	0.47847
66	Tzaneen	1	0.47847
67	Upington	1	0.47847
68	Vanderbijlpark	1	0.47847
69	Venda	1	0.47847
70	Vryburg	1	0.47847
71	Welkom	1	0.47847
72	Windhoek	1	0.47847