

Name : Mohammed Abdul Amin

Student ID : 1711961

Module : BMSK5006

Knowledge and Information Management Skills for the Workplace

Name of Lecturer : Dr Domnan Freeman Miri

Assignment Title :

Knowledge Management & Information Systems

Submission Deadline : 29/11/2019

Table of Contents

Introduction	2
PART 1 ; Data, Information, Knowledge and Wisdom	3
Task 1.1 : Useful Information	3
Task 1.2 : Data - Information - Knowledge - Wisdom (DIKW)	4
Task 1.3 : Tacit and Explicit Knowledge	6
Task 1.4 : Five Decisions Made	7
Task 1.5 : Lack of Pre-existing Data	8
Task 1.6 : Promoting New Product	9
PART 2 ; Case Study of American Airlines SABRE Systems	12
Task 2.1 : Cost Leadership and Product Differentiation	12
Task 2.2 : Barriers for gaining Competitive Advantage	14
Task 2.3 : Competitive Advantage Erosion	15
PART 3 ; Information Systems	16
Task 3.1 : Definition of Information Systems	16
Task 3.2 : Computer Based Information Systems (CBIS)	18
Transaction Processing Systems (TPS)	19
Management Information Systems (MIS)	19
Office Automation Systems (OAS)	20
Decision Support Systems (DSS)	20
Customer Relations Management Systems (CRMS)	20
Executive Support Systems (ESS)	21
Task 3.3 : Levels of Management	21
Conclusion	24
References	25

Introduction

Knowledge management (KM) is vital for an organisation to improve long term performance, build corporate intelligence and gain a competitive advantage over rivals. KM can be thought of as a framework or process of an organisation in the creation or acquisition of knowledge, then the retention of knowledge and the transfer or use of knowledge to improve performance. A definition of KM given by Bhatt (2001) is that of a process in which knowledge is created, validated, presented, distributed and applied in accordance. Similarly commented by Horwitch and Armacost (2002) is that KM can be seen as the acquisition, production, transition and preservation of useful knowledge and information in order to plan better policy, modify action and deliver better performances. Some of the critical success factors of KM implementation include management effectiveness, leadership commitment, employee training, performance evaluation, and the information systems infrastructure used for KM. The right information systems can lead to KM deliverance on innovation and performance which are vital for any organisation. Another benefit of KM according to Verma (2012) is that it improves the efficiency of an organisation by reducing decision making time and improving the quality of the decisions that are made. For KM to be successful on a long term basis, information systems must be updated and innovation must be used in all aspects.

The aim of this report is to show the importance of computer based information systems to organisations and how it supports management at all levels. Also included is an example from the case study of American Airlines, how it achieved competitive advantages with the innovation of SABRE systems.

To begin, the report will focus on data, information and knowledge, with an explanation of the differences. Furthermore, an explanation will be given on the differences between explicit and tacit knowledge, including why the usefulness of information varies.

PART 1 ; Data, Information, Knowledge and Wisdom

Task 1.1 : Useful Information

Although all information can be deemed as knowledge, not all information can be deemed as useful knowledge. How useful information is to an organisation depends on the value of the knowledge gained from it. The value of the information to the organisation can be in terms of tangible value or intangible value, and depending on the quality of information will determine its usefulness. Information that increases productivity or reduces administrative costs can be seen as tangible value. Furthermore, information that can increase a company's image or increase customer loyalty, can be deemed as intangible value of information. According to Redman (1998) how useful information is to an organisation is dependent on the quality of the information and the value it provides. Consequences of poor quality information can lead to loss of performance, increasing costs for reworking of processes and damage the image or reputation of a company. To identify poor quality information, or usefulness of information, Swash (1997) commented that organisations carry out audits to determine its usefulness, accuracy, relevance and value. The factors used to determine the usefulness of information include:

- ❑ **Timeframe.** The time period and how current the information is. It's usefulness may be limited to a period of time and its value often decreases over time. For example, data available to stock brokers has actionable value for short periods of time.
- ❑ **Content.** Is the content of the information accurate and formatted correctly. Is the scope of the information relevant and complete.
- ❑ **Form and Reliability.** Is the information clear and presented in a detailed accurate manner, is it sent from the correct channels and credible sources.
- ❑ **Completeness.** Does the information have scope, depth and coverage. For example, customer satisfaction ratings on a new product would be a more complete feedback from a wide range of consumers, rather than just a few handful of consumers.

- ❑ **Relevance.** Will the relevant information improve performance, solve problems and help in decision making. It must also be cost effective.

Task 1.2 : Data - Information - Knowledge - Wisdom (DIKW)

Data can be seen as raw facts and figures, or a sequence of random dates. Once these data are given meaning or context, they become information. For example, a sequence of random dates, given meaning as dates of birthdays, then the same sequence of dates become information of birthdays of people. Data that is processed, interpreted, structured, defined, given meaning and context can be referred to as information (Ackoff, 1989). Data is processed into information to give meaning and context in a number of ways including :

- ★ *Classification.* Categorising of data.
- ★ *Rearrangement.* Grouping or sorting data in a certain way, for example, by arranging data in last names or last payroll numbers.
- ★ *Aggregates.* Averages of data or totals of data.
- ★ *Criteria selection.* Selecting data that only meets a required criteria, for example, selection of data from people who have an income above a certain threshold.

Information into an equation form would look like this:

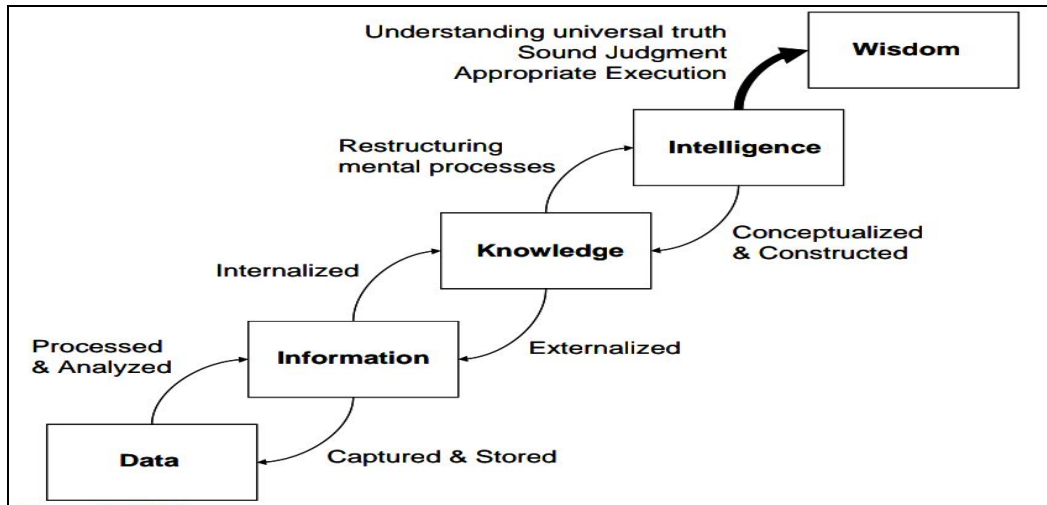
$$\text{Data} + \text{Processed or adding meaning} = \text{Information}$$

Knowledge consists of that mix of contextual information, meanings, values, experience, and rules. Knowledge builds on information by applying know-how from a person's mind. Applying information to solve problems using mental processes can be referred to as knowledge. In an equation form, knowledge would be as :

$$\text{Information} + \text{Applied or used} = \text{Knowledge}$$

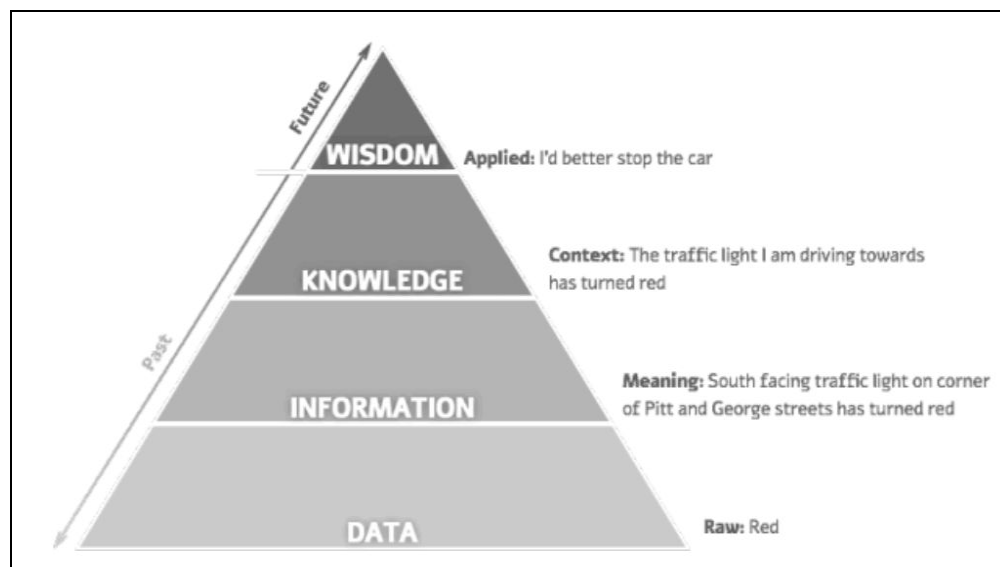
Wisdom is at the top of the DIKW hierarchy. Wisdom can be seen as an accumulation of knowledge, or an expert knowledge system of fundamental insights and can also be referred to as judgemental advice on uncertain complex matters (Baltes and Staudinger, 1993).

The link and differences of data, information, knowledge and wisdom are illustrated as follows;

Fig 1.1: DIKW Link

Source : Liew (2013, p.60).

Figure 1.1 (Liew, 2013) shows the relationship between each aspects of the chain, and it illustrates how wisdom can be obtained from knowledge with intelligence. Figure 1.2 (Rowley, 2007) illustrates the hierarchy of the DIKW aspects in a pyramid form:

Fig 1.2 : The DIKW Pyramid

Source : Rowley (2007, p.170).

Task 1.3 : Tacit and Explicit Knowledge

A widely accepted categorisation of knowledge is that knowledge is either tacit or explicit knowledge (Polanyi, 1958). Both types of knowledge are of great importance to an organisation's performance and problem solving capabilities. Tacit knowledge is very different from explicit knowledge. Tacit knowledge is based on a person's experiences and attitudes towards the broader environment. It is expressed in human actions in the form of evaluations, points of view and values. Tacit knowledge is held in the minds of individuals which can be observed through actions of the individuals, but often this knowledge is taken for granted (Koskinen *et al.*, 2003). Tacit knowledge is a complex concise knowledge gained from personal experiences. It is difficult to express, articulate and present in a tangible form which is sometimes impossible to capture. According to Leonard-Barton and Sensiper (1998) tacit knowledge is vital for an organisational success and there are three main ways it can prove beneficial which are ;

- *Problem solving.* Individual with tacit knowledge are experts who use intuitive methods that can solve problems faster and more efficiently.
- *Problem finding.* Searching if there really is a problem.
- *Prediction and anticipation.* Predicting outcomes and anticipating future problems.

Explicit knowledge is a more basic type of knowledge. It is a codified version of knowledge that can be easily passed on, accessible and understood. It can be easily communicated because it is clear and a conscious knowledge. Explicit knowledge is codified in ways including words, numbers, symbols, mathematical specifications etc (Nonaka, 1994). Explicit knowledge is often tacit knowledge that has been acquired, given context and codified for transfer of knowledge. According to Tsoukas (1996) tacit and explicit knowledge are mutually constituted, meaning that both should not be seen as separate entities but rather both as knowledge that are intertwined and complementary of each other.

An example of this can be likened to that of a player in a card game such as Poker. The player would use a combination of both explicit and tacit knowledge. The explicit knowledge they would use is codified rules and regulations of the game. These must be followed strictly in accordance or players face disqualification. But the tacit knowledge used will be the difference between winning or losing the game.

The tacit knowledge used by a player in a game card would be based on his/her insights or intuitive knowledge of the game. They would use hunches and past experiences for analysing the situation of the game to formulate a strategic game plan to win the game. This can only be done with tacit knowledge, because it requires accurate predictions and anticipating the cards of the opposite player. As explained earlier, abilities to predict, anticipation, problem solving, strategic planning, are aspects associated with tacit knowledge. As the game continued, tacit knowledge would be essential for strategically using initiative to predict more outcomes and eventually winning the game.

Task 1.4 : Five Decisions Made

Decisions made by individuals, knowingly or unknowingly, are based on pre-existing data, which are translated into meaning or information, then used as knowledge. The following is five such decisions that may be made because of pre-existing data.

- 1) A driver of a car noticed that the traffic lights ahead had turned red, so the driver makes the decision to stop the car at the traffic lights.
- 2) A person in a building finds numbers on the notice board, which he realises is the password to the free available WiFi. He decides to connect to the WiFi using his phone.
- 3) A person with a high blood sugar level goes to a shop, looks for a carbonated drink with a low content of sugar. After finding a low sugar drink, he decides to purchase it.
- 4) A person goes into a retail shop to purchase shoes. After finding shoes of choice, the person identifies the right size of shoes and decides to purchase the shoes.
- 5) A person decides to use the lift to go to the floor where he is to attend a class. He goes in the lift, presses the appropriate floor number and goes to his class.

Table 1.4 shows each decision made highlighting the data, information, knowledge and wisdom involved that determined the decisions;

Table 1.4: DIKW used for decisions

	Data	Information	Knowledge	Wisdom
Decision 1: Traffic lights	Red light	The traffic lights ahead have turned Red	I am driving towards the Red traffic lights	I must stop the car to avoid an accident
Decision 2: WiFi Pass	Numbers on notice board	Numbers are a password	Password connects to WiFi	Connecting to WiFi by using password with phone
Decision 3: Low sugar Drink	Numbers on can of drink	Numbers indicate sugar levels	Selecting a drink with low sugar content	Purchase of drink with low sugar level to avoid diabetic symptoms
Decision 4: Buy Shoes	Numbers on shoes	Numbers on shoe's indicate sizes	Match with my feet size	Purchasing the shoes with the correct size
Decision 5: Use Lift	Numbers inside lift panel	Numbers indicate the floor	Which floor is my class located	Pressing the appropriate floor number to gain access to my class

Task 1.5 : Lack of Pre-existing Data

With no data to process into information and knowledge, the decisions made in Part 4 would of been a more complex process completely. For example :

- 1) For decision to stop at the red light would of been more influenced by visual influences. If there was no data or red light, the person would have to visually observe if the road ahead was safe to continue on.

- 2) The decision to connect to the WiFi would of been influenced on how the password would be obtained. With the lack of data, this WiFi could only be accessed if the password was provided by another person, or if it was obtained through investigation and communication.
- 3) With the lack of data on sugar levels of drink, the person would of been more influenced by tacit knowledge to purchase a drink with low sugar content. Past experiences or intuition would have determined what drink would be purchased.
- 4) With the lack of data of shoe sizes, the decision of which shoes to purchase would be influenced by visual observations on which shoes would be the appropriate size to purchase. This demonstrates how data can be given context and used as knowledge to improve efficient processes, in this instance, efficiently buying of shoes.
- 5) The lack of data on the lift panel would mean that the person would need to investigate each floor to locate the correct class room.

Task 1.6 : Promoting New Product

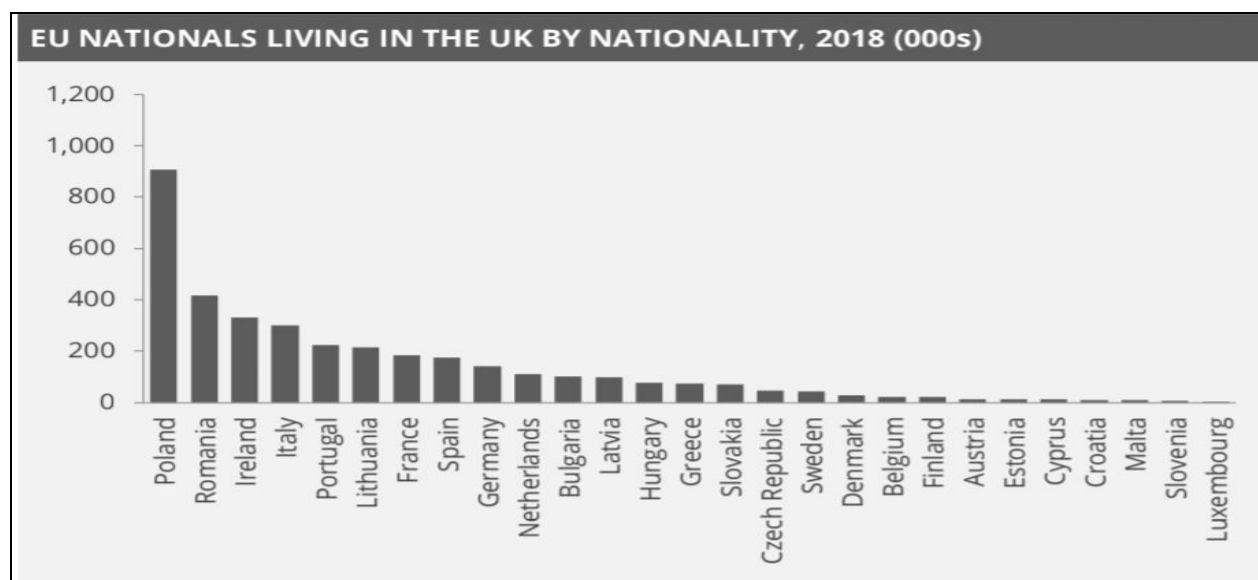


The new product invented is a handheld pocket translator (pictured left). This product translates any English words spoken into the microphone into the Polish or Romanian language, in both written and vocal format. With the number of Polish and Romanian immigrants to the UK at a high number means that this product could be a successful business venture. But where to promote this product would be dictated by the data of regional population numbers of Polish and Romanian migrants. As

these two types of migrants would be the primary users of this product, promoting this product in areas of high numbers of Polish and Romanian migrants would give a higher chance of success for this product. Data can be collected from national and regional statistics, then processing the data into relevant information to gain knowledge of potential markets.

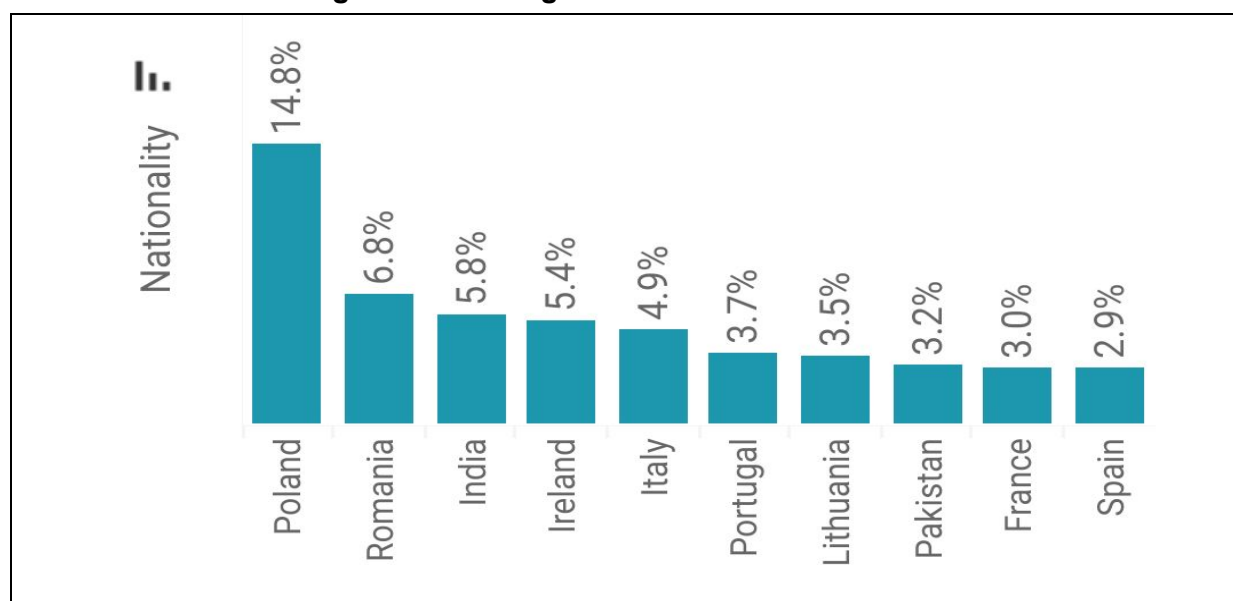
The following are secondary demographic data collected on a sample population :

Fig 1.6: Nationality of immigrants



Source: Office for National Statistics (2010).

Fig 1.7: Percentages of EU Nationals in the UK



Source: Office for National Statistics (2010).

Fig 1.8: Regional Immigration

What the data shows in Fig 1.6 and 1.7 (Office for National Statistics, 2010) is that the highest number of immigrants are from Poland and Romania. This data can be put into context and used as information. The data of Fig 1.8 (Office for National Statistics, 2010) shows that London and the South East are the regions with the highest share of migrants. This information can be used as knowledge. The knowledge gained from the data and information is that the highest number of immigrants are from Poland and Romania, and the regions with the highest share of immigration in the UK are London and the South East. This knowledge can be used for promotional activities such as advertising and product satisfaction reviews.

Source: Office for National Statistics (2010).

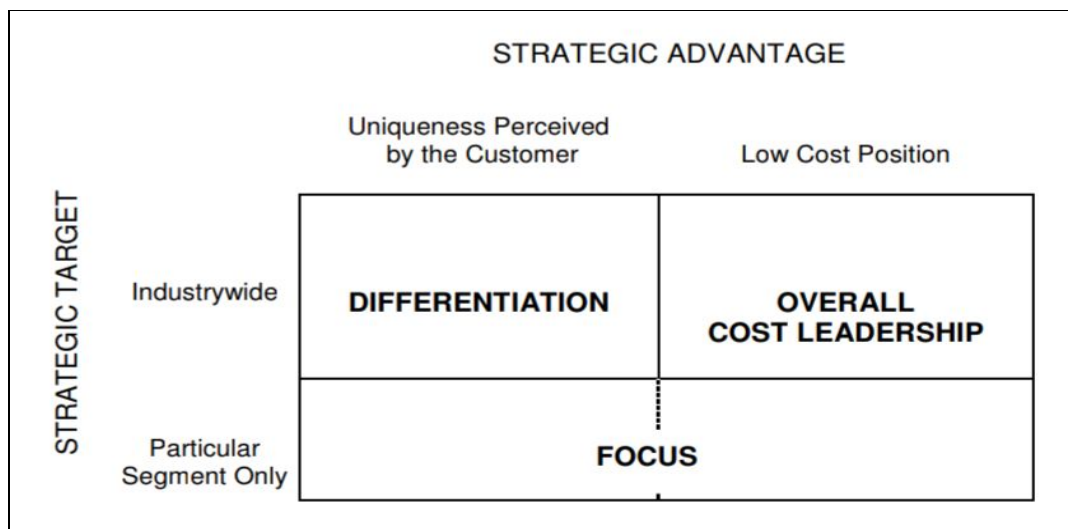
PART 2 ; Case Study of American Airlines SABRE Systems

Task 2.1 : Cost Leadership and Product Differentiation

Having a competitive advantage means that a company can outperform its competitors in its market industry. Competitive advantage allows a company to achieve better margins of efficiency and performance compared to its competition and gains value for the organisation and shareholders. This can be attributed to competitive strategies that a company incorporates and utilises. According to Porter (1990) there are three types of generic competitive strategies that can lead to outperforming business rivals which are :

- **Cost Leadership.** The objectives of the cost leadership strategy is literally to become leader of costs. This means, to become the lowest-cost producer in the industry (Johnson, Whittington and Scholes, 2011). Examples of how to achieve this strategy include methods of high production of goods to exploit economies of scale. Another example is to utilise technology for lean production of goods or services.
- **Differentiation.** This strategy is about uniqueness of products or services that give customers clear reasons to prefer the product or service over other products or services. Examples of achieving this strategy include, providing a more superior product or service in durability or reliability, quality and branding. Product differentiation reduces the risk of customers going to rival organisations, and also increases customer loyalty.
- **Focus.** Examples of focus strategy is to target niche market segments with specialized products. Companies focus on narrow market segments by offering limited products and services, serving specific markets (Hahn and Powers, 2004).

The generic competitive strategies of Porter are illustrated below in fig 2.1 (Porter, 1985, p.12).

Fig 2.1: Porter's Generic Strategies

Source: Porter (1985, p.12).

An example of how companies incorporate competitive strategies of cost leadership and product differentiation to gain a competitive advantage is that of American Airlines. American Airlines, in joint agreement with IBM, created Semi-Automatic Business Research Environment (SABRE), which was the first of its kind. This real-time business application was a Web-based inter-airline reservation system which allowed American Airlines to gain a competitive advantage and incorporate competitive strategies of cost leadership and product differentiation by enhancing operational efficiency and offering unique services. The SABRE System replaced the old handwritten system which led to process becoming more time efficient and reducing errors. Cost Leadership was achieved because with the SABRE Systems, American Airlines was able to reduce operational costs by 30% and provide customers with the same service as other airlines but at a lower cost and a better value service (Edelman, 2009). Because SABRE provided unrivalled efficiency and information across all levels of the business, it helped save 30% of costs, because fewer employees were needed, and the system was more efficient and significantly less error prone. Decision support tools, for example, for crew scheduling and yield management were also highly beneficial for American Airlines (Sabre airline solutions, 2012). Product Differentiation was achieved because at the time SABRE was not available to other airlines. Through the innovative use of SABRE Systems, customers were offered services that were unique, and different from other airlines.

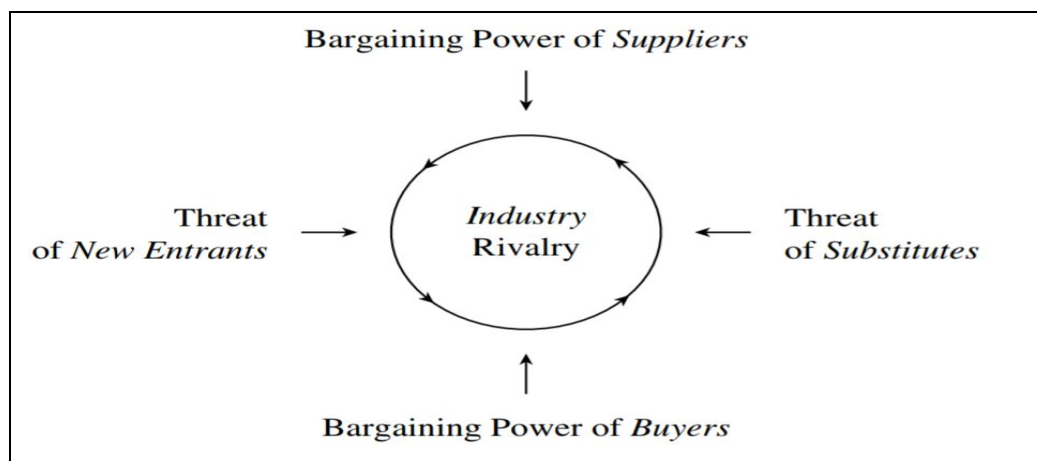
American Airlines used different applications of SABRE to meet the needs of customers with exclusivity, offering services that were more personalised.

Customers could now be offered more information and services such as hotel reservations and car rentals from one personalised service. This service was not available at other airlines at the time, thus giving American Airlines an unmatched competitive advantage of product differentiation (Stair and Reynolds, 2012).

Task 2.2 : Barriers for gaining Competitive Advantage

Computer based information systems are commonly used to achieve a competitive advantage over rivals by improving operational efficiency. This is what the SABRE system did for American Airlines, it enhanced their operational efficiency. With the innovation of SABRE, it provided American Airlines with a competitive advantage by reducing costs but still being able to offer customers with services at a reduced price and with product differentiation by offering a personalised service unique from its competitors. The innovative business information system of SABRE acted as barriers from threats faced by American Airlines. This was instrumental for the company to achieve the competitive advantage. To understand how the SABRE system acted as barriers from competitors of American Airlines, the Porter's five forces can be used to identify the factors involved. According to Slater and Olson (2002) the porter's five model is a theory that indicates the profitability of the market sector by evaluation of threats faced by external forces. Fig 2.2 (Porter, 1985, p.22) illustrates the factors of the Porter's Five Forces theory.

Fig 2.2: Porter's five forces



Source: Porter (1985, p.22).

As explained by Porter (1979) the five forces theory evaluates an organisation's environment of competitive rivalry. The theory can also be used in strategic planning to improve competitive advantages.

Using the Porter's five forces, the following aspects can determine how the SABRE system acted as barriers to help American Airlines achieve and maintain a competitive advantage.

- **Threat of New Entrants.** The start up costs of SABRE was approximately \$40 million. This high start up cost acted as a barrier and reduced the threat of new entrants into the industry.
- **Threat of Substitutes.** The SABRE system allowed American Airlines to offer highly personalised services which was unique from other rival services. Because of the differentiation achieved, customers found other services unattractive, thus reducing the threat of substitutes.
- **Power of Buyers.** Creating new features to the SABRE systems lead to high switching costs for customers. Other applications such as customer loyalty programmes increased customer loyalty that reduced the threat of buyer power.
- **Power of Suppliers.** SABRE was developed in conjunction with IBM which and was not available to other airlines.
- **Industry Rivalry.** The SABRE system was only available to American Airlines, and was connected to travel agents worldwide. It allowed personalised service different from rivals. Cost Leadership was also achieved through cost saving and efficiency which gave American Airlines competitive advantage over existing rivals.

Task 2.3 : Competitive Advantage Erosion

After the late 1980s, American Airlines competitive advantage over rivals was not maintained, and slowly eroded. One of the reasons for this was the over reliance of the SABRE system and co-developer IBM. American Airlines assumed the partnership would continue with IBM, became complacent and it did not invest in new systems to improve. Problematic issues were created between the two companies in the 1980s after SABRE sold its shares on the stock

exchange, and became a separate company. Thus was the start of the end of competitive advantage for American Airlines (Toh, 2011).

Other companies gained access to the SABRE system and some companies developed their own similar systems. This eroded the exclusiveness of innovation of the information system that American Airlines once had. According to Roberts (2015, quoted in Maund, 2018, p.65) competitiveness is only sustained if access to knowledge or the source of competitive advantage is restricted. Competitive rivals began to benefit from the efficiency SABRE systems offers, eroding American Airlines cost leadership. Entry barriers that American Airlines had in place for threats from other entrants had diminished. American Airlines became complacent and did not continue to find new ways to enhance its information systems. New innovation would of kept barriers in place so that new entrants would not find the airline market attractive to enter.

Americain Airlines responded by planning to use another information system (Hopper, 1990). This will mean American Airlines will incur new switching costs for adoption of a new system. It will also mean a significant loss for SABRE. Americain Airlines also threatened to stop selling tickets via the SABRE system, and sell tickets through new technology platforms. They would also allow tickets to be booked directly with the airline bypassing the third-party vendors that travel agencies use (O'Neill, 2017). This would risk the popularity of the SABRE company and travel agents worldwide. The dispute is ongoing, and early indications show SABRE will give leeway to the American Airlines demands.

PART 3 ; Information Systems

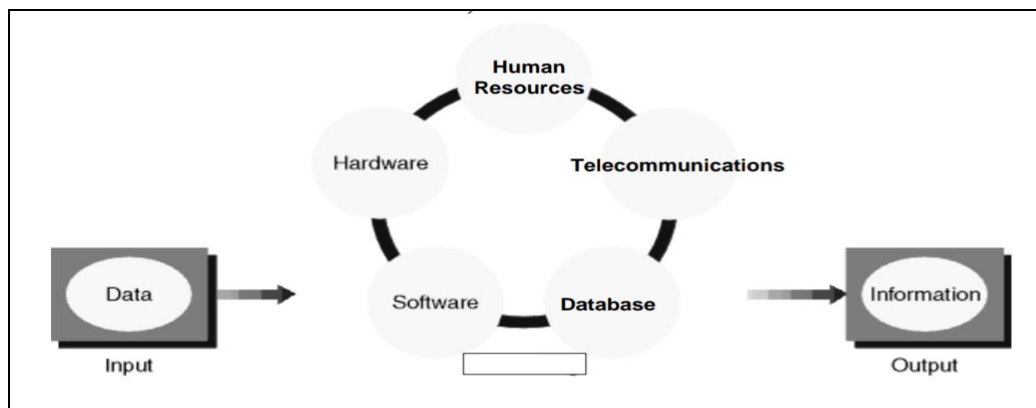
Task 3.1 : Definition of Information Systems

Business use complex ways or systems in which data is collected, stored, interpreted into information and distributed to support management in decision making or operational efficiency. These systems can be technically referred as information systems (IS). It is also referred to as "a system of people, data records and activities that process the data and information in an organization, and it includes the organization's manual and automated processes" (Paul, 2010, p.95). Information is vital for making decisions at all levels of an organisation. The system to incur this information is a collection of interrelated components working together for achieving objectives or common goals.

Common components that support IS include people, procedures, data, software, and hardware.

According to Awais *et al.* (2012) IS can be defined as a combination of information technology and human resource working in tandem to perform actions in support of business processes. Information systems transform their inputs into useful outputs of information by processes and relevant components as illustrated by figure 3.1 (What is information system, 2019).

Fig 3.1: Input - Process - Outcome



Source : What is information system (2019).

According to Bocij, Greasley and Hickie (2015) an IS can be made of smaller systems, which are called subsystems, and systems that have one or more systems are referred to as supra-systems. All of which work towards achieving a common goal and objective. Information sharing between subsystems is called the interface between systems. Efficiency of an organisation's systems is dependent on the clarity of this interface. Example of such interfaces can be that of a company such as Amazon. Sales systems receive orders then pass on orders to finance systems and delivery of goods department systems in a clear efficient way to avoid orders being lost. How dependent and the degree of linkage between subsystems is referred to as coupling. Systems that are highly dependent on each other are referred to as close coupled systems. Coupling defines how closely linked subsystems are.

The surroundings of an IS is called the systems environment, which consists of subsystems and external agencies. The system and its environment are interrelated. The interface between a system and its environment is referred to as a systems boundary (Bocij, Greasley and Hickie, 2015), The environment within the boundary forms part of the system and is referred to as the

micro environment. Interaction with elements beyond the boundary or with the macro environment are referred to as open systems. A closed system has limited or no interaction with the elements in the macro environment.

There are two types of categories in which information systems fall under, which are;

★ **Manual information systems.** Including filing cabinets storing data, paper day planners, paper based purchase ledgers and hand written reports.

Advantages of manual information systems include low costs, flexible implementation. Disadvantages are that manual systems can be time consuming, prone to errors, lack of security, lack of back ups and duplicates for easy access to other subsystems within the organisation.

★ **Computer based information systems.** These types of systems consist of components of hardware, software, databases, telecommunications, people and procedures that are configured to collect, manipulate, store and process data into information. Additionally CBIS can effectively, efficiently store, retrieve and distribute information (Stair & Reynolds, 1998).

Advantages include speed of processes, accuracy, reduction in space, increased security, easy access to information and easy distribution of information.

Disadvantages include, may need high investment of capital, threats of cyber crime, systems failure, can cause worker unemployment rates. Another disadvantage is that computers lack the judgement and initiative of humans in making or solving problems (Bocij, Greasley & Hickie, 2015).

Task 3.2 : Computer Based Information Systems (CBIS)

CBIS are seen as fundamental to achieve efficiency and improve organisational performance and plays a crucial role in supporting business activities. CBIS is a system in which the computer plays a major role consisting of elements which are hardware, software, people, data and procedures, all of which play a vital role in strategic success of a business (Hevner *et al.*, 2004). CBIS improve performance and efficiency by producing time relevant, accurate and valuable information for decision making purposes at different management levels within an organisation. According to Al-Mamary, Shamsuddin and Aziati (2014) there are many categories of CBIS, some of the most common types of CBIS used by organisations include:

- ❑ Transaction Processing Systems (TPS)
- ❑ Management Information Systems (MIS)
- ❑ Office Automation Systems (OAS)
- ❑ Decision Support Systems (DSS)
- ❑ Executive Support Systems (ESS)
- ❑ Customer Relations Management Systems (CRMS)

Transaction Processing Systems (TPS)

TPS are basic systems which serve the organisation at an operational level. CBIS that help process business transactions is referred to as TPS. This type of computerised system is used to perform daily tasks such as collecting, storing, maintaining and updating transactions. According to Laudon, and Laudon (2006) TPS is used routinely to carry out day-to-day activities that supports the business. An example of TPS is that of a point of sale system incorporated by organisations, and stock check systems where business need to keep accurate records of sales and stock levels. TPS is used to record the daily sales data which can then be stored and used as or when required, for example checking what was sold, what stock is left. This is referred to as batch processing. Another type of TPS is a real time process such as an airline ticket reservation or train ticket reservation. A TPS allows authorised employees with instant access and its support is available to managers at all strategic levels.

Management Information Systems (MIS)

MIS are commonly used by organisations to aid in decision making processes by accumulating information from data of other information systems. As commented by Hasan, Shamsuddin and Aziati (2013) MIS are systems that take data from external or internal services such as TPS systems and summarize it into useful and meaningful forms of reports to support management in decision making. MIS collects and processes information from different sources in a business to aid in decision making and commonly used by mid level management (Heidarkhani *et al.*, 2013). MIS presents data in easy to understand reports, including graphs or charts, that make interpretation easy. Sales management can use information from MIS to make appropriate decisions for example, to determine the effects of a price change on profitability.

Another example is that of human resource management using MIS to draw conclusions based on the inputs received from the different sources, which can be used in the allocation or delegation of manpower within an organisation.

Office Automation Systems (OAS)

OAS provide a powerful and effective methods of improving efficiency and quality of work in office environments. OAS are computer based systems that carry out a wide range of office activities that can support management on all levels. Office information systems are designed to support office tasks with information technology, such as electronic mail, multimedia systems, conferencing systems, and file transfers (Jatain, 2013). An example of OAS within a business environment can be that of electronic mailing system used to effectively communicate. This can be done through systems such as an intranet system which increases efficiency and effectiveness of communication throughout an organisation.

Decision Support Systems (DSS)

This type of computerised system is commonly used by senior managers to make decisions on structured processes. DSS help senior management by predicting scenarios by calculating, finding similarities, predicting, formulating plans and selecting the best options by elaborating probabilities. DSS systems are implemented to help management make decisions in situations where outcomes are uncertain (Asemi, Safari and Zavareh, 2011). Examples of DSS are financial planning systems and loan management systems used by banks. DSS can be used by banks when making decisions on bank loan applications to predict the likelihood of the loan being recovered.

Customer Relations Management Systems (CRMS)

According to Rigby and Bilodeau (2005) customer relationship management is one of the top ten tools used by management to gain vital knowledge on customer behaviours. CRMS can be seen as a strategy that integrates internal and external networks, to create and deliver tailored services to targeted customers at a profit. For example, the use of point of sales transaction to capture customer data through loyalty cards such as Tesco club cards or that of Sainsbury's Nectar cards. Once data has been captured, CRMS can be used to gain insight into customer behaviour and gain an understanding of customer habits ie. how much time they spend in store.

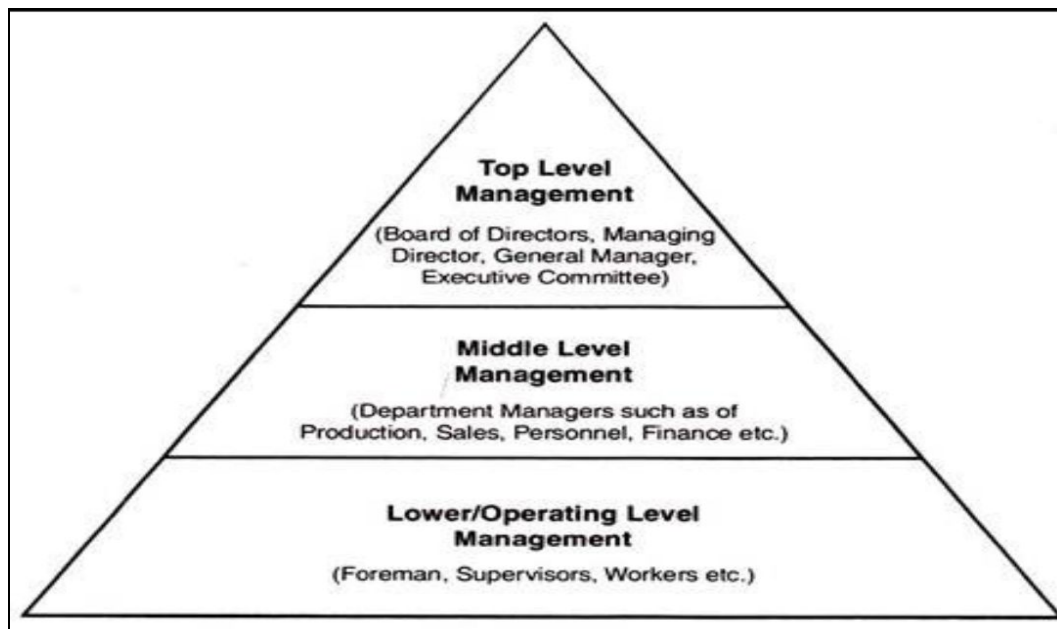
Executive Support Systems (ESS)

ESS is used in aiding senior management to make strategic decisions and supporting the business. It can be seen as an extension of DSS and combines data from TPS and MIS to gather data. ESS analyzes internal and external information gathered in everyday business activities. According to Chichernea (2009) ESS are specialists information software that transform business data and information into summarized reports displaying critical information. These reports are then used by senior management to formulate strategies and long term planning. Businesses use ESS through expert information systems, which can analyse performance, forecast trends, analyse competitors and identify opportunities. For example, senior managers can use these systems to find trends of products, predict sales accordingly, and put in place strategies to beat business rivals.

Task 3.3 : Levels of Management

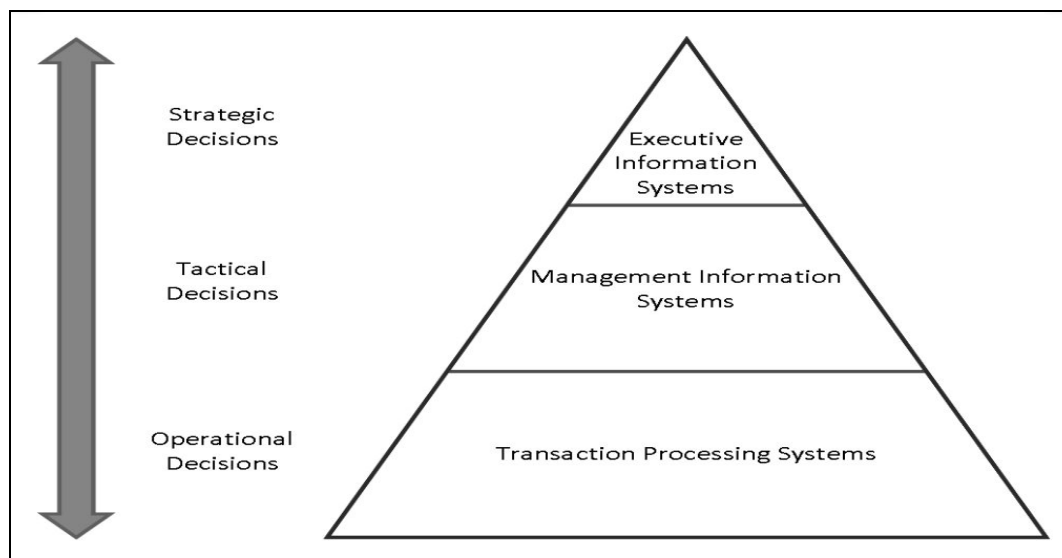
There are three major levels of management within an organisation, with each level of management supported by various types of CBIS. The systems used by each level of management depends on the complexity of the decisions that need to be made. The three levels of management, as illustrated by figure 3.2 (Asemi, Safari and Zavareh, 2011) are lower or operational management, middle level management, and top level management. The CBIS used to support each level of management various as illustrated by fig 3.3 (Asemi, Safari and Zavareh, 2011).

Fig 3.2: Levels of Management



Adopted from: Asemi, Safari and Zavareh (2011).

Fig 3.3: Support of Management



Adopted from: Asemi, Safari and Zavareh (2011).

Lower level or often referred to as operational management are involved in the day-to-day running and decision making of an organisation. They are supported by TPS in the running of the business and daily activities by evaluating activities and transactions of the business, such as sales transactions, takings, cash deposits, payroll and credit decisions. Organisations such as Sainsbury's utilise systems such as point-of-sale systems that support its operational management by allowing easy access to data on the amount of sales transactions carried out, and if new stock is required with the stock checking systems. Accurate up to date information is needed by operational managers to insure effective and efficient running of daily activities.

Middle level management rely MIS to support decision making. MIS support mid level managers to make tactical decision by aggregating, comparing and summarizing data with algorithms. For example, sales management systems are a type of MIS used by mid level management to analyse trends of products that are performing well and those that are not performing well. This information can be used by mid level management to make future stock orders by increasing orders for products that perform better and reduce the stock of products that are not performing well. Another example is that of budget systems which support mid level management to decide how to spend funds of an organisation. Budget systems are a type of MIS that gives an overview of all expenditure of an organisation, allowing short and long term expenses to be analysed. MIS provide relevant and timely information to mid level management to make strategic decisions (Reddy *et al.*, 2009).

Top level management make unstructured decisions and are at the heart of strategic long term planning of an organisation. ESS support top level management by analysing decision that need to be made with sophisticated mathematical models, allowing top level management to forecast and predict outcomes of future events or decisions. For example, financial planning systems which is a type of ESS, supports top level management to find alternative ways of achieving objectives by foreseeing outcomes. Decision can be made by predicting situations such as the impact of sales if a new competitor enters the market sector, or changes to product prices. According to Chichernea (2009) the way in which ESS supports top level management is that it provides solutions to problems that are unique and change frequently. This helps management to make effective decisions

Conclusion

Knowledge Management plays a vital role in how successful an organisation is in competing against rivals and carrying out business activities effectively and efficiently. How an organisation acquires knowledge, analyses knowledge and transfers knowledge has critical implications on an organisation thriving to achieve a competitive advantage. Organisations are investing more and more in Computer systems to gain knowledge, competitive advantages, and also in the running of the business in an efficient manner. As demonstrated by this report, computer based information systems can support management at each level of an organisation to support in decision making, promoting efficiency and forecasting future events or circumstances. When investing in high tech support systems, organisations should also invest in employees to insure systems are used to maximum effect. Investing in CBIS and highly skilled employees who are referred to as 'gold collar' workers will greatly increase knowledge assets of an organisation.

Mohammed Abdul Amin.

References

Ackoff, R. L. (1989) 'From data to wisdom: Presidential address to ISGSR', *Journal of applied systems analysis*, 16(1), pp. 3-9.

Al-Mamary, Y. H., Shamsuddin. A. and Aziati, N. (2014) 'The Role of Different Types of Information Systems In Business Organizations : A Review', *International Journal of Research*, 1(7), pp. 1279-1286. Available at:
<https://www.researchgate.net/publication/264556488>
 (Accessed: 26th November 2019).

Asemi, A., Safari, A. and Zavareh, A. A. (2011) 'The Role of Management Information System and Decision Support System for Manager's Decision Making Process', *International Journal of Business and Management*, 6(7), pp.164–173. DOI:10.5539/ijbm.v6n7p164 (Accessed: 25th November 2019).

Awais, M., Irfan, M., Bidal, M. and Samin, T. (2012) 'Helpful Business Value of Advance Information System', *International Journal of Computer Science Issues*, 9(2), pp. 415–422. DOI: ISSN 1694-0814. (Accessed: 25th November 2019).

Baltes, P.B. and Staudinger, U. (1993) 'The search for a psychology of wisdom', *Current Directions in Psychological Science*, 2(3), pp.75-80.

Bhatt, G. (2001) 'Knowledge management in organizations: examining the interaction between technologies, techniques, and people', *Journal of Knowledge Management*, 5(1), pp. 68-75.

Bocij, P., Greasley, A. and Hickie, S. (2015) *Business information systems: technology, development and management for the e-business*. Fifth edition. Harlow, England: Pearson

- Chichernea, V. (2009) 'The Executive Support Systems as Innovative Tools for the Evaluation of Financial Projects', *Journal of Information Systems and Operations Management*, 3(2), pp. 370–377. DOI: ISSN 1843-4711. (Accessed: 25th November 2019).
- Edelman. B. (2009) *distribution-at-american-airlines-a*. Available at : <https://www.benedelman.org>distribution> (Accessed: 10th November 2019).
- Hahn, W. and Powers, T.(2004) 'Critical competitive methods, generic strategies, and firm performance', *The International Journal of Bank Marketing*, 22(1), pp. 43-64
- Hasan,Y., Shamsuddin, A. and Aziati, N. (2013) 'The Impact of Management Information Systems adoption in Managerial Decision Making: A Review', *The International Scientific Journal of Management Information Systems*, 8(4), pp. 10-17.
- Heidarkhani, A., Khomami, A. A., Jahanbazi, Q. and Alipoor, H. (2013) 'The Role of Management Information Systems in Decision-Making and Problems of its Implementation', *Universal Journal of Management and Social Sciences*, 3,(3) pp. 78–89.
- Hevner, R., March, T., Park, J. and Ram, S. (2004) 'Design science in information system research', *MIS Quarterly*, 28(1), pp. 75–105. Available at: <http://www.london.edu/-media/files/publications/bsr/ashorthistoryabouefficiency.pdf> (Accessed: 25th November 2019).
- Hopper, M. D. (1990) *Rattling SABRE—New Ways to Compete on Information*. Available at: <https://hbr.org/1990/05/rattling-sabre-new-ways-to-compete-on-information> (Accessed: 17th November 2019).
- Horwitch, M. and Armacost, R. (2002) 'Helping knowledge management be all it can be', *Journal of Business Strategy*, 23(3), pp. 26-32.

Jatain, R. (2013) 'Different prospects of Office Automation Systems', *International Journal of Computer Trends and Technology*, 4(3), pp. 210-212. Available at: <http://www.internationaljournalsrsg.org> (Accessed: 26th November 2019).

Johnson, G., Whittington R. and Scholes, K. (2011) *Exploring Strategy Text and Cases*. 9th Ed. Harlow, England: Pearson Education Ltd.

Koskinen, K.U., Pihlanto, P. and Vanharanta, H. (2003) 'Tacit knowledge acquisition and sharing in a project work context', *International Journal of Project Management*, 21(4), pp. 281–290.

Leonard-Barton, D. and Sensiper, S. (1998) 'The role of tacit knowledge in group innovation', *California Management Review*, 40(3), pp.112–132.

Liew, A. (2013) 'DIKIW: Data, Information, Knowledge, Intelligence, Wisdom and their Interrelationships', *Business Management Dynamics*, 2(10), pp.49-62

Laudon, K. and Laudon, J. (2006) *Management Information Systems: Managing the Digital Firm*, 9th Ed. London: Prentice-Hall.

Maund, A. (2018) *Skills for the Workplace Student Yearbook 1st year*. London: Sage Publications.

Nonaka, I. (1994) 'A dynamic theory of organizational knowledge creation', *Organization Science*, 5(1), pp. 14–37.

Office for National Statistics. (2010) *Mid-year 2009 population estimates*. Available at: <http://www.statistics.gov.uk/statbase/Product.asp?vlnk=15106> (Accessed: 5th November 2019).

O'Neill, S. (2017) *American Airlines Revives Direct-Connect Moves While Sabre Questions*

- Feasibility*. Available at: <https://skift.com/2017/08/02/american-airlines-revives> (Accessed: 10th November 2019).
- Paul, R.J. (2010) 'What an Information System Is and Why Is It Important to Know This', *Journal of Computing and Information Technology*, 18(2), pp. 95–99. DOI :10.2498/cit.1001800 (Accessed: 17th November 2019).
- Polanyi, M. (1958) *Personal knowledge : Towards a post-critical philosophy*. Chicago: University of Chicago Press.
- Porter, M (1979) 'How Competitive Forces Shape Strategy', *Harvard Business Review*, 57(2), pp. 142- 167.
- Porter, M. (1985) *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press
- Porter, M. E. (1990) 'New global strategies for competitive advantage', *Planning Review*, 18(3), pp. 4-14.
- Reddy, G.S., Srinivasu, R., Rikkula, S.R. and Rao, V.S. (2009) 'Management information system to help managers for providing decision making in an organization', *International Journal Of Reviews in Computing*, Available at: [http:// www.ijric.org](http://www.ijric.org) (Accessed: 27th November 2019).
- Redman, T.C. (1998) 'The impact of poor data quality on the typical enterprise', *Communications of the ACM*, 41(2), pp. 79-82.
- Rigby, D. and Bilodeau, B. (2005) 'The Bain 2005 management tool survey', *Strategy and Leadership*, 33(4), pp. 4-12.
- Rowley, J. (2007) 'The wisdom hierarchy: representations of the DIKW hierarchy', *Journal of Information Science*, 33(2), pp.163-180.

- Sabre airline solutions, (2012) *Customer sales and service*. Available at:
<https://www.sabreairlinesolutions.com/home/products> (Accessed: 10th November 2019).
- Slater, S. F. and Olson, E. M. (2002) 'A fresh look at industry and market analysis', *Business Horizons*, 45(1), pp. 15-22.
- Stair, R. M. and Reynolds, G. W. (1998) *Principles of Information Systems (A Managerial Approach)* 3rd Ed. Cambridge, UK: International Thomson Publishing Company.
- Stair, R. M. and Reynolds, G. W. (2012) *Fundamentals of Information Systems*. New York : Cengage Learning.
- Swash, G. D. (1997) 'The Information Audit', *Journal of Managerial Psychology*, 12(5), pp. 312-318.
- Toh, W. (2011) *American Airlines & SABRE*. Available at:
<https://sites.google.com/site/uolext/home/isorg/isorg-case-studies/untitledpost>
 (Accessed: 17th November 2019).
- Tsoukas, H. (1996) 'The firm as a distributed knowledge system: a constructionist approach', *Strategic Management Journal*, 17, Special Issue, pp.11–25.
- Verma, A. (2012) 'Institutionalising Organisational Effectiveness Through Knowledge Management', *International Journal of Research and Development - A Management Review*, 1(1), pp. 2319–5479.
- What is information system (2019) *Chapter 1 Peter Lo*. Available at : www.peter-lo.com
 (Accessed: 17th November 2019).