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1. The Landscape of Information Security: An American Organizational
Perspective-Benjamin Khoo and Peter Harris, of USA 01
2. Impact of Organisational Culture on Employees' Performance in Selected
Pharmaceutical Companies in Nigeria-Isiaka and Kadiri, Adeoti and Saka,
Suleiman and Jimoh, of Nigeria 07
3. An Investigation of Auditors' Guanxi Orientation in Different Level of Education
and Age-Dr. Ruchuan Jiang of Australia, Min Wang of China 16
4. Strategic Groups Analysis of China Circle Airlines--Perspectives of Structure and
Development-Pen-Che Liao, Chun-Wei Chang, and Ghi-Feng Yen, of Taiwan 24
5. Biometrics Yesterday, Today and Tomorrow- Patwa and Dr. A Seetharaman,
Alfaro and Singhvi, Nandakumar and Alahari, of India 35
6. Advertising Design Department Curriculum from the Manpower Requirements of
Design Industry-Chung Kuang-Yang of Taiwan 44

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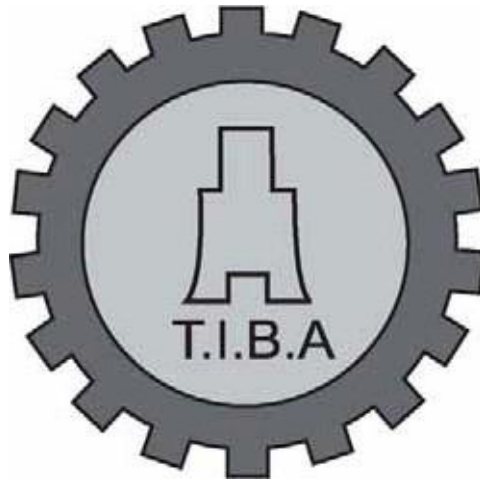
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The Landscape of Information Security: An American Organizational Perspective

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ABSTRACT

The rapid integration of the Internet into business processes and in everyday living is transforming myriad parts of society and their relationship to one another, from business to government to communities to private individuals. Organizations are now dependent on the information infrastructure via the Internet. Organizations of all types (business, academia, government, etc.) are facing risks resulting from their ever-increasing reliance on the information infrastructure. The impetus for developments in information security arose from directives from the United States government issued in the aftermath of catastrophic incidents. This paper will discuss the current landscape of Information Security from the enterprise/organizational perspective. Information Security is an applied science when viewed from this perspective and it is cross-functional, involving the economics, audit, personnel and management aspects.

Keywords: Information Security, Enterprise/Organization, Governance

INTRODUCTION

The technological advancement in recent times have culminated in a movement toward network centric computing. The rapid adoption by businesses of the Internet, Intranet and Extranet and the advent of new programming languages such as Java (“write once, run anywhere”) and JavaScript, has opened new opportunities for information systems researchers to develop distributed, network centric systems. The modern enterprise has evolved in the network economy due to Web 2.0 technologies, the increase in processing speed of computers, various mobile devices, ubiquity and availability of mobile service platforms. Business data is generated as “Big Data” and is now captured real-time via various application software and stored in databases locally or in the cloud. The term Enterprise Information Systems (EIS) is used to refer to the enterprise-wide computer-based systems that gather and store data, process information and generate reports for management. EIS are now operating in the network economy with expansion to the external stakeholders. The network economy is dependent on the information infrastructure. Each day millions of dollars of business transactions and data flow through the information infrastructure via the Internet. Organizations of all types (business, academia, government, etc.) are facing risks resulting from their ever-increasing reliance on the information infrastructure. The high risks in cyberspace needs to be mitigated and managed.

Some key terms in this paper are:¹

Information Security, which is the protection of information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to ensure confidentiality, integrity, and availability. *Confidentiality*, which is preserving authorized restrictions on information access and disclosure, including means for protecting personal privacy and proprietary information. *Integrity*, which is guarding against improper information modification or destruction and ensuring information non-repudiation and authenticity. *Availability*, which is ensuring timely and reliable access to and use of information. *Security Controls*, which are the management, operational, and technical controls (i.e., safeguards or countermeasures) prescribed for a system to protect the confidentiality, availability, and integrity of the system and its information.

This paper will discuss the current landscape of Information Security from an American enterprise/organizational² perspective. Information Security is an applied science when viewed from this perspective and it is cross-functional, involving the economics, audit, personnel and management aspects. A number of business environmental and organizational factors influence how an organization handles these risks.

¹ These terms and definitions were retrieved from CNSSI 4009, Committee on National Security Systems (CNSS) Glossary, dated April 6, 2015.

² The terms organization and enterprise are used inter-changeably in this paper.

BUSINESS ENVIRONMENTAL FACTORS

Enterprises operate in a business environment affected by the main players in its industry. The major environmental factors influencing an organization includes the government, academia and professional societies. In 2002, the US Congress passed the Sarbanes-Oxley Act (SOX) and President Bush signed the Act into law in response to public out-cry over the financial scandals that rocked the corporate world such as those at Enron, WorldCom, etc. (Obringer, 2005). As enterprises digitize and embed application software in the workflow for business processes; information technology is thus integrated into every aspect of the enterprise. The SOX require all public companies to submit both quarterly and annual assessments of the effectiveness of their internal information technology (IT) controls to the Securities and Exchange Commission. It is also required that each company's external auditors audit and report on the internal control reports of management, and any other areas that may affect internal controls. It also requires the company's principal executive officer and principal financial officer to personally certify that the financial reports are true and that everything has been disclosed (SOX Section 404). The SOX is of particular interest because it focuses on corporate governance, mandates stronger internal controls and institutes personal liability for top executives of companies that are publicly traded in the United States. The SOX has thrust IT controls to the forefront as an important mitigating aspect of information security in an organization.

The US President's National Strategy to Secure Cyberspace has been initiated since February 2003 where the Department of Homeland Security (DHS), as lead agency, and the National Security Agency (NSA) were tasked to design and operate the National Centers of Academic Excellence in Cyber Defense (CAE-CD) and the National Centers of Academic Excellence in Cyber Operations (CAE-CO) including the CAE-CD Research (CAE-R) outreach programs. Educational institutions that qualify for the program are awarded the CAE designation and are eligible to apply for scholarships and grants from the National Science Foundation (NSF). Such institutions are encouraged to conduct research in information assurance and may become focal points of recruiting by federal departments and agencies seeking individuals with information assurance expertise. Information security personnel required in organizational security teams can also be recruited from these proven institutional academic programs. Organizations are required to have the appropriate certified or trained staff when working with a government agency involving cyber-security.

The United States Department of Defense (DoD) issued the Cyber Workforce Management Program, that is Directive 8570 in 2006 and was extended to 8140.01 in 2015 where the US government allocated a budget in the millions to fund the training and certification of all personnel involved in information assurance (IA) job functions whether technical or management. The IA functions focus on the development, operation, management, and enforcement of security capabilities for systems and networks. Organizations are required to have the appropriate certified or trained staff when working with a government agency involving technical or management of information assurance. Table 1 provides a list of DoD approved IA baseline certifications for each category and level. Personnel performing IA functions must obtain one of the certifications required for their position based on the category and level to meet the certification requirement. Most IA levels within a category or specialty have more than one approved certification and a certification may apply to more than one level. Details of these certifications can be found in Appendix 1.

The National Institute of Standards and Technology (NIST) is an institute created and funded by the US government that is vested with the responsibility to develop information security standards and guidelines including minimum requirements for federal systems. The standards and guidelines developed have often been adopted by the private sector as well as organizations that work with the federal government. NIST have published special publications on various information security issues such as "NIST SP 800-12r1, Introduction to Information Security" to provide an introductory overview of information security principles, related concepts and categories of security controls that organizations can leverage to effectively mitigate the risks in their systems and information. While another publication, "NIST SP 800-100 Information Security Handbook: A Guide for Managers" discusses an overview of information security program elements and guide managers in understanding how to establish and implement an information security program. The information security program offers the organization a comprehensive way to ensure the selection and implementation of appropriate security controls to mitigate the risks and meet compliance requirements such as the SOX.

Table 1. Approved Baseline Certifications (DoD Directive 8570)

Approved Baseline Certifications		
IAT Level I	IAT Level II	IAT Level III
A+ CE CCNA-Security Network+ CE SSCP	CCNA Security CySA+ ** GICSP GSEC Security+ CE SSCP	CASP+ CE CCNP Security CISA CISSP (or Associate) GCED GCIH
IAM Level I	IAM Level II	IAM Level III
CAP GSLC Security+ CE	CAP CASP+ CE CISM CISSP (or Associate) GSLC CCISO	CISM CISSP (or Associate) GSLC CCISO
IASAE I	IASAE II	IASAE III
CASP+ CE CISSP (or Associate) CSSLP	CASP+ CE CISSP (or Associate) CSSLP	CISSP-ISSAP CISSP-ISSEP
CSSP Analyst	CSSP Infrastructure Support	CSSP Incident Responder
CEH CFR CCNA Cyber Ops CySA+ ** GCIA GCIH GICSP SCYBER	CEH CySA+ ** GICSP SSCP CFR	CEH CFR CCNA Cyber Ops CySA+ ** GCFA GCIH SCYBER CHFI
CSSP Auditor	CSSP Manager	
CEH CySA+ ** CISA GSNA CFR	CISM CISSP-ISSMP CCISO	

Another environmental factor that influences the enterprise is academia. Educational institutions that qualifies for the NSA's IA center of excellence program can apply for funding to develop training programs based on the Information Security and/or Assurance degree curricula. Students graduating from such programs are recruited by the government or enterprises for their information security programs. Professors from these institutions can also act as consultants to enterprises to guide in the implementation of their programs. Information security or assurance certified professors from other educational institutions can also be engaged to advise an enterprise.

Another environmental factor that influences the enterprise is professional societies. Professional societies such as Information Security, Audit and Control Association (ISACA) and International Information Systems Security Certifications Consortium (ISC)² work with the NIST to develop training and certification programs for information security, assurance and cyber-security. The various professional societies provide the technical knowledge required to support the government's directives. Industry Professional Standards, for example, Code of Conduct, Ethics, Best Practices, Career Skills Specifications, etc. provide a body of knowledge for the skill requirements of information security and cyber-security professionals needed to defend the security space. These professional societies (for example, ISACA and (ISC)²) have also been collaborating with the NIST and also NSA in updating the certification programs for IT Security and Audit professionals, for example the Certified Information Systems Auditor (CISA), Certified Information Security Manager (CISM) and Certified Information Systems Security Professional (CISSP) programs.

ORGANIZATIONAL FACTORS

Information Security of an enterprise also include protecting its critical information assets/elements, the software and hardware that use, store, process and transmit that information through the application of policy, technology, and education and awareness. Businesses and organizations in the US have come to the realization that security is more than just a technical issue (Allen, 2006). Information security is now a business problem. The enterprise will have to utilize all the available resources to manage the security risks and make information security a core part of business operations by integrating it into the existing internal controls and policies that constitute corporate governance (ITGI, 2003). Information Security Governance (ISG) is a subset of corporate governance that relates to the security of information systems. (Allen, 2005) defined "governing for

enterprise security” as “directing and controlling an organization to establish and sustain a culture of security in the organization’s conduct (beliefs, behaviors, capabilities and actions) ...treating adequate security as a non-negotiable requirement of being in business.” Information Security Governance (ISG) is a pro-active way of mitigating the risks from usage of the information infrastructure.

An enterprise’s management, especially the top-level executives, are responsible for ISG and act as the main driver. They are responsible for initiating/setting up an Information Security Program (ISP) team to oversee the enterprise information security which includes formulating the ISP; the development of the corporate security policy that often include third-party policies; the budgeting/economics of implementing the ISP including the recruitment of certified/trained personnel, purchase of hardware and software equipment/tools.

One of the major goals of the ISP team is to develop an enterprise-wide awareness of information security through the Security Education, Training and Awareness (SETA) program for knowledge workers; inculcating a Responsibility, Integrity, Trust and Ethicality (RITE) subculture (Whitman and Mattord, 2004b). The operational aspect of the ISP includes security administration such as systems administration, network administration, database administration, installation of hardware, firewalls, anti-virus and internet security software, and application software deployment. The risk assessment aspect includes systems audit, security policy audit, information security practice audit and IT governance audit. In the case where the enterprise develops application software for the processing, transmission and/or storage of data, there will be a need to conduct an analysis of the security functional and assurance requirements where secured software development practices are integrated in the development process. Last but not least, a major task of the ISP team is the monitoring, enforcement and support of IT controls which includes monitoring and enforcing the IT security and IA practices and procedures, and taking supportive action to protect, detect and correct through updating policies and procedures, training and continuous monitoring.

EPILOGUE

As the 21st century gets more competitive, enterprises continue to push the envelope of the extended enterprise by extending deeper access to their information assets and services but at the same time balancing their compliance with the myriad legislations around information privacy and corporate governance. Information security governance consists of the leadership, organizational structures and processes that safeguard information. Information security protects the confidentiality of data by ensuring unauthorized access to information will be denied; the integrity of data by ensuring that business transaction data is not altered or corrupted. If something has been changed or modified since it was created, verifying that the changes are legitimate and protecting the availability of data by ensuring that data availability is as expected. A secondary role is the protection of intellectual property by ensuring that assets such as business intelligence, source code, and any data related to intellectual property is safeguarded and user’s data privacy.

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Appendix 1 (DoD Directive 8570)

The table below lists the Certification Providers associated with each approved certification.

IA Workforce Certification Providers	
Certification Provider	Certification Name
CertNexus *	CyberSec First Responder (CFR)
Cisco *	Cisco Certified Network Associate-Security (CCNA-Security)
Cisco *	Cisco Certified Network Professional-Security (CCNP-Security)
Cisco *	Cybersecurity Specialty Certification (SCYBER)
Cisco *	Cisco Certified Network Associate-Cyber Ops (CCNA-Cyber Ops)
Computing Technology Industry Association (CompTIA) *	A+ Continuing Education (CE)
CompTIA *	Security+ Continuing Education (CE)
CompTIA *	CompTIA Advanced Security Practitioner (CASP+) Continuing Education (CE)
CompTIA *	Network+ Continuing Education (CE)
CompTIA *	Cybersecurity Analyst (CySA+ **)
EC-Council *	Certified Ethical Hacker (CEH)
EC-Council *	Certified Chief Information Security Officer (CCISO)
EC-Council *	Computer Hacking Forensics Investigator (CHFI)
International Information Systems Security Certifications Consortium (ISC)2 *	Certified Information Systems Security Professional (CISSP) (or Associate - this means the individual has qualified for the certification except for the number of years experience)
(ISC)2 *	Certified Secure Software Lifecycle Professional (CSSLP)
(ISC)2 *	Certification Authorization Professional (CAP)
(ISC)2 *	Information Systems Security Architecture Professional (ISSAP)
(ISC)2 *	Information Systems Security Engineering Professional (ISSEP)
(ISC)2 *	Information Systems Security Management Professional (ISSMP)
(ISC)2 *	System Security Certified Practitioner (SSCP)
Information Systems Audit and Control Association (ISACA) *	Certified Information Security Manager (CISM)
ISACA *	Certified Information Systems Auditor (CISA)
Global Information Assurance Certification (GIAC) *	GIAC Certified Intrusion Analyst (GCIA)
GIAC *	GIAC Certified Enterprise Defender (GCED)
GIAC *	GIAC Certified Forensic Analyst (GCFA)
GIAC *	GIAC Certified Incident Handler (GCIH)
GIAC *	GIAC Global Industrial Cyber Security Professional (GICSP)
GIAC *	GIAC Security Essentials Certification (GSEC)
GIAC *	GIAC Security Leadership Certificate (GSLC)
GIAC *	GIAC Systems and Network Auditor (GSNA)

Impact of Organisational Culture on Employees' Performance in Selected Pharmaceutical Companies in Nigeria

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ABSTRACT

The various studies on organisational culture have shown that employees in most of the business organisations in Nigeria today are operating under the whims and caprices of the owner's established beliefs, values and norms which are usually difficult to change as environment changes. Failure in the attempt to properly capture the interest of the employees when addressing this, usually generate the exhibition of some attitudes and behaviours that are inconsistent with the company's best interests. Therefore, this study examines the impact of organizational culture on employees' performance with reference to selected Pharmaceutical companies in Nigeria. The study adopted a survey research design. Primary data was used to obtain the needed information through structured questionnaire. Out of 634 permanent staff of the selected pharmaceutical companies in Nigeria, simple random sampling technique was used to select a sample of 239 respondents. Multiple regression used to test the formulated hypothesis. The result of the regression showed that organizational culture has significant impact on employees' performance (R Square of 0.684, p-value=0.0001). The study concludes that organization culture has a significant relationship as well as a good influence on employees' performance. Also, significant differences exist in the level of adherence to the identified cultural dimensions. The study therefore recommended that the Pharmaceutical companies in Nigeria should promote organisational culture, especially by paying more attention to detail so as to yield positive and significant contribution to employees' performance.

Keywords: Organisational Culture, Employees' Performance, Norms and Value

INTRODUCTION

Every organization whether large or small is characterized by goals, structure and people. These goals are usually expressed in terms of purpose which organisation hopes to fulfill. It also needs people who perform the work that is necessary for the organisation to achieve its goals and likewise structure which establish procedures by which members do their work. It is in this regard that Robbins and Coulter (2013) defined organization as a deliberate arrangement of people to accomplish some specific purpose. As differences occur in the nature of organisations, so also in their objectives to



success in terms of long-term survival, growth and profit maximisation. However, employees have been identified as one of the major resources that organizations have to achieve its goals and objectives (Menaka & Chandrika, 2015). This is because they contribute much of their efforts towards achieving organizational objectives by performing their roles. In lieu of this, companies attribute extreme values to employees as they become most valuable asset in the organisations (Menaka & Chandrika, 2015).

Generally, it is the work of Human Resource Manager to motivate employees for maximising performance and maintaining an organizational culture of high spirits. But employees' performance which is the degree to which the set objective is achieved, can be affected by many factors which may be internal or external. Kottawatta (2007) cited in Menaka and Chandrika (2015) reported organisational culture as one of the factors that affect employees when determining their job performance. Every business organisation usually wants to adapt to the changing nature of the business environment so as to succeed in the competitive market. In attempt to this, most organisations usually required to change their existing strategies and structures which likewise affect the existing cultural dimensions.

It is when the outcome of this failed to fall in line with the interest of employees; that they decide to exhibits some attitudes and behaviours that are inconsistent with the company's best interests. Such attitudes include low productivity, demotivation, increased absenteeism, reduced quality of output and voluntary resignation. Meanwhile, for culture to be a fundamental aspect of a successful organization, it must be positive to attract and retain loyal and committed employees, which in turn, increase their performance. Just like any other asset, organizational culture must be monitored and nurtured to ensure that, it reflects the organization's mission and vision. In addition, it must play a significant role in an organization regarding how people feel about their work, levels of motivation, commitment, and job satisfaction (Kokila & Ramalingam, 2014).

However, organizational culture is general and influential. It is either a force for initiation of change in the organisation or a barrier to it. It can also be the glue that bonds members within the organization or what drives them away. Hence, managers today are faced with changing organizational culture to support new ways of accomplishing work. It is against this background that this study establishes a better understanding of the relationship and effect of organisational culture on the performance of employees in the selected Pharmaceutical companies in Nigeria. Recent studies have shown that employees in most of the business organisations in Nigeria are operating under the established procedures, norms and beliefs of the founders which are usually difficult to change as environment changes. This usually call for concern when misalignment occur in the cultural content (that is, the relative ordering of values and assumption) of the firm's environment.

In an attempt to respond to the changing nature of the environment, employees usually decide to exhibit some attitudes and behaviours that are inconsistent with the company's best interests. Moreso, Organisational Culture research has not been effectively done in developing countries, in particular Nigeria. Hence, this becomes a major gap in relevant literature in Nigeria and other developing countries at large. The research intends to bridge this available gap by identifying the actual effect of culture in an organisation to the employees' performance. Thus, the study will be limited to Tuyil pharmaceuticals companies in Ilorin, Kwara state.

CONCEPT OF ORGANISATIONAL CULTURE

Brown (1998) conceptualized organizational culture as the pattern of beliefs, values and learned ways of coping with experience that have developed during the course of an organisation's history, and which tend to be manifested in its material arrangements and in the behaviors of its members. This suggests that organisational culture is communicated in the organisation in order to shape the way in which organisational members should behave. In relation to the above, Hill and McShane (2009) described organization culture as that which consists of values and assumptions shared within an organization. It directs everyone in the organization toward the right way of doing things. It frames and shapes the decisions that managers and other employees should make and the action they should take. This presents culture as a framework that defines and guides actions and decisions taking in organisation.

Linking up with the above definitions, Freeman and Gilbert (2011) defined organization culture as a pattern of shared basic assumptions that a group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, desirable to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. Culture, therefore, is how an organization has learned to deal with its environment. It

is a complex mixture of assumptions, behaviours, stories, myths, metaphors, and other ideas that fit together to define what it means to work in a particular organization.

Schermerhorn (2011) as cited in Edger Schein (2004) defined organizational culture as the system of shared beliefs and values that develops within an organization and guides the behavior of its members. This is sometimes called corporate culture; it is a key aspect of any organization and work setting. With this, organisational culture is established by founders and handed over to the employees to guide their mode of operations. Given the various definitions of organisational culture discussed above, the adopted and relevant definition for this study is stated by Robbins and Judge (2013) who see organizational culture as “a system of shared meaning held by members, distinguishing the organizations from other organizations”. They believe that these shared meanings are a set of key characteristics, and that the value of organization values and its essence can be captured in seven primary characteristics which are innovation and risk taking; attention to detail; outcome orientation; people orientation; team orientation; aggressiveness; and stability.

CHARACTERISTICS OF ORGANISATIONAL CULTURE

Robbins and Judge (2013) and McLaughlin (2016) identified seven characteristics which must be the heart of organizational culture which are explained as follows:

1. **Innovation** (Risk Orientation) - Companies with cultures that place a high value on innovation encourage their employees to take risks and innovate in the performance of their jobs. Companies with cultures that place a low value on innovation expect their employees to do their jobs the same way that they have been trained to do them, without looking for ways to improve their performance.
2. **Attention to Detail** (Precision Orientation) - This characteristic of organizational culture dictates the degree to which employees are expected to be accurate in their work. A culture that places a high value on attention to detail expects their employees to perform their work with exactness. A culture that places a low value on this characteristic does not.
3. **Emphasis on Outcome** (Achievement Orientation) - Companies that focus on results, but not on how the results are achieved, place a high emphasis on this value of organizational culture. A company that instructs its sales force to do whatever it takes to get sales orders has a culture that places a high value on the emphasis on outcome characteristic.
4. **Emphasis on People** (Fairness Orientation) - Companies that place a high value on this characteristic of organizational culture place a great deal of importance on how their decisions will affect the people in their organizations. For these companies, it is important to treat their employees with respect and dignity.
5. **Teamwork** (Collaboration Orientation) - Companies that organize work activities around teams instead of individuals place a high value on this characteristic of organizational culture. People who work for these types of companies tend to have a positive relationship with their coworkers and managers.
6. **Aggressiveness** (Competitive Orientation) - This characteristic of organizational culture dictates whether group members are expected to be assertive or easygoing when dealing with companies they compete with in the marketplace. Companies with an aggressive culture place a high value on competitiveness and outperforming the competition at all costs.
7. **Stability** (Rule Orientation) - A company whose culture places a high value on stability are rule-oriented, predictable, and bureaucratic in nature. These types of companies typically provide consistent and predictable levels of output and operate best in non-changing market conditions.

The above revealed that organizational culture is composed of seven characteristics that range in priority from high to low. Also that every organization has a distinctive value for each of these characteristics, which, when combined, defines the organization's unique culture. As a result, members of organizations make judgments on the value their organization places on these characteristics and then adjust their behavior to match this perceived set of values.

Organizational Subcultures

Dominant Culture: This is the culture being referred to when discussing organizational culture. It refers to the themes shared most widely by the organisation's members.

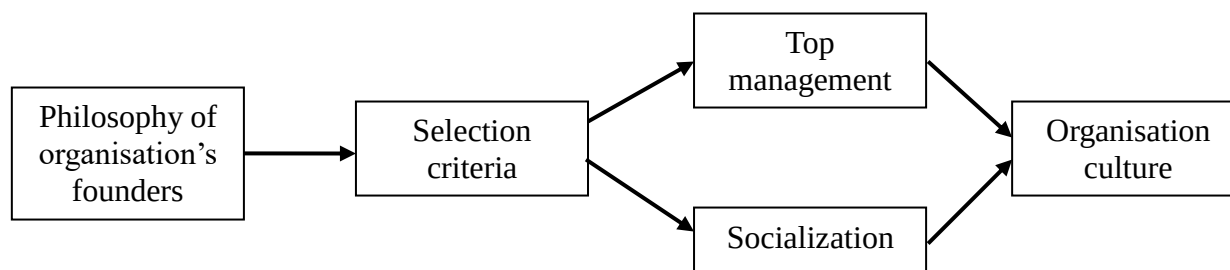
Subculture: These are cultures located throughout the various divisions, geographic regions, and occupational groups of an organisation. Some subcultures enhance the dominant culture by espousing parallel assumptions, values, and beliefs.

Countercultures: This is the subculture that directly opposes the organisation's core values. The main disadvantage of this is that it potentially creates conflict and dissension among employees.

Creating and Sustaining Organisational Culture

Robbins and Judge (2013) in his model, as illustrated in figure 2, summarizes how an organization culture is established and sustained.

Figure2: How organization cultures form



Source: Robbins, P. S. and Judge, A. J. (2013). *Organizational behavior* (5th Eds.). Pearson Education limited.

How employees learn culture

Organizational culture's shared assumptions, values, and beliefs are not directly seen, but instead deciphered indirectly through artifacts which are the observable symbols and signs of an organisations culture, such as the ways visitors are greeted, the physical layout, and the ways employees are rewarded (McShane & Glinow, 2003; Hill & McShane, 2009). Hill and McShane (2009) further added that some experts suggested that artifacts are the essence of corporate culture while others view it as symbols or indicator of culture. Either way, artifacts are important because they represent the best source of information about a company's culture. Also, McShane and Glinow (2003); Hill and McShane (2009) argued that the study of culture is like an anthropological investigation of a new society. It involves observing workplace behaviour, listening for unique language in everyday conversations, studying written documents, and interviewing staff about corporate stories.

The four broad categories of artifacts through which culture is transmitted are stories and legends, rituals and ceremonies, physical structures or materials and symbols, and language (Robbins & Coulter, 2013; Robbins & Judge, 2013; McShane & Glinow, 2003; and Hill & McShane, 2009).

ORGANIZATIONAL CULTURE AND PERFORMANCE

The concept of organization culture and performance is sometimes explained as cultural functions or importance of culture. Hill and McShane (2009); McShane and Glinow (2003) argued that companies with strong cultures are more likely to be successful, provided its employees widely and deeply hold its dominant values and assumptions. Moreso, in a strong culture, most employees across all subunits hold the dominant values which are institutionalized through well-established artifacts, thereby making it difficult for those values to change. Furthermore, strong cultures tend to be long-lasting; some can be traced back to the beliefs and values established by the company's founder. In contrast, companies have weak cultures when the dominant values are short-lived and held mainly by a few people at the top of the organization.

As a result, strong corporate culture potentially increases the company's success by serving three important functions (Hill & McShane, 2009): Firstly, corporate culture is a deeply embedded form of social control that influences employee decisions and behaviour. Culture is pervasive and operates unconsciously. One might think of it as an automatic pilot, directing employees in ways that are consistent with organisational expectations (McShane & Glinow, 2003; Hill & McShane, 2009). Secondly, corporate culture is social glue that bonds people together and makes them feel part of the organizational experience. Employees are motivated to internalize the organisation's dominant culture because it fulfills their need for social identity. This social glue is increasingly important as a way to attract new staff and retain top performers (McShane & Glinow, 2003; Hill & McShane, 2009).

Finally, corporate culture assists the sense-making process. It helps employees understand organizational events. They can get on with the task at hand rather than spend time trying to figure out what is expected of them. Employees can also communicate more efficiently and reach higher levels of cooperation with each other because they share common mental models of reality (McShane &

THEORETICAL CLARIFICATION

This study reviewed the theories below relating to organisational culture and employees' performance. These theories include, The Schein's theory of organisational culture, and Equity theory of Adams Stacey J. (1960).

Schein's Theory of Organisational Culture

Wambugu (2014) explained Schein's model of organizational culture as not being only one of the most cited culture models but also one that serves a high degree of abstraction and complexity reduction. Wambugu, stressed that Schein's model consists of three domains which are basic underlying assumptions, espoused values and artifacts. Not only that, the model also distinguished observable elements from unobservable elements of culture. As a result, it becomes clear that there is a certain hierarchy between these domains where visible behaviour influences and as well being influenced by unobservable assumptions through rules and standard. This is further clarified in the figure below.

Artifacts are considered as the surface level of an organizational culture that are difficult to measure and characterized as tangible, easily seen and felt indicators such as products, physical environment, language, technology, clothing, myths and stories, published values, rituals and ceremonies, etc. Espoused beliefs and values are the next level of Schein's organisational culture that are measured using survey questionnaires and it consists of strategies, goals, shared perceptions, shared assumptions, norms, beliefs and values instilled by founders and leaders. Basic underlying assumptions are the base level of organisational culture, and are the deeply-embedded, unconscious, taken for granted assumptions that are shared with others. Any challenge of these assumptions will result in anxiety and defensiveness.

Equity Theory

Robbins and Coulter (2013) explained the Equity theory developed by J. Stacey Adams in 1960. The theory proposes that employees compare what they get from a job (outcomes) in relation to what they put into it(inputs), and then they compare their inputs-outcomes ratio with the inputs-outcomes ratios of relevant others. As a result, If an employee perceives his ratio to be equitable in comparison to those of relevant others, there is no problem. However, if the ratio is inequitable, he views himself as under-rewarded or over-rewarded. When inequalities occur, employees attempt to do something about it. The result might be lower or higher productivity improved or reduced quality of output, increased absenteeism, or voluntary resignation. The study adopted this theory because it touches issues bothering on determinant of performance of employees in organisations.

Empirical Review

Awad and Saad (2013) adopted literature review to assess the impact of organisational culture upon process, employees and systems. Identifying Power distance, Individualism, Uncertainty avoidance, and Masculinity as cultural variables discovered that values and norms of an organization were related to employees' performance. In addition, Uddin, Luva and Hossian (2013) conducted interview with 34 members of staff across various departments and cadre in GrameenPhone, the biggest cellular phone in Bagdad with more than 32million subscribers. Using qualitative method of analysis, the study observed that organizational culture has significant influence on employees' performance and productivity in the dynamic emerging content.

Similar to the above, Agwu (2014) adopted cross sectional survey research design and judgmentally selected 10 each from all the 36 states and 6 geo-political region of the 42 offices of National Agency for Food and Drugs Administration and Control (NAFDAC), in Nigeria observed that there is a significant relationship between organisational culture and increased employees' commitment and productivity. However, Olanipekun, Aje, and Abiola-Falemu (2013) conducted a survey research design by administering 126 copies of questionnaire to the staff of Quality Surveying Firms in Lagos, Nigeria in order to investigate the effect of organisational culture on the performance using Organisational Culture Profile. Using regression analysis, the study found that organisational culture influenced the performance of Quantity Surveying firms except the supportiveness that has no influence on any of the performance area.

METHODOLOGY

The study adopted survey research design. This is because copy of a structured questionnaire based on the contents of dimensions of organisational culture and employees' performance. The population of this study consists of 43 senior and 591 junior staff of Bioraj and Tuyil Pharmaceuticals Limited, making a total of six hundred and thirty-four (634).

Table 3.1: Population of Senior and Junior staff of Bioraj and Tuyil Pharmaceuticals Limited.

Company	Senior Staff	Junior staff	Total
Bioraj Pharmaceuticals Limited	15	105	120
Tuyil Pharmaceuticals Limited	28	486	514
Total	43	591	634

Source: Human Resource Department of the selected Companies as at January, 2017

Owing to the fact that the total population of 634 staff of the selected companies considered by the study cannot be conveniently studied, the study adopted Krejcie and Morgan's formula of (1970)'s and arrived at 239 sample size. The study also used simple random sampling probability sampling method to distribute the copies of questionnaire to the selected staff. Below is the application of Krejcie and Morgan (1970) formula:

$$S = \frac{X^2 * NP(1 - P)}{d^2(N - 1) + X^2 P(1 - P)}$$

The questions of the questionnaire was structure in form of 5-point Likert scale. Respondents were asked to rate the extent of agreement or disagreement with statements cast for both organisational culture and employees' performance using 5 as "Strongly Agree" to 1 as "Strongly Disagree".

In analyzing the data collected using the multiple regression method of data analysis.

Ho₁: There is no significant effect of Organizational culture on employees' performance

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon$$

Where:

Y= Employee performance; B = coefficients of variables; X₁= Attention to Detail;

X₂ = Emphasis on Outcome; X₃ = Emphasis on People; X₄ = Aggressiveness; X₅ = Stability;

X₆ = Innovativeness X₇ = Coordinated Teamwork, ε= Error term.

Ho₁: There is no significant effect of Organizational culture on employees' performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	Df1	Df2	Sig. F Change
1	.827 ^a	.684	.674	.66519	.684	68.778	7	222	.000

a. Predictors: (Constant), Coordinated Teamwork, Emphasis on Output, Attention to Detail, Stability, Emphasis on People, Innovation, Aggressiveness

Sources: SPSS Printout, 2017

The table 4.13 above presents the model summary of the effect of organisational culture on the performance of employees. The table shows Correlation coefficient (R) and R-square to be 0.827 and 0.684 respectively. This explains that, organisational culture is highly positively related with the performance of employees and organisational culture variables explain for about 68.4% of the variations in the performance of employees of the selected pharmaceutical companies and the remaining 32.6% was explained by other factors not included in the model.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.352	.476		-.738	.461
Attention to Detail	-.080	.116	-.032	-.687	.493
Emphasis on Outcome	.499	.099	.242	5.042	.000
Emphasis on People	.104	.066	.079	1.581	.115
Aggressiveness	.194	.108	.096	1.800	.073
Stability	.532	.097	.277	5.494	.000
Innovativeness	.449	.095	.245	4.710	.000
Coordinated Teamwork	.360	.091	.183	3.940	.000

a. Dependent Variable: Employees' Performance (EP)

Source: SPSS Printout, 2017

From the above regression coefficient table, Emphasis on Outcome, Stability, Innovativeness, and Coordinated Teamwork were statistically significant and thus affect Employees' performance with probability value less than 0.05 while dimensions/indices such as Attention to Detail, Emphasis on People and Aggressiveness were statistically insignificant to Employees' Performance with probability value greater than 0.05. Moreover, Attention to detail in addition to not being statistically significant also has a negative influence on employees' performance. With this, it is suffice to say that organisational culture dimensions have significant influence on employees' performance. Therefore, the Null hypothesis is rejected while the Alternative hypothesis is accepted.

DISCUSSION OF FINDINGS

The study was of the opinion based on Hypothesis one as tested revealed that organizational culture dimensions have significance influence on the performance of employees. This however necessitates the rejection of the null hypothesis as earlier stated. This result was in line with the work of Nanjiku and Agusioma (2014) titled "Effect of Organisational culture on employees' performance", where all the organisational culture type identified had significant effect on the performance of employees. Also the study revealed that organisational culture has significant influence on employees' performance. This influence manifests with the correlation coefficient value of 0.827 which depicts that Organisational culture maintains 82.7% relationship with Employees' performance.

Likewise, all organisational culture dimensions/variables accounted for 68.4% of the variations in the performance of employees. Specifically, Emphasis on Outcome, Stability, Innovativeness and Coordinated Teamwork were statistically significant and thus affect Employees' performance with probability value less than 0.05 while dimensions/indices such as Attention to Detail, Emphasis on People, and Aggressiveness were statistically insignificant to Employees' Performance with probability value greater than 0.05. Moreover, Attention to detail in addition to not being statistically significant also has a negative effect on employees' performance.

CONCLUSION

Organisational culture dimensions have positive interrelationship with one another, but Attention to Detail has a strong relationship with aggressiveness when compared with others. Conversely, all organisational culture dimensions/indices have strong relationship with employees' performance except Attention to detail that is relatively low related to employees' performance.

RECOMMENDATION

The pharmaceutical companies in Nigeria should ensure to lay more emphasis on how Attention to detail as one of the cultural dimensions considered by the study can have positive and significant impact on employees' performance. This is because, production of drugs involves following

procedures to reach standard. Also that emphasis on people and aggressiveness should equally be channeled to be significant, because given people due consideration on issues that will affect them can make them to increase their performance. Likewise being aggressive can make companies to have competitive advantage.

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An Investigation of Auditors' *Guanxi* Orientation in Different Level of Education and Age

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ABSTRACT

Purpose – The purpose of this study is to examine the influence of education and age on auditor's *guanxi* orientation. To achieve this aim, this study compares auditor's *guanxi* orientation in different level of education and age

Design/methodology/approach – This study utilises a questionnaire based on Fan's (2012) scale to survey 200 MBA students, who are former auditors in China. Multivariate analysis of variance is used for comparing the level of *guanxi* orientation between different groups

Findings – Auditors on different levels of age and education have a similar perceptions of *guanxi* orientation, including both *favour-seeking* and *rent-seeking guanxi*.

Originality/value – This study firstly distinguish *favour-seeking* and *rent-seeking guanxi* to examine the association between factors of education and age and *guanxi* orientation. The findings of this study provide evidence for exploring the nature of "guanxi".

Keywords Guanxi orientation, favour-seeking guanxi, rent-seeking guanxi, age, education

INTRODUCTION

Guanxi, a unique cultural concept in Chinese context, describes the basic personal networks among people in China (Fan *et al*, 2012). Different from "relationships" in western countries, *guanxi* especially highlights the communication of emotions and focuses on favour exchanges in a long-term (Law and Chan, 2013). Nowadays, *guanxi* is considered as a crucial factor for business success in China (Yeung & Tung, 1996), and as a factor cannot be neglected for studies of auditors' ethical behaviour (Liu, 2013). Since auditing is an important way to protect investor's profits, auditors are required to keep an independent, objective and fair attitude in the auditing process. Therefore, auditors must avoid of being affected by other people's financial incentives. However, as many studies (e.g. Snell 1999, Fan 2002) suggest, *guanxi* sometimes is associated with the behaviours of violating ethical standards. Therefore, it is necessary to explore the auditor's *guanxi* orientation in their practical process. Nevertheless, as Cooper *et al* (1996) suggest, different groups of people may be varying in *guanxi* orientations. Thus, an investigation of auditors who are varying in social identities, such as educational backgrounds and ages, will give researchers some key facts about the factors affecting an auditor's *guanxi* orientation. Unfortunately, limited literature has focused on this topic. Hence, the aim of this study is to focus on this issue and the results will fill in the current literature gaps.

To achieve the research objectives, this study investigates the MBA students, who are former auditors, from Wuhan and Dalian cities through using a survey methodology. The survey instruments are designed based on the scale from the Fan *et al*. (2012). Finally, 200 samples are included in this study. Then the data are analysed through MANOVA and ANOVA method, using the SPSS software. The results indicate that Chinese auditors with different levels of education and age have no significant different both in their *favour-seeking* and *rent-seeking guanxi* orientation. This results will help researchers have a deeply understand how Chinese auditor's perceive *guanxi*.

The reminder of this paper is organized as follows: the section 2 proposes research questions of this study; the section 3 reviews the related literatures, and then, proposes the hypotheses; the section 4 introduces the results of data analysis; and then, the section 6 discusses the implications of the results.

RESEARCH QUESTIONS

Since China has become the second largest economic entity in the world, *guanxi* is one issue that attracting researcher's interest. Many studies have considered *guanxi* within an ethical context. For instance, Chan *et al* (2002) argues that an individual's *guanxi* orientation will lead to some unethical behaviours; however, Lovett *et al* (1999) assert that Chinese people do not perceive *guanxi* as

unethical issues. To explore the answers to the question that whether “guanxi” is ethical, Su and Littlefield (2001) classify “guanxi” into two types: *favour-seeking* and *rent-seeking guanxi*. Fan *et al* (2012) believe that *rent-seeking guanxi* is associated with unethical behaviors, and *favour-seeking guanxi*, on the other hand, may not be involved in ethical scandals. In contrast with previous studies, the aim of this study is to explore how auditors perceive *favour-seeking* and *rent-seeking guanxi*. As Hunt and Vitell (1986) suggest, an individual’s perception can be influenced by some personal characteristics, such as education and age. Thus, this study examine whether auditors varying in education and age have different perception of *favour-seeking* and *rent-seeking guanxi*. More specifically, the study addresses the following research questions:

RQ1. Do auditors have different “guanxi” orientations, in particular *favour-seeking* and *rent-seeking guanxi*, in terms of level of education and age?

RQ2. Does the combination of education and age is associated with auditor’s *guanxi* orientation?

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Guanxi Orientation

The concept of guanxi

Guanxi is the combination of two Chinese characters: “guan” and “xi”. The former character means closing up a door, and the later one means maintaining a relationships. Thus, “guanxi” can be explained as maintaining a relationship with people who are inside the “door”. Many studies try to define *guanxi* as a special relationship from a western cultural perspective. For instance, Osland (1990) comments *guanxi* as a relationship that occurred when one person just needs something and another person who can give that thing. Similarly, Fan (2002) defines *guanxi* as a process that individuals assist each other to solve the problem. Although Dunfee and Warren (2001) suggest *guanxi* is a cultural phenomenon including many elements and cannot be simply defined in just one sentence or a few words, most studies achieve an agreement that *guanxi* is considered as a personal relationship for exchanging emotions and benefits in a long-term between individuals. To explore the nature of *guanxi*, many studies focus on its components and classifications. Su and Littlefield (2001) classify *guanxi* as *favour-seeking* and *rent-seeking guanxi*. This classification provides theoretical basis for many studies (e.g. Su *et al* 2003, Fan *et al* 2012, Law and Chan 2013).

Favor-seeking guanxi

Su *et al* (2003, p.310) states that *favour-seeking guanxi* is “cultural rooted...and builds on interdependence and sharing scarce resources in a collectivist culture”. Hwang and Staley (2005) asserts that this type of *guanxi* has been existed since Confucius’s period. The primary objective of *favour-seeking guanxi* is to exchange favors and emotions with each other. This type of *guanxi* exists widely among family members, friends, relatives and even strangers. “Mianzi” and “renqing” is the two basic elements in this type of *guanxi*. “Mianzi” means an individual’s social status, and this element refers to an obligation rule, suggested by Su and Littlefield (2001). “Renqing” focus on favor exchange in the long-term (Lovett *et al*, 1999). Since *favour-seeking guanxi* is only emotionally driven and mutually affected (Fan, 2002), Chan *et al* (2002) believed that this type of *guanxi* can be perceived as good and ethical.

Rent-seeking guanxi

Rent-seeking guanxi is different from *favour-seeking guanxi*, because this type of *guanxi* refers to power and benefit exchanges (Su *et al*, 2013). Fan (2002) argues that *rent-seeking guanxi* may exist in the relationship between businessman and government officers. Su and Littlefield (2001) suggest that *rent-seeking guanxi* will involve unethical behaviour such as back-door deal. However, *rent-seeking guanxi* is not rooted in Chinese culture and widely emerged since the economic reforms began in 1978 (Seligman, 1999). Fan (2002) also argues that this type of *guanxi* is the temporary product of China’s imperfect political and economic systems. Since *rent-seeking guanxi* is related with bribery and corruption (Fan, 2002), it may negatively affect an auditor’s ethical judgements, and lead auditors to act in their own self-interest at the expense of investors’ welfare (Law and Chan, 2013).

Educational Backgrounds

Until recently, limited studies have focused on the association between education and auditors’ *guanxi* orientations. However, since *guanxi* is a concept related to ethics, the literature exploring education’s effect on ethics may give us some inspiration. Puxty *et al* (1994) indicates that education has a positive influence on ethics theoretically. Accounting students are directed to perform ethical

behaviour, as a result of preparing for qualification exams. Su *et al* (2003) also argues that managers' educational backgrounds have a significant influence on their "guanxi" orientations based on empirical evidence. Since the principles of "independence" and "fairness" will be taught in each phase of education, the more education auditors accept, the more solidly the principles of "independence" and "fairness" will be established in their minds. As what has been mentioned previously, *rent-seeking guanxi* is associated with unethical behaviour. Therefore, education may lead auditors to engage in less unethical behaviour, and thus have no effect on *favour-seeking guanxi* orientation. The hypotheses are developed as:

H1a: Auditors with different level of education have no difference in the *favour-seeking guanxi* orientation

H2b: Auditors with different level of education have significant difference in the *rent-seeking guanxi* orientation.

Age

Hunt and Vitell (1986) argues age is directly associated with ethical decision-making. Hall (1976) also asserts that people pay less attention to their wealth and advancement as they aged, thus tend to concern more ethical issues. Similarly, Kohlberg (1981) finds that people will change ethical modes due to the accumulation of life experience. Thus there will be a positive association between people's ethical behaviour and age. Terpstra *et al* (1993) also argue that an individual can become more ethical when becoming older. Since "guanxi", an ethical issue, can be classified as *favour-seeking* and *rent-seeking guanxi*, it is necessary to examine the associations between age and these two factors separately. *Rent-seeking guanxi* is related with unethical behaviour such as back-door deal, thus this study assumes that auditors with different ages would be varying in *rent-seeking guanxi* orientations. *Favour-seeking guanxi*, on the other hand, do not refers to unethical behaviours. Therefore, age will not have any influence on auditor's *favour-seeking guanxi* orientation. Based on the result of previous study, the hypothesis can be developed as:

H2a: Auditors with different ages have no difference in *favour-seeking guanxi* orientation

H2b: Auditors with different ages have significant difference in *rent-seeking guanxi* orientation.

Since this study assume that both of education and age are associated with auditors' *rent-seeking guanxi* orientation, age and education can also affect the level of *rent-seeking guanxi* orientation in conjunction. Therefore, hypotheses can be developed as:

H3a: There is no association between education and age in conjunction and auditors' *favour-seeking guanxi*

H3b: There is a significant association between education and age in conjunction and auditors' *rent-seeking guanxi*

METHODOLOGY

Sample

This study utilizes survey methodology. The instrument used in this survey includes a cover letter and a self-administered questionnaire, using for measuring respondent's "guanxi" orientation. The sample consists of 200 MBA students who are former auditors in Wuhan and Dalian cities. The survey was conducted at the end of class, and instruments were distributed to students by the third parties. After deleting invalid data, 169 instruments were returned, giving a response rate of 84.5%. The manager's background is shown in the Table 1.

Table 1: Backgrounds of respondents

		Frequency	Percent
Gender	Male	89	52
	Female	82	48
Age	20-30	110	64.3
	31-40	58	33.9
	41-50	3	1.8
Education	Bachelor	130	76.9
	Master	30	23.1

Measurement for Variables

“Guanxi” orientation

To measure an individual’s *guanxi* orientation, Ang and Leong (2000) developed a nine-item scale. This scale is widely used in many studies (e.g. Su *et al* 2003, Liu, 2013). However, as Fan *et al* (2012) suggest, this scale only deal with *favor-seeking guanxi*, while *rent-seeking guanxi* should also be considered. Based on Ang and Leong’s (2000) scale, Fan *et al* (2012) develop a new instrument including a seven items based on two dimensions: *favor-seeking* and *rent-seeking guanxi*. This new scale is shown in the Table 2. The new scale includes four items (i.e. knowing the right people, maintaining a good network, developing the right contacts and maintaining good relationships) focused on *favour-seeking guanxi* and three items (i.e. power exchange, back-door deals and bureaucratic privilege) related with *rent-seeking guanxi*. Given its high reliability and validity, this study will also use this new scale to measure auditors’ perception of *favour-seeking* and *rent-seeking guanxi*. Respondents are asked to answer seven questions related with items based on a nine-point Likert scale, ranging from “Strongly disagree” to “Strongly agree”.

Table 2: Guanxi Orientation*

<i>Favour-seeking guanxi</i>	<i>Rent-seeking guanxi</i>
In business, it is important to maintain a good network of relationships	Back-door deals are alright as long as those involved in the process benefit
Maintaining good relationships is the best way to enhance business	Bureaucratic privilege, which benefits some parties at the expense of others is acceptable
Doing business involves knowing the right people	It is acceptable behaviour for the dominant parties to a deal to make all the decisions.
Doing business involves knowing the right people	

* Measured on a nine-point (9) response scale, ranging from Strongly disagree (1) to Strongly agree (9). Source: Fan *et al*. (2012)

Education and age

The instrument used in this study also includes the demographic information of the respondents. Education is measured in four categories: bachelor, master, Ph.D, other. Age is also a nominal variable, and measured as four categories: 20-30, 31-40, 41-50, 50 or above.

Validity and Reliability

Validity and reliability are two basic characteristics for a valid measurement. Sekaran (2000) defines validity as the ability of a scale to measure the intended factors and reliability as the accuracy of the scale, including stability and consistency. Thus the scale should be tested for its validity and reliability by using Components Factor Analysis. Since the Cronbach’s Alpha for favor-seeking guanxi and rent-seeking guanxi are 0.836 and 0.747 separately, the scale used in this study has a satisfactory degree in reliability.

The results of factor analysis are shown in the Tble 3. The results indicate that 69.50% of variance can be explained by two factors. Items 1-4 are loaded significantly on factor 1 (with 46.80% of the variance), and items 5 to 7 are loaded significant on factor 2 (with 22.70% of the variance). Therefore, factor 1 including five items can be titled as *favour-seeking guanxi*. Items 5 to 7 refer to unethical behavior and can be titled as *rent-seeking guanxi*.

Table 3: The results of factor analysis

Factor 1 (Favour-seeking guanxi)	Factor loading	Factor 2 (Rent-seeking guanxi)	Factor loading
Eigen value:	3.276	Eigen value:	1.589
% of Variance:	46.798	% of Variance:	22.704
Good network	.827	Back-door-deals	.669
Right people	.791	Bureaucratic privilege	.855
Right contacts	.846	Power exchange	.856
Good relationships	.797		

RESULTS

Review of “guanxi” orientation

The overall mean and standard deviation of “guanxi” orientation for each group is shown in Table 4. The result show that auditors in the *master* group have the highest level of *favour-seeking* orientation and the *bachelor* group have the highest level of *rent favour-seeking guanxi* orientation

Table 4: The descriptive results of *favour-seeking* and *rent-seeking guanxi*

Age	Education	FG		RG	
		Mean	SD	Mean	SD
20-30	Bachelor	7.73	1.517	4.75	1.948
	Master	8.25	.585	4.38	1.738
	Total	7.81	1.428	4.70	1.915
31-40	Bachelor	8.34	.835	4.37	1.919
	Master	8.13	1.005	4.47	1.810
	Total	8.26	.901	4.41	1.901
41-50	Bachelor	8.63	.177	2.17	.236
	Master	7.00		2.67	
	Total	8.08	.946	2.33	.333
Total	Bachelor	7.91	1.377	4.61	1.965
	Master	8.15	.856	4.38	1.756
	Total	7.97	1.277	4.56	1.916

Multivariate Analysis of Variance

In order to test the hypotheses, Multivariate analysis of variance (MANOVA) was performed using *favour-seeking* and *rent-seeking guanxi* as dependent variables, *education* and *age* as independent variables. The results indicate that there is no significant between-group difference on “guanxi” orientation among four age groups ($F=1.195$, $p>0.05$). This result suggests that older people do not have any difference with younger people in the perception of guanxi orientation.

The result of MANOVA are shown in the Table 5. These results indicate that there is no difference between different education groups in the *favour-seeking* and *rent-seeking guanxi* orientation ($F= 1.517$, $p > 0.05$). This result indicates that auditors’ guanxi orientation is not affected by auditors’ educational backgrounds. Puxty (1994) indicates that education of accounting ethics cannot affect auditors’ ethical judgement, since auditors only utilise the principles of professional ethics for qualification exam, not for guiding practices. Su *et al* (2003) also indicate that guanxi cannot be learned from school, but from experience of the profession. Thus, these literatures can explain this result.

Furthermore, there is no significant influence of education and age combined on “guanxi” orientation, according to the result shown in the Table 5 ($F = 1.438$, $p > 0.05$).

Table 5: The Results of MONOVA

Effect	Value	F	Hypothesis df	Error df	P
Intercept	0.258	232.688	2.000	162.000	<0.001
Age	0.971	1.195	4.000	324.000	0.313
Education	0.964	1.517	4.000	324.000	0.197
Age* Education	.965	1.438	4.000	324.000	0.221

Hypotheses Tests

Since hypotheses focus on the influence of education and age on *favour-seeking* and *rent-seeking guanxi* separately, Univariate analysis of variance (ANOVA) is used to test these hypotheses. The result is shown in Table 6.

Table 6: Results of Univariate analysis of variance

Source		Type III Sum of Squares	df	Mean Square	F	P
Intercept	FG	747.323	1	747.323	467.977	<0.001
	RG	262.206	1	262.206	71.646	<0.001
Age	FG	1.833	2	.916	.574	0.564
	RG	11.781	2	5.890	1.609	0.203
Education	FG	2.021	2	1.010	.633	0.532
	RG	19.388	2	9.694	2.649	0.074
Age * Education	FG	5.732	2	2.866	1.795	0.169
	RG	1.824	2	.912	.249	0.780
Error	FG	260.298	163	1.597		
	RG	596.540	163	3.660		

The results indicate that there is no difference in the level of *favour-seeking guanxi* orientation between different age groups ($F = 0.574$, $p > 0.05$), thus H1a is supported. However, auditors varying in age have no difference in the perception of *rent-seeking guanxi* ($F = 1.609$, $p > 0.203$). Thus H1b is rejected.

H2a states that auditors varying in education do not have different *favour-seeking guanxi* orientation. This hypothesis is supported by the results of Univariate ANOVA analysis ($F = 0.633$, $p > 0.05$). On the other hand, H2b is rejected, since the results show that no significant group-between differences exist between groups of auditors with different level of education ($F = 2.649$, $p > 0.05$).

H3a is supported, since result show that the combination of age and education is not associated with auditors' *favour-seeking guanxi* orientation ($F = 1.795$, $p > 0.05$). However, as the results indicate, combination of age and education is not associated with auditors' *rent-seeking guanxi* orientation ($F = 0.249$, $p > 0.05$). Thus, H3b is rejected.

DISCUSSION

This study explores the influence of auditors' age and education on their *guanxi* orientation. The results of MONOVA analysis clearly show that auditors varying in age and education have the similar *guanxi* orientation, both in *favour-seeking* and *rent-seeking guanxi* orientation. This result is different from the Su *et al* (2003) study, which suggests education is negatively associated with *guanxi* orientation. The difference of the results may lie in the scale used in two studies. Su *et al* (2003) used a scale developed by Ang and Leong (2000) including nine-item in their study. However, as Fan *et al* (2012) suggest, this scale only focuses on *rent-seeking guanxi* orientation, which is only one dimension of *guanxi* orientation. This study utilises the scale developed by Fan *et al* (2012). The items in the scale consider both *favour-seeking* and *rent-seeking guanxi* orientation. As Puxty (1994) indicates, auditor's ethical behaviour in practice is more possibly influenced by their observation of others' behaviours in their firms. Therefore, the education from school cannot affect auditors' *guanxi* orientation. Su *et al* (2003) also argues that age has no significant influence on auditors' *guanxi* orientation, which is consistent with this study. Rao and Vitell (1999) also support this point, and indicate that age has little influence on individual's ethical judgment. Su *et al* (2003) further suggest that time spent in the profession, not age, is a significant predictor for *guanxi* orientation. The results of this study indicate that auditors have the similar *guanxi* orientation, though their ages are different with each other.

Compared to other studies, such as Su *et al* (2003), this study is noteworthy. Firstly, since *favour-seeking* and *rent-seeking guanxi* is different in moral context, this study distinguishes *favour-seeking* and *rent-seeking guanxi* and explores the factors associated with these two dimensions of *guanxi* orientation separately. Furthermore, this study examines the factors of education and age, and testifies that these two factors are not associated with auditors' *guanxi* orientation, both in *favour-seeking* and *rent-seeking*. However, this study also has some limitations. Firstly, this study uses MBA students as the sample. Although these students are former auditors, the representation of this sample cannot compare with the ones drawn from current auditors. Secondly, since the students in the sample come from the cities of Wuhan and Dalian, the influence of cultural difference in these cities should be considered by this study. Thirdly, as Gilligan (1982) indicates, man and woman are different in the perception of ethics. Therefore, gender should also be considered and examined as a factor in

this study.

In a sum, the findings of this study provide useful information for further examining auditor's *guanxi* orientation. Further study will focus on the influence of cultural differences in China on individuals' *guanxi* orientation. As Huang *et al* (1994) suggest, the culture in northern China is different from that in southern China. Cui and Liu (2000) also argue that there is a significant cultural difference between coastal and inland provinces in China because of uneven development. Therefore, a more comprehensive and nationwide study about *guanxi* orientation will provide a deep understanding about how Chinese perceive *guanxi* for researchers

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Strategic Groups Analysis of China Circle Airlines —Perspectives of Structure and Development

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ABSTRACT

The growth of the tourism industry has led to development of the airline industry, resulting in a fiercely competitive environment within this industry. The airline industry in the highly populated Asia-Pacific region is particularly competitive. Therefore, identifying their position and that of their competitors, in addition to position changes in the market, is essential for airlines.

This study investigates airlines in the China Circle under the theoretical framework of strategic groups. These airlines are grouped using raw data extracted from annual reports covering 2011–2015. We use the CoPlot method for analysis and investigate five dimensions including operating revenue, operating costs, operating profit rate, available seat kilometers (ASKs), and revenue passenger kilometers (RPKs). Four airline groups are identified: performance-leader, survival-nicher, policy-nicher, as well as performance-laggard. According to the average performance of each group, the performance-leader and survival-nicher groups maintained their positions in the competitive market whereas the policy-nicher and performance-laggard groups were strongly affected by national policies (subsidies and constraints). The dynamics among the groups reveal the rigidity of the airline industry in this region and the effect of whether an airline is publicly or privately owned; therefore, airlines predominantly moved within groups, with intergroup movements rarely observed.

Keywords: China Circle, airlines, strategic groups, CoPlot method

INTRODUCTION

Research Background

Air transport is among the most used means of transportation, and the rapid development of the airline industry has greatly reduced journey times for both passenger and freight transport. Increases in tourism have also contributed to the growth of the airline industry. According to the Commercial Market Outlook 2018–2037 published by Boeing (2018), the global economic growth rate is estimated to be 2.8% in the next 20 years, which will lead to annual growth rates of 4.7% in airline passenger traffic. The same report also estimated a market demand of 42,730 new airplanes (US\$ 6.3 trillion) and the demand of commercial services will be valued at US\$ 8.8 trillion over the next 20 years, and the Asia-Pacific region with large emerging markets such as China and India being the main drivers of both global GDP growth and demand for air travel.

How airlines can improve their business operations and detect market changes in the fiercely competitive Asia-Pacific region will become a crucial issue for airline management. This study investigates airlines based in the China Circle, which comprises Taiwan, Mainland China, and Hong Kong (Macao is excluded due to its size), exploring the strategic groups in this circle through the inter-airlines structural relationships. The dynamic development perspective is adopted, and the study results provide insights that can help airlines make future decisions.

Research Purpose

According to the relevant research, the status of an industry can be understood by obtaining information on the industry's external environment and on the strategies and performance of companies in that industry. Once the status has been determined, appropriate recommendations can be made and feedback given for each company (Porter, 1998). Therefore, the analysis of intra-industry variations in the competitive behavior and performance of firms has gained prominence during the early 1990s (Hodgkinson, 1997). Analyses conducted from a single perspective and focusing on a single airline can only reveal some of the airline's strengths and weaknesses, resulting in recommendations that address only short-term goals and failing to describe the actual environment. Investigating airlines in the China Circle, this study aims to perform objective data analyses regarding the competitive situation in the airline industry. We conduct structural analysis of the strategic airline groups in the China Circle to investigate each airline's positioning in the market; the competitive

structure of airline industries in the China Circle and the structure of each area's strategic group are also analyzed to establish strategies for improving the overall competitiveness of the airline industry in the China Circle. The chronological dimension is incorporated into the analyses to detect airlines' strategic changes over time. Accordingly, the research objectives are as follows:

1. To analyze the airline industry in the China Circle and the competitive relationships among them;
2. To analyze the operational strategies of airlines in the China Circle and the structural segmentation of strategic groups;
3. To determine the operational strategies of airlines in the China Circle from the dynamic development perspective; and
4. To provide practical and theoretical recommendations for airlines and future research regarding the operational strategies of airlines in the China Circle.

LITERATURE REVIEW

Definition of Strategic Groups

Strategic groups were originally used to describe a phenomenon within an industry; specifically, a strategic group refers to a group of companies adopting similar strategies. Hunt (1972) introduces the concept of strategic groups, which are defined as companies within the same industry that have similar resources and symmetric strategies. Porter (1998) considers a strategic group to be a group of companies in the same industry that employ similar strategies. Cool (1985) defines a strategic group as a group of companies, within a certain time range and industry, that have similar resource allocation, competitive advantage, and strategy scope.

This study categorizes companies in a strategic group based on their resources, target customer groups, and product portfolio strategies.

Theory and Application of Strategic Groups

Since Hunt (1972) introduced the concept of strategic groups, the number of scholars studying the structures of strategic groups has been increasing. For example, McGee and Thomas (1986) and Barney and Hoskisson (1990) investigate how the concept emerged and indicate the lack of studies conducted from the dynamic development perspective and empirical analyses. Those authors also argue that the structures of strategic groups change over time that strategic groups are affected by changes in industry structure, and that companies can change their strategies and switch from one strategic group to another (McNamara & Vaaler, 2000).

In the 1980s, scholars began investigating the effects of strategic grouping on company performance in addition to exploring how strategic grouping affects the structure of industry. However, the results obtained have been inconsistent and a consensus has not been reached. The inconsistency in the outcomes possibly results from the various factors in the studies (Short et. al, 2002; Short et. al, 2007). Regarding the effect of strategic grouping on company performance, studies have predominantly considered industry characteristics to be a determinant of strategic group structures; for example, in a rapidly changing industry, early studies tended to believe competition and performance variance were greater between strategic groups than within groups. By contrast, in a relatively stable industry, performance within groups is more stable or inflexible than that between groups, which creates high barriers to entry of a group and thus protects each strategic group's resources and profits from competitors (McNamara, Deephouse, & Luce, 2003; Dornier, Selmi, & Delécolle, 2012).

Structure of Strategic Groups and the Dynamic Development Perspective

Structure of strategic groups indicates that companies in different industries establish appropriate strategies according to different dimensions. Company characteristics, resource allocation, and strategies can all act as criteria for dividing the companies of an industry into strategic groups. Moreover, different industries should be investigated through different dimensions (Oster, 1982; McGee and Thomas, 1986; Cangur, Ercan, & Ozkaya, 2015). However, the dynamic development of strategic groups is often ignored. Few studies related to strategic groups have discussed how these groups change over time (McGee and Thomas, 1986), which may have led to results that fail to reflect the actual situation. Cool (1985), Fiegenbaum and Thomas (1993), and Desarbo, and Grewal (2008) propose that strategic groups should be discussed from the dynamic development perspective and use this perspective to obtain comprehensive research results providing theoretical and practical implications. In recent years, researches on dynamic development of strategic groups of different industries in Taiwan is emerging (Liu, 2015; Yen & Lee, 2018; Yen, Yang, & Liao, 2019).

RESEARCH METHODOLOGY AND DESIGN

CoPlot Method

The CoPlot method, a non-quantified, multi-dimensional and visual form of analysis, was introduced by Raveh and Talby and still accessible on world-wide-web (Raveh & Talby, 2018). Employed to quantify data and visualize data analysis results (Bravata, Shojania, Olkin, & Raveh, 2008), the method is commonly used to present the analysis results of complex, multidimensional studies by using two-dimensional graphs. A coefficient of alienation is employed to determine whether multidimensional raw data can be compressed into two dimensions while preserving the state of the data, and the average of correlations is used to generate the coordinates of sample subjects. CoPlot graphs are concise and easily understood, facilitate rapid and intuitive judgment, and are thus widely applied in various domains (Raveh, 2000; Paucar-Caceres and Thorpe 2005; Yen & Lee, 2018).

This study employs the CoPlot method to compress multidimensional data on the performance of airlines in the China Circle into two dimensions, after which the strategic directions of these airlines are determined. We segment the investigated airlines into strategic groups according to their performance (with airlines having similar strategies in the same group), compare the performance of each airline over various years, investigate the airlines' changes in strategic directions, and thus determine changes in the competitive situation among airline industries in the China Circle.

Sample

We employ airlines in the China Circle as our research sample, and the statistics for these sample airlines are extracted from each airline's annual reports from 2011 to 2015 (Table 1).

Table 1. Research sample

Areas	Airlines
Taiwan	EVA Air
	China Airlines
Hong Kong	Cathay Pacific
Mainland China	Air China
	China Eastern
	China Southern
	Hainan Airlines

Source: Official websites of the airlines

Strategy Dimensions

This study uses available seat kilometers (ASKs) and revenue passenger kilometers (RPKs), both of which are crucial indicators of airline performance, as the strategy dimensions. Operating revenue, operating costs, and operating profit rate are incorporated as the dimensions measuring airline performance (Cool & Schendel, 1987; Cool & Dierickx, 1993). Furthermore, each airline's operating revenue, cost of sales, ASKs, and RPKs are divided by the airline's fleet size to obtain the airline's performance per airplane. The conceptual and operational definitions of each strategy dimension are displayed in Table 2.

Table 2. Definitions of the strategy dimensions

Strategy dimension	Conceptual definition	Operational definition
Operating revenue	Revenue earned from selling products or providing services	Revenue before deducting any costs and expenses
Operating costs	Direct costs derived from primary business activities, namely the production and selling of products and services, including raw materials, labor costs (wages), and fixed asset depreciation	$\sum \text{number of sales (processed products)} \times \text{cost (cost of processing)}$
Operating profit rate	Ratio of operating profits to operating revenue, which yields the operating profits generated per unit of operating revenue and thus reveals the profitability of operating activities	$\text{operating profits} / \text{operating revenue} \times 100\%$

Strategy dimension	Conceptual definition	Operational definition
ASKs	The production capacity of an airline, namely its maximum economic benefits, with higher ASKs indicating more air routes and higher transport capacity	Number of seats available × distance flown (km)
RPKs	An integrated indicator reflecting the number of passengers transported by an airline, namely the total distance flown by all passengers	Number of passengers × distance flown (km)

Source: compiled by this study from *China Aviation Daily* (2018) and *MBALib* (2018)

EMPIRICAL RESULTS

Structural Analysis of the Current Airlines in the China Circle

This study uses the CoPlot method to analyze the performance data of the sample companies (Table 1) for 2011–2015 and obtain the coefficient of alienation and average of correlations, which are detailed in Table 3.

Table 3. Coefficient of alienation and average of correlations for the performance of China Circle airlines

year	2011	2012	2013	2014	2015	2011-2015
Coefficient of alienation	0.000	0.000	0.035	0.000	0.000	0.038
Average of correlations	0.977	0.965	0.979	0.979	0.983	0.979

The collected data almost perfectly meet the requirements of coefficients of alienation and averages of correlations. Figure 1 illustrates the structural change among the airlines of the China Circle over the 5 years investigated. For example, the operating revenue, operating cost, ASKs, and RPKs of China Airlines, EVA Air, and Cathay Pacific are the leading companies throughout the 5 years. Interestingly, China Airlines and EVA Air, which have relatively high performance, have lower operating profit rates than Hainan Airlines.

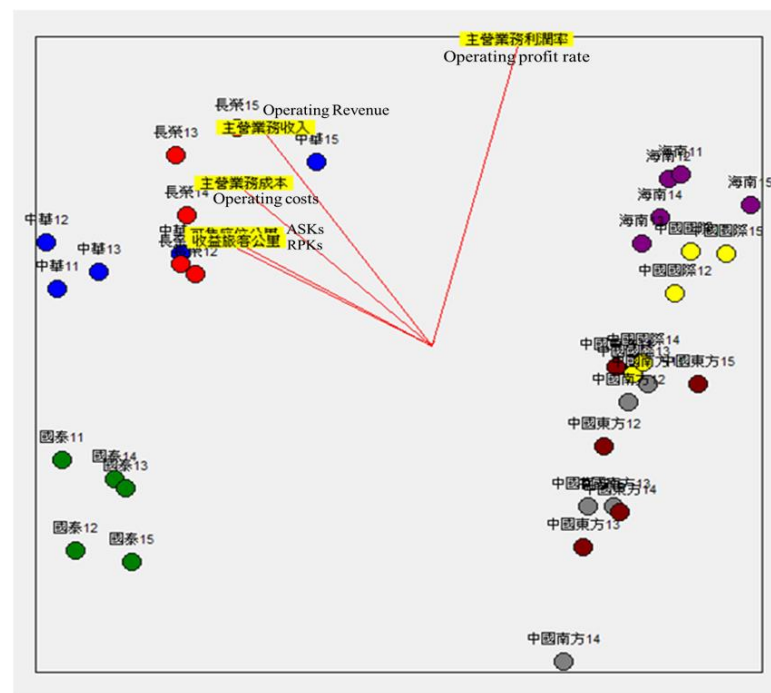


Figure 1. Structural and temporal positions of China Circle airlines

Note: 長榮(EVA Air), 中華(China Airlines), 國泰(Cathay Pacific), 中國國際(Air China), 中國東方(China Eastern), 中國南方(China Southern), 海南(Hainan Airlines). Each year is dated behind company name.

Table 4 Correlation coefficient matrix of the strategy dimensions

	Operating revenue	Operating costs	Operating profit rate	ASKs	RPKs	Overall performance
Operating revenue	--					1.00
Operating costs	0.99**	--				1.00
Operating profit rate	-0.61**	-0.68**	--			0.96
ASKs	0.95**	0.96**	-0.65**	--		0.98
RPKs	0.93**	0.94**	-0.63**	1.00**	--	0.96
Average of correlations						0.98

** significance at the level of 0.01 (two-tailed) * significance at the level of 0.05 (two-tailed)

Table 4 displays the correlation coefficient matrix of the strategy dimensions for China Circle airlines. Both positive and negative correlations are discovered between the dimensions. The correlation coefficient between operating revenue and operating cost is 0.99; operating revenue and ASKs, 0.95; operating revenue and RPKs, 0.93; operating cost and ASKs, 0.96; operating cost and RPKs, 0.94; and ASKs and RPKs, 1.00. These coefficients indicate high correlations between dimensions.

Structural Analysis of Strategic Groups among China Circle Airlines by Year

By inputting each airline's performance data for 2011–2015 to CoPlot graphs for calculation, we categorize the China Circle airlines into four groups according to their performance (Figures 2–6, respectively).

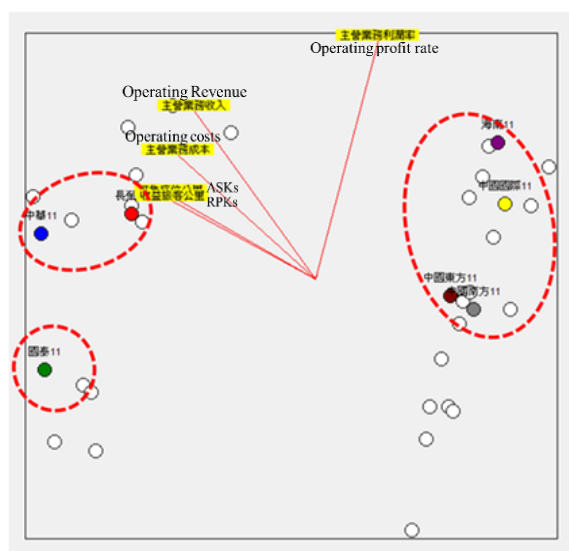


Figure 2. Structural analysis of strategic groups in 2011

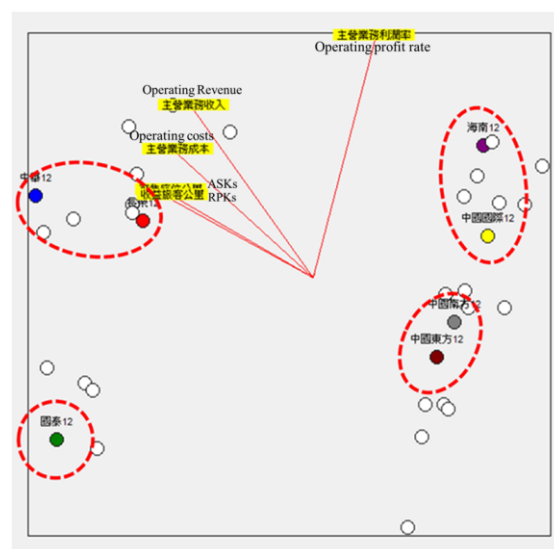


Figure 3. Structural analysis of strategic groups in 2012

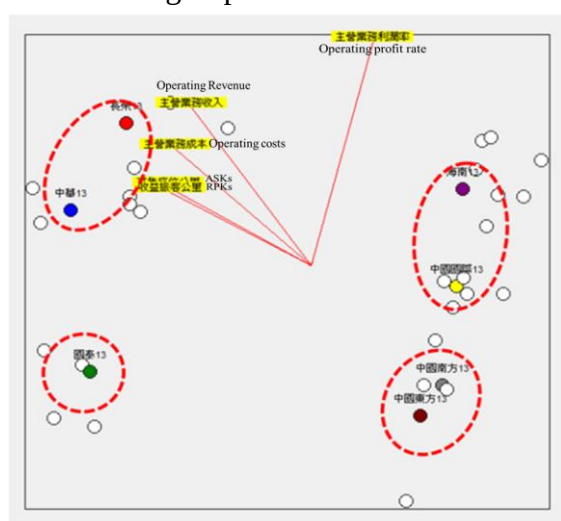


Figure 4. Structural analysis of strategic groups in 2013

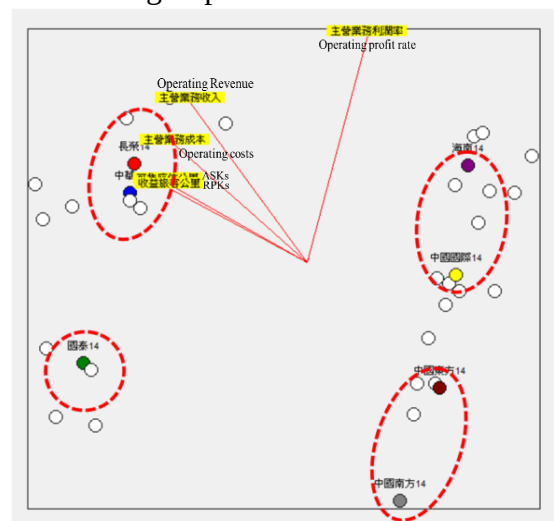


Figure 5. Structural analysis of strategic groups in 2014

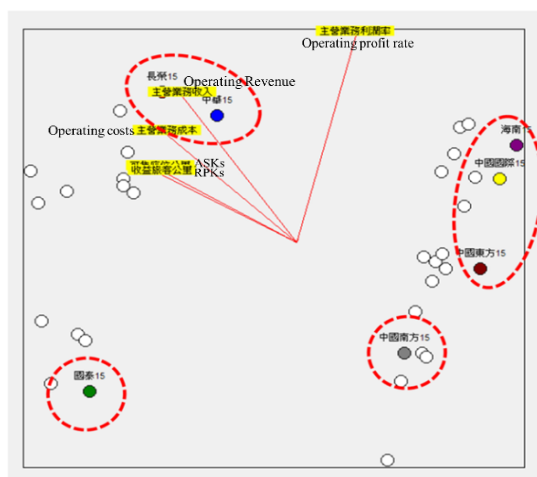


Figure 6. Structural analysis of strategic groups in 2015

Note: 長榮(EVA Air), 中華(China Airlines), 國泰(Cathay Pacific), 中國國際(Air China), 中國東方(China Eastern), 中國南方(China Southern), 海南(Hainan Airlines).

Dynamic Development of Strategic Groups among China Circle Airlines

The dynamic development of China Circle airlines over 2011–2015 (Figure 7) indicates that four strategic groups exist. The movements of the China Circle airlines during 2011–2015 predominantly occur within their groups; only a few instances of intergroup movement are observed, indicating that strategy is changed insubstantially in the airline industry.

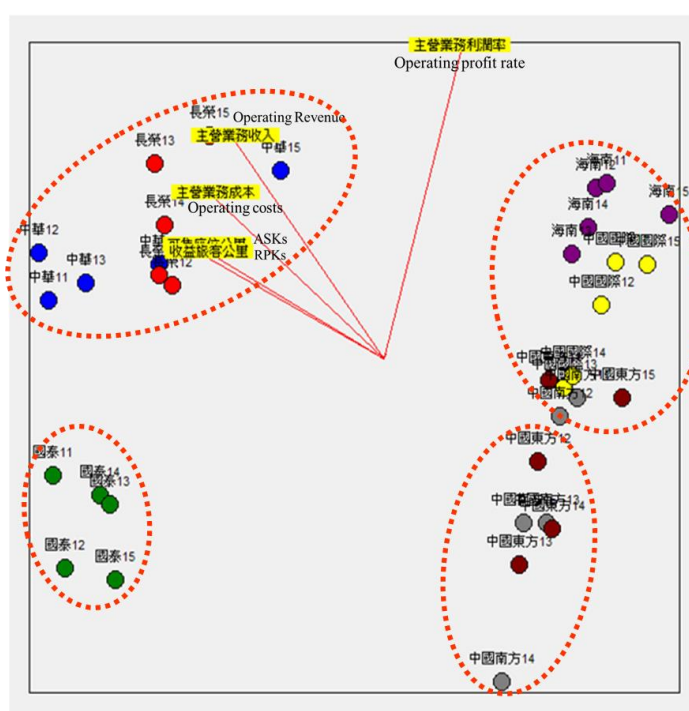


Figure 7. Strategic groups of China Circle airlines

Note: 長榮(EVA Air), 中華(China Airlines), 國泰(Cathay Pacific), 中國國際(Air China), 中國東方(China Eastern), 中國南方(China Southern), 海南(Hainan Airlines). Each year is dated behind company name.

The strategic groups of China Circle airlines are as detailed in Table 5.

Table 5. Strategic groups of China Circle airlines

Groups	Airlines within groups	Airline moving between groups
Group 1	China Airlines and EVA Air	
Group 2	Cathay Pacific	
Group 3	Hainan Airlines and Air China	China Eastern and China Southern
Group 4	China Eastern and China Southern	China Eastern and China Southern

Group 1 members demonstrated leading performance in all aspects in 2011–2015. In 2015, the operating revenue and operating costs of China Airlines and EVA Air declined considerably but their operating profit rates increased substantially. These two airlines exhibited relatively stable performance in all dimensions during 2011 to 2014. Group 2 comprised only Cathay Pacific, which demonstrated outstanding performance in all indicators. Its operating revenue, operating cost, ASKs, and RPKs were close to those of the leading airlines in Group 1; however, it had a much lower average operating profit rate than the airlines in other groups. Group 3 was behind other groups in all indicators except for operating profit rate. Hainan Airlines exhibited stable development between 2011 and 2012, but in 2013, its operating revenue and operating costs declined. The ASKs, RBKs, and operating profit rate of Air China decreased between 2011 and 2013, with a slight reverse of this trend in 2014.

Group 4 was formed by Group 3 members moving into a new position. This group exhibited the poorest performance in all aspects. China Eastern and China Southern both moved to Group 4 from Group 3. China Southern moved to Group 4 in 2013 and exhibited constantly declining performance in 2011–2014, although its performance did improve considerably in 2015. China Eastern was in Group 3 in 2011 and Group 4 between 2012 and 2014 but moved back to Group 3 in 2015. These results indicate that both China Eastern and China Southern improved their performance considerably in 2015.

Table 6. Characteristics of the strategic groups and naming

Groups	Group names	Group characteristics
Group 1	Performance-leader	Leading performance in operating revenue, operating cost, ASKs, and RPKs; operating profit rate maintained at a certain level
Group 2	Survival-nicher	Above-average performance in operating revenue, operating costs, ASKs, and RPKs; operating profit rates much lower than the average
Group 3	Policy-nicher	Below-average performance in operating revenue, operating costs, ASKs, and RPKs; above-average performance in operating profit rate
Group 4	Performance-laggard	Below-average performance in all indicators, namely operating revenue, operating costs, operating profit rate, ASKs, and RPKs

Strategic Trajectories of China Circle Airlines in Different Strategic Groups

(1) Airlines considerably changing trajectory within their group

China Airlines exhibited slightly improved performance in 2012 compared with 2011, but performance then worsened in 2012–2013; the overall decline was not substantial, but the performance decline of this airline is easily observed through various aspects. From 2013 to 2015, the operating revenue, operating costs, ASKs, and RPKs of China Airlines decreased noticeably. In particular, its operating revenue was 4.5% lower in 2015 than in 2014. EVA Air had poorer operating profit rate, ASKs, and RPKs than China Airlines in 2011 to 2014. However, this dynamic was reversed in 2015 when EVA Air had higher operating profit rate, ASKs, and RPKs than China Airlines. EVA Air may have considerably improved its performance in various dimensions in 2012 and 2013 because it joined the Star Alliance in June 2013, which greatly enhances its competitiveness.

Hainan Airlines had the highest operating profit rate among the investigated airlines for all years, but its overall performance declined in 2011–2013. The greatest decline was that of the operating profit rate, whereas the other dimensions—namely operating revenue, operating cost, ASKs, and RPKs—slightly increased in 2011–2012 and then also declined in 2012–2013. Air China exhibited a clear trajectory change within its group and had a trajectory similar to that of Hainan Airlines. Its operating profit rate decreased drastically in 2011–2013; to a lesser degree, its operating revenue and operating costs also declined over the same period. In 2015, the operating profit rate of Air China was 7.11% higher than that in 2014, with operating revenue and operating costs declining concurrently.

(2) Airlines slightly changing trajectory within their group

Among all the airlines, Cathay Pacific had the least noticeable dynamic change. During 2011 to 2015, Cathay Pacific moved within a specific area without salient changes in its position or strategic trajectory. Throughout the investigated time period, Cathay Pacific had a relatively low operating profit rate, although its performance in all other dimensions was above average.

(3) Airlines changing trajectory between groups

The position change of China Eastern was distinct, with its performance in all dimensions declining over 2011–2012, particularly its operating profit rate. In 2014–2015, its operating revenue and operating costs decreased slightly but its operating profit rate considerably increased. These performance changes resulted in first a move from Group 3 to Group 4 and then back to Group 3. China Southern had a similar strategic trajectory to China Eastern, with both airlines moving between groups. According to Figure 7, China Southern was in Group 3 in 2011 and 2012 but moved to and remained in Group 4 since 2013.

Analysis of Passenger Load Factor in China Circle Airlines

In addition to the five dimensions, another dimension named passenger load factor is considered for comparison purpose. When this dimension is added to the other five dimensions in CoPlot graphs, the CoPlot graphs containing both operating profit rate and passenger load factor are inconsistent with the actual data, particularly in analyses on Cathay Pacific. Therefore, we generate a CoPlot graph of the two dimensions of operating profit rate and passenger load to understand the relationship between these aspects. According to Figure 8, Cathay Pacific and Hainan Airlines are different from the other airlines. The passenger load factor of Cathay Pacific increased annually over 2011–2015, but this airline's operating profit rate declined over the same period. Carious problems in its internal operations may have occurred during the 5 years, leading to a loss of HK\$0.575 billion in 2016. For example, tickets being sold at their cost price or excessively high operating costs could have led to considerable losses, forcing Cathay Pacific to reorganize its management.

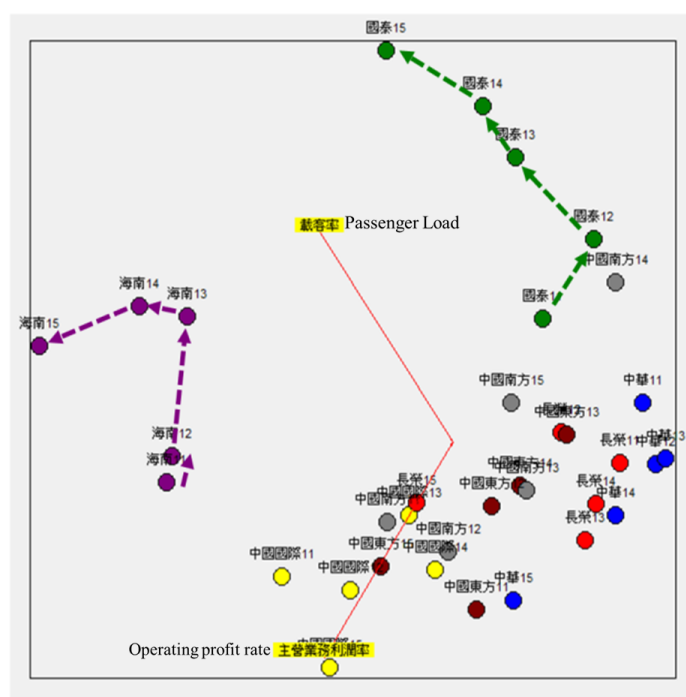


Figure 8 Operating profit rate and passenger load factor of China Circle airlines

Note: 長榮(EVA Air), 中華(China Airlines), 國泰(Cathay Pacific), 中國國際(Air China), 中國東方(China Eastern), 中國南方(China Southern), 海南(Hainan Airlines). Each year is dated behind company name.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Underpinned by theories related to strategic groups, this study groups airlines by their industry characteristics, analyzes structures in the China Circle airline industry in each year, and investigates the dynamic development (strategic trajectory) of the airlines. According to the CoPlot results, the following conclusions are drawn.

- (1) The strategic groups of China Circle airlines were rigid: Our analysis of the structures of strategic groups of China Circle airlines reveals that the groups had distinct performance and none of the groups exhibited balanced development with respect to the discussed dimensions. Dynamic development analysis indicated that the airline industry had rigidity

- (Bain, 1956); specifically, airlines rarely moved between groups.
- (2) Movements of China Circle airlines were predominantly within groups: Analyzing the trajectories of airline strategic group members, we identify three main trajectory types: considerable within-group strategic trajectories, slight within-group strategic trajectories, and intergroup trajectories. Most airlines—including China Airlines, EVA Air, Cathay Pacific, Hainan Airlines, and Air China—exhibited within-group movements in 2011–2015 period.
 - (3) Whether an airline was public or private played a crucial role in strategic grouping: The plot of strategic group dynamics in 2011–2015 has two main parts: the left side of the plot corresponds to China Airlines, EVA Air, and Cathay Pacific, whereas the right side of the plot corresponds to Air China, Hainan Airlines, China Eastern, and China Southern. By incorporating data for each dimension and the seven airlines in 2011–2015 by using the CoPlot method, the Taiwanese and Hong Kong airlines, which are privately owned, are identified as being on the left side of the plot. Specifically, China Airlines, EVA Air, and Cathay Pacific are on the left side, which indicates higher performance in operating revenue, operating costs, ASKs, and RPKs. By contrast, the Mainland Chinese airlines, which are publicly owned, are on the right side of the plot. Specifically, Hainan Airlines, Air China, China Eastern, and China Southern are classified on the right side, which indicates high operating profit rate.
 - (4) Chinese airlines were strongly affected by the “belt and road” initiative: The Mainland Chinese airlines all had similar strategic trajectories. Their operating profit rates mostly decreased between 2011 and 2014 but subsequently increased in 2015. Because Hainan Airlines had a higher operating profit rate than the other airlines, its profit rate increased more slowly in the subsequent time period. The rate of Hainan Airlines increased by 3.71%, whereas that of the other Mainland Chinese airlines increased by at least 7%. The Taiwanese and Hong Kong airlines exhibited relatively slower growth in operating profit rate than the Mainland Chinese airlines.

Managerial Implications

The strategic group plot reveals the market positioning of the China Circle airlines and indicates that the three Taiwanese and Hong Kong airlines, which are privately owned, performed more favorably in some dimensions and had more autonomy to develop and implement their strategies. The plot also indicates that the Chinese airlines changed their strategic trajectory according to their operating profit rate. The Mainland Chinese airlines are all publicly owned; therefore, their strategy development is greatly influenced by national policy change and they have less autonomy. However, the Mainland Chinese airlines receive greater subsidies than the other airlines. Publicly owned airlines must align their strategies with national policies, regardless of the detail of their original strategies, because for public airlines, national policies have much greater hierarchical importance (Tywoniak, Galvin, & Davies, 2007).

The increasing number of budget airlines has led to increasingly fierce competition within the airline industry, and airlines have developed various strategies in response. Distinct differences in competitiveness among the airlines are evident in the strategic group analysis, which reveals four strategic groups among the China Circle airlines. Only the Mainland Chinese airlines moved between groups; all other airlines moved within their groups. Accordingly, the relative positions of the airlines are well established, indicating that large intergroup movements are highly unlikely. This may be because the airline industry is capital intensive; large changes in strategy thus require long-term evaluation and preparation, although this does not indicate that the industry is uncompetitive. The dynamic development analysis reveals that the groups have distinct characteristics but members do move within groups. For example, China Airlines and EVA Air alternated their positions and competed with each other within their group; the trajectories of China Eastern and China Southern in 2011–2015 revolved around each other, showing the fierce competition between them. Accordingly, despite the clear grouping of China Circle airlines, fierce competition does exist within each group, and selecting appropriate strategies to respond to environment changes is thus the foundation of stable development for these airlines.

Research Contributions

This study applies strategic group theories to the China Circle airline industry. Scholars using related theories have mainly grouped sample subjects according to their attributions, explained how the groups are selected, indicated the number of groups, and named these groups. The attributions of

the groups have been overlooked, and studies have used cluster analysis, which groups sample subjects only by dimensions without considering changes over time. By contrast, this study employs the CoPlot method to place China Circle airlines into strategic groups. The results reveal the strategic group structures and development trends of these airlines. Our findings deepen the understanding of the strategic changes and trajectories of airlines in each group, enabling us to explore the positioning and strategic directions of each airline from an objective perspective and serving as a reference for airlines selecting their future strategy.

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BIOMETRICS YESTERDAY, TODAY AND TOMORROW

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ABSTRACT

The purpose of this research is to understand the factors of biometric technologies that influence the usage of cashless payments. Moreover, our research also focuses on forecasting the future usage of biometric technology types by considering the past performances in the industry. Our study involves interview from industry professionals who have the expertise in the biometric technologies and cashless payments and a survey which were analyzed using software ADANCO. Transparency, flexibility and storing data in personal devices rather than centralized databases are few recommendations we have arrived at after our extensive research the same are briefed and supported by evidence. These measures will influence the usage of the biometric technologies in the cashless payments today and in the future ahead. This research is beneficial to many stakeholders who are involved not only in the biometric technology and cashless payment industry but in all businesses and organizations who use biometric technologies in their everyday operations.

Keywords: Biometrics, Cashless-payments, Biometric technologies.

INTRODUCTION

Technology has become an integral part of human's everyday life. Entering the Internet Century and a world of technological advances, many industries and countries rely on technology to provide order and progress. We get exposed to hair-raising technologies that have increased the lifestyle, productivity and overall effectiveness of society.

Technologies, like biometrics, have been introduced in many leading countries. Governments and institutions are revolutionizing with the objective of creating a cashless system in society by using biometrics. Biometrics is the "measurement and statistical analysis of people's physical and behavioral characteristics for identification and access control." The term "biometrics" derived from the Greek words "bio" meaning life and "metric" meaning to measure. (Rouse, 2015). This technology has been present for many years, and it is continually being developed and used more frequently in our everyday lives. Examples of biometric technologies are facial and voice recognition, retina and iris scanning, gestures and ear features.

Biometrics being incredibly secure, it helps avoid the duplication of cards, password hacking and not losing keys or forgetting a PIN number. The research, we will focus on the Security of payments, Trends in biometrics and the Factors that will affect the future of cashless payments. Factors including trust, quality, and benefits, accessibility, awareness, and security & privacy were analyzed to study what they are, their old methods, the challenges and the future and benefits they will provide towards cashless payments.

From the study, we aim to determine the influential factors of biometrics that affects the current and future of cashless payments in the world. Consequently, by these goals, our research question was finalized. *"How will Biometric technologies affect the future of cashless payments?"*

LITERATURE REVIEW

Types of Biometrics

Biometrics get classified into two categories: behavioral and physical. The use of behavioral biometrics is when one uses the specific technology while "doing something," where the person's activities can measure it. For example, typing patterns, voice ID, and signature analysis. Physical biometrics is the use of the technology that involves natural human characteristics, such as fingerprints or iris patterns. (Rouse, Behavioural biometrics, 2015).



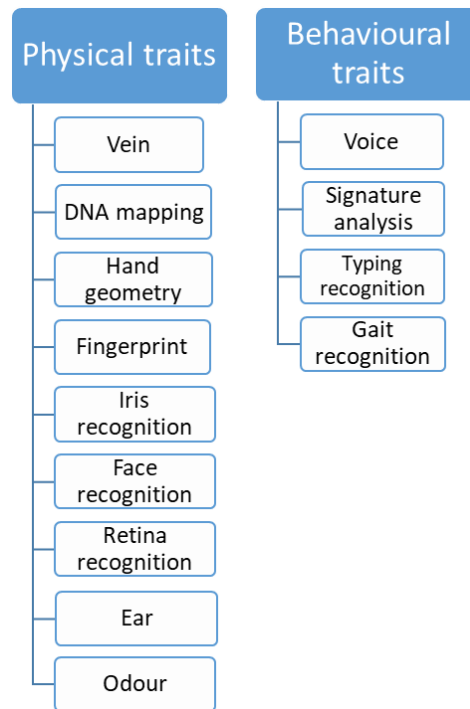


Figure 2: Types of biometrics.

Behavioral Traits

Behavioral traits consist of Voice, Signature analysis, Typing recognition and Gait. Under voice, an individual's vocals get used for authentication and verification. The voice of the speaker is recorded and stored in the form of a voice print or voice model. At the time of authentication, the voice of the speaker gets matched to the template. Voice recognition and Speech recognition are two different things. Voice/speaker recognition is used to identify the speaker whereas speech recognition is a method of identifying what spoken and not the speaker. (Biometrics Institute, n.d.). Under signature analysis, the individual signature used as a mode of authentication, It is of two types, i.e. static and dynamic. In static, a person's signature on a piece of paper gets digitalised for future uses. Dynamic is the most commonly used method for signature where an individual's signature is taken on a tablet in real time and plotted using coordinates for future verifications. (Biometrics Institute, n.d.).

A gait is a form of biometrics that can be used to identify the locomotion of human. Recent studies showed that the way human feet strike the ground is specifically unique. Scientists and researchers compared it to be in the same level of the fingerprint authentication accuracy. (Boyd & Little, n/d). In a recent study published in the Journal of Royal Society, 96 volunteers walked around, and the 3D image processing scanned them and identified individuals with 99.6% accuracy which has opened the door to new possibilities (Homeland security newswire, 2011). Under typing recognition, typing pattern of person used as the method of authentication. The person is required to type some samples and then the system measure features such as timing, latency, dwell time (the time duration that a key gets pressed), key interval, up to up, flight time (the time duration in between releasing a key and pressing the next key), and several other factors. (Keystroke dynamics, 2016).

Physical Traits

Physical traits consist of eight subcomponents mainly. Under vein recognition, the vascular patterns of an individual's hand and fingers get used for authentication and verification. It is hard to copy and replicate one's vascular patterns thus making it one of the safest form of biometrics. (Biometric update, 2016). DNA mapping identifies information in every cell of the body in a digital form and is therefore called the "ultimate identifier." Identical twins have the same DNA, which is one of the limitations of this technology. It contains information like race, paternity, and medical conditions which can lead to a privacy breach. (Novák, 2014).

There are two types of hand geometry, i.e. Full hand geometry, in which one's hand image get taken whereas two finger readers, in which the image of only two fingers get used. It is one of the most effective biometric techniques used today. With the help of a camera and mirror, the image of the hand and its edge is captured to get its silhouette and geometrical characteristics. (Novák, 2014). The uniqueness of an individual's fingerprints serves as an essential basis under fingerprint scanning. It

distinguishes and confirms an individual's fingerprint with the information entered in it. Fingerprint scanning accomplishes in three ways. Minutiae-based scanning, which has details in an arrangement of focuses on a plane and these focuses get coordinated in the layout and the minutiae. Correlation-based coordinating; it superimposes two unique finger impression pictures and connection between two pixels. Ridge feature matching is a propelled strategy that catches edges, as details catching are troublesome in low-quality unique finger impression pictures. (Angle, Bhagtani, & Chheda, n/d).

Under Iris recognition, features like rings, creases, and freckles existing in the colored tissue surrounding the pupil get inspected. This scanning uses a high-resolution digital camera that works through glasses and contact lenses. Again, like the fingerprint matching, iris scanning works on the assumption that an individual's iris color never changes. Unlike a fingerprint, where a person needs to be in contact with the scanner, iris recognition is rendered to be hygienic since it is contactless. (Find Biometrics, 2014). Facial recognition programming can distinguish faces in pictures, evaluate their features, and after that match them against the stored layouts in a database. Again, like the iris scanning, this process is contactless and hygienic. (Ex-Sight.Com, 2009).

Retina recognition is an ocular-based identification technology, and unique physiological characteristics are used to identify an individual. The retina is a tissue located in the eye comprised of many capillaries that supply it with blood. This network of blood vessels is unique in every single human being. It is such a complicated network that not even identical twins share a similar pattern. Most of the time, retina patterns of blood vessels never change in a lifetime, however, it does in rare cases such as diabetes, glaucoma or degenerative disorders. Biometric technologies known as retinal scanners are used to map these unique patterns in people's retinas. With the appropriate infrared lighting and scanner, the blood vessels absorb light better than the rest of the surrounding tissue, making it easier to identify the patterns. Once the pattern gets scanned, it is converted to computer code and stored in a database for any use desired. (Trader, 2012).

Ear Recognition is a powerful tool in the biometrics arsenal. Recognising the ear of the person involves four essential steps by which 2D or 3D scans get analyzed. The first step and one of the most critical steps are the ear detection inside the rectangular boundary. Successful completion leads to no error on the following step. Followed by feature detection, the system uses the segmented ear, a pointedly silent set of features, used for the next step. Matching involves the process of looking in the database and matching it with an identical score of the segmented ear. The final step is the decision step, by which the system ranks the two data by scoring and responds appropriately to the decision. (Ross & Abaza). People produce different body odors as they have different immunity genes and thus odor serves as one of the traits of biometrics. Artificial/electronic noses are developed to detect and classify odor, vapors, and gases automatically. These still aren't reliable enough for their job and are still in development. (Novák, 2014).

Latest research at Jadavpur University in Kolkata, India revealed that thermal imaging could get used as a new form of identification. Like human fingerprints, iris, retina, thermal imaging or images formed by the pattern of blood vessels under the skin, thermograms are unique compared to fingerprints which are widely used and are very hard to imitate. Thermographic cameras with infrared imaging can detect the radiation in the infrared range of the electromagnetic spectrum. Thus, as the object increases the radiation, the temperature raises, and by using infrared thermography, we can use it as a unique form of biometrics. (Charles, 2013).

Factors affecting Biometric technologies in cashless payments

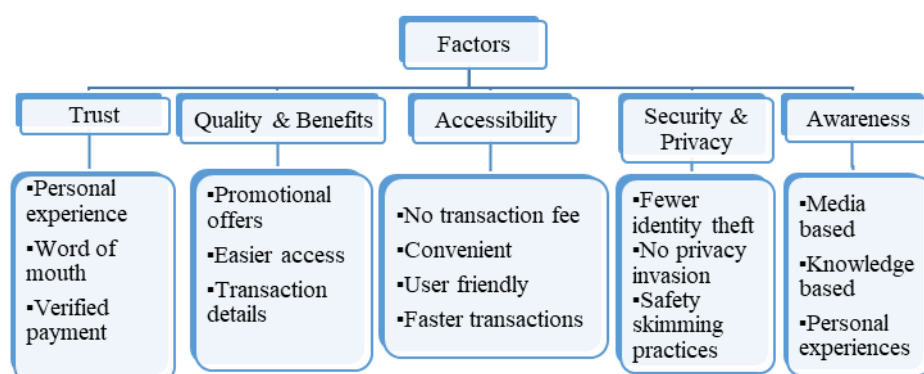


Figure 3: Factors affecting Biometric technologies in cashless payments

Accessibility

The principal reason why cashless payments are getting more popular and widely implemented is that of its convenience and speed of conducting financial transactions. Traditional passwords or PIN codes provide evidence of ownership of knowledge, whereas biometrics provides information regarding who the user is rather than what he knows making it more sufficient than the traditional system. Sometimes we forget to take cash or plastic cards with us, or they get stolen, or we cannot remember passwords they can also get hacked. The possibility of such activities is zero when biometrics used, which diminishes the tension of safeguarding our money. (Dave, 2016) It brings down the transaction cost to zero making it less costly for consumers. (Dail, n.d.).

Awareness

People have started relying on biometrics to combat identity threat. However, the public is only aware of the most common and convenient types such as fingerprints, signatures and voice recognition. The most sophisticated ones like iris and retinal scanning are less heard but are ready to accept the most convenient methods, even though they may not be secure due to lack of awareness and knowledge about biometrics. Media and the industry should focus on educating people about the most secure and reliable methods and should work on building trust

Quality and Benefits

The use of biometrics for cashless payments has a wide range of quality aspects and provides everyone with many benefits. Both quality and benefits get influenced by other sub-factors including accessibility to a smart-device platform, promotional offers to usage, and timely transaction reports provided. Some of its benefits are- Governments are promoting offers and usage of digital transactions by reducing the service taxes when using these, and with the primary incentive to increase users' savings and cash flow in the economy. Secondly, by using biometrics in cashless payments, people are easily able to track the amount they have spent and in what as timely transaction reports are recorded and sent to the user instantly (Dave, 2016). The benefits have no boundaries and will keep increasing as the technology keeps on developing and being used more by the population.

Security and Privacy

As the online or cashless payment industry keeps dealing with breaks, hacking and burglary, it appears to be that industry pioneers would swing to confirmation innovations that are harder to fake. Biometrics could be a significant step towards safer payments. Rather than conventional password-based client confirmation, biometrics-based verification is progressively prevalent because of its consistent quality and proficiency to verify remote clients or people. Online banking and authorizing of payments are the two essential parts where users say they support usage of biometrics. (Experian, 2016). As indicated by a report by Acuity Market Intelligence, mobile biometrics is set to secure 65% of all versatile trade exchanges by 2020, creating \$34.6 billion in yearly income. The main thrust behind this change is the yearning for expanded security. Biometrics signifies the potential for more secure and harder to copy verification methods. (Sadowski, 2015).

The biometrics technology industry is investigating how buyers can utilize their bodies to boost security. Numerous associations are attempting the use of fingerprints, voices, irises, and faces to support the client when making transactions. MasterCard declared that it is trying facial recognition to approve exchanges. Alibaba is taking a gander at utilizing a selfie to pay and confirm with facial acknowledgment. Samsung is considering unique finger impression, voice and iris acknowledgment for its Samsung Pay advertising. For Apple Pay and iTunes, Apple permits unique mark approval. With companies like this exploring biometrics, it is evident that biometrics will make its mark as a secure form of payment. With regards to overseeing online accounts, three in five users (61%) accept biometric technology is similarly as secure, or significantly more secure, than the present arrangement of passwords – including anything from messages and web-based social networking and annuity log-ins. (Experian, 2016). Biometrics provides considerable security advantages to the ordinary shopper — including fewer identity thefts, less fear of privacy invasion and safety from fraudulent activities and skimming practices.

Biometric technologies have got proclaimed as an excellent approach to better shield one from card skimmers. Securing against this sort of assault calls for better identity confirmation, which can come as validation systems like biometrics

Trust

The most important factor to create and maintain trustful relationships has first-hand experience

as humans, we trust our senses more than anything, and throughout evolution, our five senses helped us to stay alert. (Saylor, n.d.). Furthermore, word of mouth plays a vital role because the bond between the people around us and helps us to trust with products or services that we never experienced before. (Trusov, Bucklin, & Pauwels, 2009). As a third factor, verified payments are a third-party service provider that we already know and are aware of, which helps the user decide to make cash transactions to others. MasterCard and Visa act as ambassadors of the payment verification in almost every online transaction we make. All the three factors play an essential role in creating a trustful relationship between the customers and businesses. By focusing on how biometrics will affect the future of cashless payments, it depends on how people will trust the institutions that use their unique biological identity to provide any services.

RESEARCH METHODOLOGY

Data Collection

To supplement our research project, we have conducted primary and secondary data, including qualitative and quantitative data collection. Through extensive research consisting of journal material, research papers, company websites, telephonic/in-person interviews and online questionnaires, we have gained a greater depth of understanding and knowledge in our chosen field.

The data collected through the surveys in UAE, a 61% of the respondents answering the questionnaire were South East-Asian, 29% were Middle Eastern followed by 8% were of Western backgrounds and the remaining from other regions of the world including Africa and East Asia.

Out of all the 260 respondents, 35% of the respondents use cashless payments daily, 22% use them once every three days, and only a 3% never use them. The majority of the respondents 46% came across the biometrics term through personal experiences, and the type of biometrics that 53% of all the respondents prefer to use is fingerprint technology (Touch ID).

Questionnaire & Data Analysis

A Likert scale format survey circulated among 300 people who were culturally and globally exposed to various cultures and geographies to understand the future in cashless payments 40 responses were discarded leaving 260 responses. The questionnaire used a 5-point Likert scale: 1-Strongly Disagree, 2-Disagree, 3-Neutral, 4- Agree and 5-Strongly Agree, as it is one of the most common ways of attributes measurement. It measures human attitudes by asking respondents to rate a topic about the extent to which they agree or disagree and hence, tapping into their cognitive brain. (McLeod, n.d.).

Data Analysis Method

A variance-based structural equation model for analyzing data using ADANCO, It implements several limited-information estimators like Partial Least Square Path modeling (PLS) for testing the hypothesis and analyzing research models. It is easy to use, quick to learn, has an accurate composite and reflective measurement models, estimates direct, indirect and total effects, high speed of calculation and advance bootstrap (MODELING, n.d.).

Measurement, Validity, and Reliability

Cronbach's alpha (as a measure of composite reliability) was used to check the reliability of the independent variables. It measures the extent to which every construct is reliable and consistent. If $\alpha=0$, all constructs are independent of each other. Higher the Cronbach alpha, higher is the covariance of constructs. Variables need to have at least 0.6 Cronbach's alpha. All the constructs have a Cronbach's alpha above 0.8. (Goforth, 2015).

FINDINGS

Accessibility

The transaction fee for payments while using biometric payments is almost zero. As biometrics are becoming more reliable and available, they are coming up as a more convenient alternative for passwords and pins. Unlike passwords and pins, biometrics does not require the user to remember anything which makes the process short and simple. Most of the biometric transactions get completed within a few seconds. *Hypothesis H1 (t-value= 4.1028) and ($\beta= 0.1673, p<0.01$) was supported, i.e., "Using biometrics in cashless payments reduces cost, saves time and is user-friendly."*

Awareness

Biometrics Industry has taken all steps towards communicating the advantages and effectiveness of using various forms of biometrics. Individuals today are more aware of the various types available, and the same got communicated effectively through media and education. *Hypothesis H1 (t-value = 7.5638) and ($\beta = 0.1753$, $p < 0.01$) got supported, i.e., "Individuals are aware of the term biometrics and its usages."*

Quality and Benefits

For the quality and benefits of biometrics in cashless payments, the hypothesis is that more natural access in smart-devices, more promotional offers and receiving timely transaction reports will lead to higher use of biometrics in cashless payments. Indeed, the manifestation of these sub-factors will affect the quality and benefits factor that will create an overall influence on the usage of biometric technologies in cashless payments. Thus, the *hypothesis H1 (t-value = 10.3105) and ($\beta = 0.3222$, $p < 0.01$) got supported, this means "Having easier access in smart-devices, promotional offers, and receiving timely transaction reports will increase the usage biometrics in cashless payments."*

Security

Biometrics helps to find physical or behavioral characteristics that can particularly and precisely identify users. An example of physical biometrics is fingerprints, which works on the basis that the fingerprint of individuals is unique and moderately simple to record and analyze which reduces the issue of identity theft. From the aspect of privacy invasion, biometrics can give a precise and fast technique for recognition, therefore securing the user's privacy. For instance, biometrics helps in securing an individual's data, by allowing the user to control his/her information. Biometrics proclaimed as an excellent approach to better shield from card skimmers. Biometrics includes another layer of security that can't be replicated or stolen and can reduce the risk of fraudulent activities and skimming practices. *Hypothesis H1 (t-value = 9.0115) and ($\beta = 0.2670$, $p < 0.01$) was supported, i.e., "Using biometrics in cashless payments reduces identity theft, privacy invasion and risk if fraudulent and skimming practices."*

Trust

Trust plays an important role, and each sub-factor of trust which are personality based trust, knowledge-based trust, and institution-based trust have a robust correlation in order to create and maintain a trustful relationship with users of biometrics. Users are aware and do care about their data and throughout their usage with technological devices they want and prefer transparency. *Hypothesis H1 (7.87566 t-value) and ($B = 0.2562$) with the Cronbach alpha of awareness is 0.8800, which means users which concludes that trust the factor that needs to be cover in order to succeed.* For example, use of the app from Google which is Google Maps on our smartphones asks the users every time they lunch their permission about the gathering location coordinates from the user.

5.0 Conclusion & Limitations

Throughout this research with the support of interviews, questionnaires and extensive research, the team has conclusively understood the limitations of both biometric technologies and cashless payments partake. Biometric technologies and cashless payments have a great future ahead. However, it is still in development and not in complete use.

Dependence on a platform: As the research has indicated, humans still depend on cards, smartphones and other platforms to use cashless payments. The hope and expectation of the team and the professionals interviewed is that in the future humans will not require any platform for cashless payments. It will eventually get incorporated in one's body.

Cost and availability: Biometric technologies and systems can still be expensive nowadays, and not everyone can afford these utilities at their businesses or lifestyles. Also, individual cities and towns in less developed countries do not have the available technology for cashless payments and biometric technologies yet.

Biometrics cannot get reset: Unlike biometrics, other security measures like passwords, PINs, and tokens can be canceled or reset when needed. They can easily get replaced when the security gets compromised. Biometrics is perpetual to the user and can't get reset or replaced if it gets jeopardised. (Mutelo, 2014).

Dependence on one's body: One of the disadvantages of biometrics is that it is non-cancellable. This means that if body parts are damaged or replaced, it is not possible to use biometrics. (Mutelo, 2014).

Biometrics can get compromised: One advantage of biometrics is that it reduces the need for remembering multiple passwords. However, on the flip side, this can also be a disadvantage for the

user if they use the same kind of biometric for all their transactions. This way, if one application gets hacked, all the others can be hacked too if the user is using the same type of biometrics. (Mutelo, 2014).

Biometrics can get lifted: Even though biometrics are easy to use when compared to other security measures, like passwords or pin, it can also be easy to get robbed. Just like with passwords, fingerprints or stolen photographs can be used to access the user's data and commit crimes. Hackers can also use algorithms to access people's accounts. (Johnson, 2016).

Inaccuracy: It is not the best when it comes to accuracy as the user can experience false accept rate (FAR), or false reject rate (FRR). FAR/ FRR shows how many times a biometric characteristic which should not have been accepted/rejected but was accepted/ rejected. Biometrics' characteristics collected by the system can get misused as hackers can create a fake biometric account using that information often called Physical Spoof Attack. Even if such information is not accessible by the hacker, he can still use algorithms; intelligent guessing or real sample of non-valid users to access bank accounts. (Johnson, 2016).

RECOMMENDATIONS

Based on the themes examined in the findings and the outcomes of extensive research, some recommendations were as follows: Broadly stated, companies and governments should follow strict procedures to ensure success at the moment of implementing biometric technologies in their specific objectives which includes a range from inserting a biometric identification on smartphones to creating payment platforms with biometric technologies. As for recommendations, we suggest that industry stakeholders should:

Store data in personal devices rather than centralized devices: It is recommended to store data in exclusively held; relevant data subjects as encrypt templates in personal devices by providing them with an encryption key. Many problems can get avoided by doing so. It reduces the risk of identity theft and makes sure that re-use of this data is eliminated or at least traceable as it is hard to exploit decentralized data. Sources of biometrics cannot get changed even when there is a technological evolution or information breach. Therefore, the technology should design in a way in which it can renew the identity link or permanently remove it.

The authentication process should be made more transparent: Most of the users do not know when and for what will their biometric data be assessed. Many times, private information of users get tracked without their knowledge which makes the technology less reliable and trustworthy. The user should be informed or asked for consent before using his/her data. (Alliance, n.d.).

Industry constituents should find further uses to the technology: As learned from interviews with professionals, both the interviewees and the team agreed that the biometric technologies should not have boundaries and should motivate professionals to have a broad mind and find new ways of use. There is a great opportunity ahead of biometrics for cashless payments, palm secure is one of the safest forms of biometrics, however, as of now, used for authentication in governments. Governments should think furthermore and innovate their societies by introducing this as a platform for cashless payments.

Users need to be Educated: As mentioned by our factors, many people do not have an explicit knowledge of biometric technologies and the benefits it can provide to their lifestyles. According to the industry professionals interviewed, it is compulsory for companies/governments to make a bond of trust with the users which will ensure a safe environment for the use of biometrics during cashless payments and a harmonious and trustworthy user-experience.

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Discussion on the Development of Technical High School Advertising Design Department Curriculum from the Manpower Requirements of Design Industry

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ABSTRACT

In response to the development of the new global economy, innovation is the only way to create new markets, and design is also the only tool to achieve innovation. In recent years, Taiwan's economy has been facing the problem of being unable to find suitable talents for the industry. Youth unemployment has remained stubbornly high, and it shows that how serious the problem of academic drop is. By using quality research such as literature review, employment market analysis, and research on education site issues, we are looking forward to revising the Advertisement Design Department Curriculum in 12-year National Education in base of the analysis of the quality and quantity of demand for industrial talents.

In Taiwan's "design industry" development trend, a variety of cultural and creative designs, digital contents, designing services are the new blue ocean. The industry category changes from simple design or manufacturing into a package design service. In the next three years, the three major trends of "Rise of China Market", "Brand Development" and "ICT Development" (Information and Communication Technology) will continue to impact the responsiveness and talent demands of the design service industry.

This study aims at the Technical High School Advertising Design Section (hereinafter referred to as the "Advanced Vocational Division"). Through the analysis of the quo of old and new textbooks, the analysis of vocational credits, and the analysis of studies and employment pathways, for the Vocational High Schools with the Advertising Design Section, we make the proposals of curriculum development, implement the educational goals of "spontaneity, interaction, and mutual prosperity" so as to assist students in seamlessly connecting to higher education or employment after graduation, helping students move toward self-fulfilling life.

Keywords: Technical High School, Technical High School Advertising Design Department, Advertising Design Department, Curriculum Development

INTRODUCTION

Education is the best investment. Investing in education means investing in the future of society and the country. (Wu Ching-shan, 2012) Students are the hope of the society. With educating outstanding students, who are able to benefit the society by devoting to social construction and services tomorrow, a beautiful society in the future can be just around the corner. Whether the choice of the path of education is appropriate is relevant to whether the future of the individual is competitive. Vocational High School education plays a very important role in our country's economic growth. In the past, the aim of vocational education was to develop practical talents with the goal of immediate employment. In recent years, with the rapid growth of the economy, industrial structure has changed dramatically. The demand for education reform the demand for social change, the demand from students' parents and the demand for talents in this knowledge economy is valued. Industrial upgrading is also the top priority currently. How to respond to the development trend of the world, no matter it is "the gap between industry and education" or "the gap between the students and the students", technical and vocational education must face a considerable degree of impact and challenge.

Advanced secondary education aims to lay the foundation for academic research or technical know-how. It is the turning point of the future adaptive approach of junior high students. According to the analysis of the Statistics Department of the Ministry of Education, the number of students enrolled in senior high schools is the highest, with 902,554 people, in the 99 academic year. After that, it was reduced by years due to the influence of fewer children. By the 105th school year, it has dropped to 776,000. Compared with the peak of the 99-year, a total of 126,000 people were reduced, and the total dropped by 13.9%. The total number has been reduced by the student source, while the number of

people in various departments and programs is growing, Due to the influence of parents and students' concerning about future employment approach, the basic of the professional group and the characteristics of the general education, and the increase in the chances of further education in colleges and universities, there are different phenomena.

Analyzing the distribution of students in various professional groups in the 105 academic year, the number of students in the technical high school design group has increased. The total number of students enrolled was 28,000, ranking the fourth (the top three were commercial, industrial, and family). Compared with the number of 17,000 in the 97 academic year, it has increased by 37.5%. It is a few groups that the number of students is growing up besides the hospitality class. The reasons analyzed should be the rise of the domestic advertising creative design and multimedia design. Also, the society attaches greater importance to the aesthetic value and the government's emphasis on the cultural and creative industries becomes higher. All these lead to the design innovation of extension product manufacturing and marketing. Therefore, the design industry in our country is in the process of transformation. How to catch up with the development of the advertising creative design industry and how to effectively educate the professionals in the advertising design industry has become an urgent issue in today's advertising design education..

Generally speaking, "design" can be inferred that it is a creative act with purposes, and "Advertising Design" is a creative design which is based on the promotion of commercial activities. In our country, design is broadly divided into 2D graphic design, advertising design, visual communication design and product design in 3D. Most of the Vocational High Schools and the Higher Education Colleges generally set up departments related to commercial design. The number of departments in Vocational High Schools is greater than that in the higher education colleges. Although courses given are similar, the technical college students graduated from vocational high school generally has better basis in technical subjects and also better implementation capacity, while the institute students graduated from senior high school has relatively superior language ability and general education literacy.

In view of the comprehensive promotion of 12 years of national education in the 103 academic year, and in response to the full implementation of the new curriculum in year 108, through various public hearings, the standard curriculum credits was set. The trial conditions of various pilot schools will be released as a pilot case reference given to school curriculum development conference. In accordance with school-based features, industry communities and student career development, schools edit the syllabus and curriculum plans.

Thus, this study, known as " Discussion on the Development of Technical High School Advertising Design Department Curriculum from the Manpower Requirements of Design Industry", not only provides the direction for the Curriculum Development of the Advertising Design Department in vocational schools, but can also be used as a reference for design industry talent planning, or for the basis of further study of the Design Department in technical and professional colleges, in order to achieve the goal of technical high school education.

LITERATURE REVIEW

1. Technology & Vocational Education

In order to distinguish between vocational preparation education in secondary schools and that in colleges, many countries refer to the vocational preparation education provided in secondary schools as "vocational education". The vocational preparation education provided in the technical colleges is called "technical education" (including engineering and technical education). Thus, the technical education and vocational education of these two stages shall be collectively referred to as "technical and vocational education", abbreviated TVE). In response to the promulgation of the "Technical and Vocational Education Act" of January 14, 2014, it is expanded to the scope of "professional awareness" and "professional temptation" in primary and secondary schools (see Article 9 of the Act for details). Therefore, "technical education" is the abbreviation of technical and vocational education. In essence, it includes the engineering technology education in higher education and technical education, and the vocational education in secondary education. In our country, the scope of business of the Technical Department of the Ministry of Education covers arts education programs, practical skills classes, vocational school, two-year college, five-year college, technical institute (including two-year and four-year), University of Technology (including master's degree and Ph. D degree) and so on. (Zhang Ren-jia, For the Title and Positioning of Vocational Education)

2. Technical High School

Its educational goals focuses on industrial development, and strengthen students' expertise and professional competence. It emphasizes on teaching cooperation and practical skills, providing courses based on "general subjects" and "professional subjects and practice courses". It assists students in developing professional practical skills, cultivating professional ethics, enhancing humanities and scientific literacy, creating ability of thinking and adapting to social change. It lays a foundation for career development and enhances the practical power of employment. (Advanced Secondary School Education Act)

3. Advertising Design Department

Teaching practical techniques and basic knowledge about advertising design, cultivating product design and production knowledge related to product promotion and visual communication. Through professional subject learning and technical training, develop a working attitude of integrity, diligence and enthusiasm. To raise humanities and scientific literacy by enriching professional knowledge, enhance the abilities of creative thinking and adapting to social change. Mainly studying the practical techniques related to advertising design to enhance sales, develop product marketing and visual communication, print advertising, media, advertising films and other design and production related know-how. Advertising & Design Science students mentioned in this study are those from public and private high schools in Taiwan with Advertising Design department, and students of the Comprehensive High School Advertising Design Program, excluded students in the night department or the training department.

4. Visual Communication Design

Visual communication, as the name suggests, is a visual approach to communicate. It is a way to transfer readable ideas and information. It is mainly associated with flat images, including logos, fonts, printings, paintings, graphic designs, illustrations, color schemes and electronic materials. Visual communication relies entirely on visual images, and the form of communication is the visual effect. Visual communication also allows us to start thinking, and it visualized messages with text are more powerful than education and persuasion.

5. Professional Competency

Specifically, professional competence is the professionalism that a technical personnel should possess, including professional knowledge, professional skills and professional attitude. Butler (1978) considered that professional competence is the knowledge, skills, and attitudes required to complete the job in an individual's professional career. Every worker is working hard to develop his professional skills, starting with the most basic work, and then to process improvement, method innovation. The last but not the least, to achieve a highly competitive individual, and fulfill unique results.

6. career development

Career development focuses on individual's career awareness, career choice, career preparation, employment placement and the process of continuing development on the job. Therefore, career counseling includes personal career awareness, career exploratory, career preparation and placement. Simply speaking, career development is a lifelong work experience. Career awareness, occurs before the age of 10-12, that is at the primary stage. Career exploration occurs at the secondary stage. And the career preparation takes place in high school level or the college stage. (Higher Education Job Newsletter No.80, taken from August 2013)

7. Curriculum and Curriculum Development

- (1) Course: Students' learning experiences, learning activities, subjects, knowledge learned, contents learned, learning results, the productions after learning, or related learning plans, are likely to be called the "courses." (Wu Ching-Shan. 2002)
- (2) Curriculum development: Beach and Reinhartz (1989) believe that curriculum development is divided into the process and the content. The process involves curriculum planning, curriculum implementation and curriculum evaluation. The course development is a process of continuous improvement. As to the content, it involves the structure of curriculum, the organization of curriculum, the selection of teaching materials, the teaching methods and so on. Since this study was applied after the implementation of the new curriculum of the 12-year National Education, each school will practice according to the needs of the characteristics of each school. Therefore, in this study, curriculum development is defined as, under the authorization of national and local governments, the school curriculum planning according to administrative organization of each school, including school-based curriculum development, curriculum

decisions, the selection of textbooks, evaluation and so on.

DISCUSSION ON THE CURRENT SITUATION OF THE TECHNICAL DESIGN COURSE OF THE HIGH SCHOOL

I. Analysis of education policy

- (1) According to the "Technical and Vocational Education Act" promulgated by the President on January 14, 2015, particularly emphasizes that the competent educational authorities at all levels should make the vocational education rooted down, technical and vocational education curriculum convergence mechanism, strengthen practical teaching ability of teachers in vocational schools, and shorten the drop in learning. Thus, the goal of technical high school education is to teach professional knowledge, cultivate professional ethics, cultivate practical technical talents, and lay the foundation for career development. Cultivate the ability of professional work and cultivate professionalism, responsible and enterprising work attitude. Enhance humanities as well as science and technology literacy, enhance the ability to create ideas and adapt to social changes, cultivate an interest and ability to pursue further studies, in order to lay the basis for their career development.
- (2) According to Senior Secondary Education Act, Technical High School is clearly designated as one of the main types of schools. It also stipulates that classification should be established, grouped according to categories, and set up under the group to match the national construction, conform to the social industry, fit the professional group attributes and students career development.
- (3) The Ministry of Education promoted the three-phase technical education re-engineering plan in 1999, 103 and 107 years respectively. The bottom plan, which is to promote the technical and vocational education thoroughly, focuses on the link between vocational, technical professional schools and the industry. It considers "to achieve that students graduated from a vocational college, technical school have the ability to get immediate employment", "to fully provide the high-quality technical manpower needed for industrial development", "to change the view of society on vocational education" to be the three objectives. Multi-faceted adjustment to vocational education in out country, return to the pragmatic direction and respond to industrial restructuring and economic development, and cultivate the technical talents needed by the country.

2. The goal of the 12-year National Education High School Curriculum Outline (hereinafter referred to as the 108-year program)

(1) Targeting the policy objectives of the new curriculum

In addition to the establishment of core literacy, there are three spindles in professional curriculum planning. The first spindle is student subject - to deepen learning motivation and employment competitiveness, the second spindle is suitable for training – to respond for the spirit of 12-year national basic education, and the third spindle is career preparation – to be in line with the development of the social context and international trends. Strengthen the characteristics to be practical, implement the curriculum coherences, deepen the basic functions, in order to meet the difference in demand. Planning skills course, each section can correspond to one to three occupations. Strengthen the skill areas, emphasis on curriculum and professional ability orientation, strengthen students' skill level. (Song Xiu-de, 2015).

(2) Design groups and advertising design department of education goals

For design group education, students should have the common core competence of design group, and lay the foundation for learning related fields of professional training or a higher level of professional knowledge. A junior technical staff who is well trained in design related industries can work in the design field such as advertising, packaging, display, editing, printing, media, products, furniture, crafts and interior design. The goals in the Advertising Design Division are to foster grassroots designers or advertising design. Teaching practical techniques and basic knowledge about advertising design, cultivate product design and production knowledge related to product promotion and visual communication, and cultivate a work attitude that fosters integrity, diligence and enthusiasm.

(3) Analysis of the 108-year curriculum of the Higher Vocational Advertising Design Division

- a. The Ministry of Education requirements of compulsory: 45-53 credits. In addition to 28-36 credits of basic literacy of design group, 17 credits of the required professional skills

- graphic design and digital audio and video skills should be added.
- b. Each school has its own compulsory or elective: Among 61-81 credits including thematic production, each school is required to set the necessary general subjects or professional academic subjects according to the school-based characteristics. Depending on the implementation of the pre-school, there should be 2/3 of the courses as a professional academic or license course to enhance skills development.
 - c. Graduation qualification: Technical high school students graduate with credits of 160 credits, 111-129 credits are required for all compulsory subjects, and at least 85% pass before they may graduate. In order to strengthen the professional ability and the development of the student's career, including 2-6 credits for project implementation, students must have at least 80 credits and above for majors and practice subjects for graduation qualification. Among them, at least 60 credits in passing, with internship (experiments and practice) subjects at least 30 credits or more.
 - d. Teaching objectives: Develop a three-year complete course in each subject according to the 12-year National Basic Education Curriculum Outline and the teaching subjects and credits. The Advertising Design Division is to teach students the practical skills and basic knowledge about Advertising Design. Its teaching goals are to teach practical skills and basic knowledge about advertising design, develop design and production knowledge related to product promotion and visual communication, and cultivate a honest, diligent (Ministry of Education, 2017). and enthusiastic working attitude.

ADVERTISING DESIGN STUDENTS STUDY STATUS

Affected by domestic social environment changes, from the 101 academic year to the 105 academic year, the number of colleges and universities has been reduced from 162 to 158 schools. Advertising Design Division in Vocational Schools is one of the Vocational Education Departments. After entering the University, the Department of Visual Communication Design, with the Department of Architecture and Design, serves as the foundation of technical education.

The number of high schools with professional groups grows from 256 to 257. The number of comprehensive high schools has been reduced from 107 to 95. The number of high schools with academic departments has grown from 366 to 371 in the 103-105 academic year. The number of the courses of practical skills has been reduced from 139 to 130 (see Table 1)

Table 1. Statistics from the 101st school year to the 105th school year

school year School system	101	102	103	104	105
College college	162	161	159	158	158
Professional group (vocational)	155	155	256	257	257
Comprehensive high school	111	111	107	102	95
Senior secondary school			503	506	506
General			366	372	371
Practical skills course			139	134	130

Source: Organized from the Ministry of Education and Statistics Department

Today, vocational schools in Taiwan (now to be known as technical high schools) have six categories, it can be subdivided into 15 groups and 91 subjects. Organized together with Medical Technology and Nursing groups in 5-year junior colleges, we can classify the occupational groups into seven families: Industrial (Mechanical Engineering Group, Dynamic Mechanical Engineering Group, Electrical and Electronic Engineering Group, Chemical Engineering Group, Civil Engineering and Architecture Group); Agriculture (Agricultural Group and Food Science Group); Marine Technology and Fishery (Marine Technology Group and Fishery Group); Commerce (Commerce and Management Group, Foreign Language Group, Design Group); Home Economics (Home Economics Group and Hospitality Group), Art (Art Group), Medical technology and Nursing (Dept. of Nursing, Dept. of

Medical Laboratory, Dept. of Optometry, Dept. of Dental Technology, Dept. of Caring Service, etc.). Compared with the vocational education systems of major countries in the world, the vocational education system in Taiwan can be considered quite complete.

The Dept. of Advertising Design referred to in this research is based on the classification of schools in the Group Science Center of the Ministry of Education. According to the website statistics of the Technical Vocational High School, the Comprehensive High School, and the Technical High School practical skills course, a total of 70 public and private high schools across the country have Advertising Design Departments (excluding the further training schools) (See Table 2).

Table 2. Statistical Table of the Advertising Design Departments of Taiwan's Public and Private Vocational High Schools in the 105th Academic Year

Difference	County	Schools
Northern	Taipei, New Taipei City, Keelung City, Taoyuan City, Hsinchu County, and Miasu County	29
Central	Taichung City, Changhua County, Nantou County, Yunlin County, Chiayi County	21
Southern	Tainan City, Kaohsiung City, Pingtung County	18
East	Yilan County, Hualien County, Taitung County	2
Outlying Islands	Jinmen County, Lianjiang County, Wuhu County	0
Total		70

Source: This study was organized by the Design Group Center (2016)

ADVERTISING DESIGN TALENT INDUSTRY DEMAND

1. Labor policy analysis

According to the survey of talent supply and demand of key industry carried out by the Ministry of Economic Affairs Industry Bureau in 2017-2019, design services are a wide range. According to the "Taiwan Design Industry Soaring Plan" of the Industrial Bureau of the Ministry of Economic Affairs, the Design Services industry is mainly for the following three categories:

- (1) Product design: Product design planning, product design, institutional design, prototype and model making, as well as other specialized design services, including fashion design, furniture and more.
- (2) Visual communication design: CIS companies identify system design, brand image design, graphic design, advertising design, web multimedia design.
- (3) Design brand fashion category (package design): Industrial packaging design, commercial packaging design.

According to the classification of Taiwan's cultural and creative industry development annual report, those engaged in product design planning, product design, structural design, prototype and model making, popular design, patent and trademark design, brand visual design, visual design, packaging design, multimedia web design, design consultants and other industries all belong to it. In recent years, in response to the information society, in addition to constantly replace the old equipments continue, the Advertising Design Division also procures computer-related equipment for use in the Design Industry. It makes the skills that students acquire in school be linked to the future work environment.

2. Employment status survey

A statistics of the recruitment needs for the Advertising Design related industry, released by four major cyber manpower banks – 104, 1111, Yes123 and 518 on December 25, 2006 showed that, there are many job requirements in graphic design / art editors, web designers, commercial design, advertising design, multimedia animation designer and packaging design, and they are mainly for practical application. The data shows that Taiwan is dominated by small and medium enterprises. (See Table 3).

Table 3. Employment requirements of relevant industries in the Advertising Design Division

Unit demand	staff needs			
	104	1111	518	YES123
Graphic design /art editor personnel	3151 people	1964 people	795 people	492 people
Web Designer	2188 people	800 people	204 people	193 people

Professional	Unit demand	staff needs		
	104	1111	518	YES123
Commercial design	1495 people	465 people	76 people	100 people
Advertising design	1072 people	471 people	300 people	134 people
Multimedia animation designer	994 people	281 people	96 people	52 people
Packaging design	425 people	180 people	46 people	49 people

Source: four Internet Job Bank Recruitment, finishing the present study (2017.12)

3. Employment market analysis

According to Cheers magazine (No.184, 2016.01) , analyzing from the questionnaire of “Corporate Human Resource managers”, the development trend of Taiwan’s Design Industry and the competition that practitioners should face in the next three years, in terms of market changes, a variety of cultural and creative design, digital content, design service is the new blue ocean. The industry category transfers from simple design or manufacturing into a thorough design service industry. In the next three years, the three major trends of the rise of the China market, brand development and the ICT development (Information and Communication Technology) will continue to impact the response measures and talent needs of the Design Service Industry.

All of the above industries need planning talents and design talents to input product, service content elements of the idea and production. Also, the digital content industry, due to responding to business opportunities in micro applications, such as mobile video and mobile games, need game, digital teaching designers, screenwriters, directors and other planning talents. In the trend of social economy and e-commerce, the Design Services Industry needs visual communication design talents to involve in a multimedia application design project that combines APP and website development. At the same time, the market demand for the smart handheld devices continues to be strong, the industrial design talents are also needed to develop products that conform to fashion trends.

According to the above analysis of industrial talent needs, and in accordance with the Ministry of Economic Affairs Industrial Bureau 2017-2019, the major industry talent supply and demand survey design service report, the employment expertise in the above categories, the development of the core competence of the students of the Advertising Design Division should be the educational goals of cultivating creative design talents with ability of Visual Communication Design and Digital Content Service.

TO INVESTIGATE THE CAUSE OF INDUSTRY-ACADEMIA GAP

To present the relationship between the labour market and the school education system, researchers cited European Training Foundation (2000) model of the interface, as an illustration of the architecture discussion.

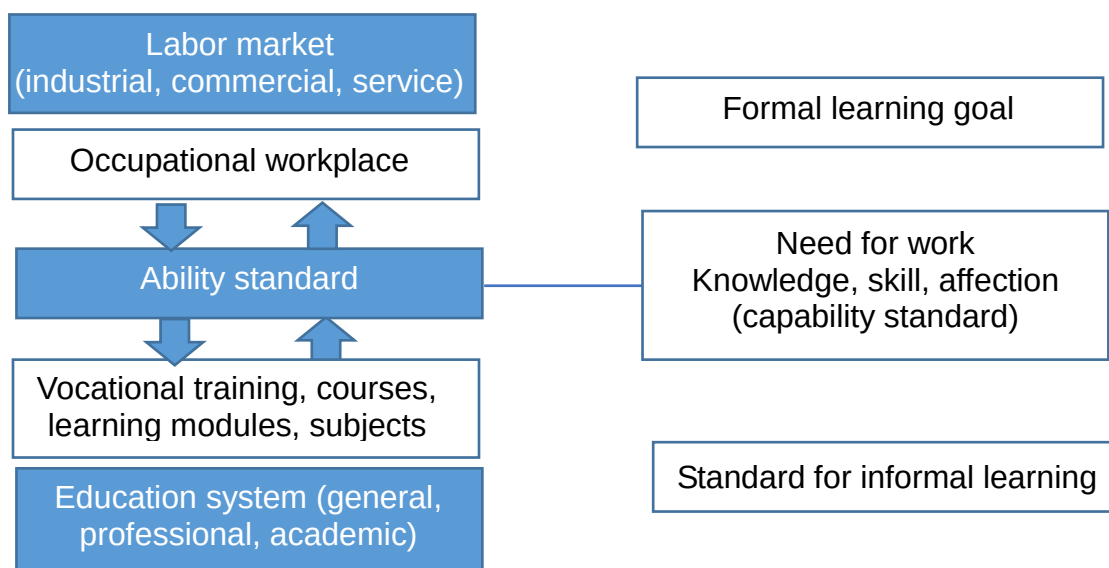


Figure 1. The competency standard is the interface between the market and the education system.

Source: European Training Foundation (2000)

For the study of the gap between industry and education, according to Figure 1, there are several interfaces to be effectively connected. The relevant literatures have explored their professional competence or technical traits from various industries (Gao Chen-min, 2003; Wang Shu-zhen, 2005; Xu Dao-yi, 2006), or explored the direction of talent cultivation from the policy perspective (Yang Yun-zhe, 2002; Luo Yun, 2006). How to match the supply and demand of the design service industry, lower the industry-academia gap with training, depends on the development of a common and feasible model of "professional competence indicators". From the connotation of reliability and validity of the output of the industry, establishing the interface between supply and demand of talents in Design Service Industry and providing the talent training units or schools with appropriate curriculum and teaching environment ensure that students receive a modest education. To reduce both supply and demand gap and to make it more reflective, cutting in from the competency standard is one of the best ways (Tian Zhen-rong, 2006).

In addition, in the past, family had a great influence on the development of children, especially the behaviors and values of parents. Parents' occupations were the factor that directly affected the child's career value. It was said that students who went to vocational schools were those who couldn't study well, so most of the vocational school students were directly involved in the workplace after graduation. Today, due to the education policy, the social and the structural change, the factors such as fewer children, the post-graduate learning style of vocational school students has been transformed into a new trend of keeping studying and continuing to go further study. It becomes very different from the goals of the technical and vocational education that is to cultivate professionals. It not only confuses the professional values of vocational students, but also affects the normal teaching of vocational schools.

All in all, The market for commercial design or advertising design is still biased towards the technical level. Traditionally, the solid technical training of the Advertising & Design Science students has been affirmed, but now it has suffered from the impact of globalization. From the perspective of demand for industrial change, cognition of new and old educational concepts, and distribution of educational resources, the design services industry should be committed to the research gap. Among them, guiding students to choose career development is particularly important. Apart from the need for industry to set functional standards, the educational authorities and the school administrative units should carefully consider the school-based characteristics and community-based development of the Advertising Design Department, understand the needs of the social environment, cultivate the vocational students to become the talents used by the society. It can not only increase the use of human resources, but also reduces the problem of youth unemployment in the society.

CONCLUSION AND SUGESTION

This study explores the educational goals, curriculum development, total enrollment trends, and other analysis of the Advertising Design Section of the Technical High School from the 12-year National Education. In terms of the technical education goals, it encourages continuing education to the Dept. of Visual Communication Design in the Architecture and Design Group in the tertiary institutions, or to immediately hire to the actual job position of the design service industry. In addition, according to the researcher's long-term experience in the design industry and research in the educational field, analyze as follows:

The conclusions of this study are as follows:

1. The number of schools at all levels which provide the Advertising Design Department and the number of students do not decrease because of the impact of low birth rate but is growing. Also, the employment demand of related industries also shows the phenomenon of insufficient supply.
2. For the design industry requirements, graphic design or art personnel, web designers, commercial design, advertising designers are the highest employment of the first four. The use of software tools and E-pages are common needs of job competencies across jobs.
3. Most of the Advertising Design division in technical high schools belongs to the stage of career development. It is also an extended education for vocational education in the junior high schools. Because of the popularity of higher education in Taiwan, most senior high school students aim to go to college. Therefore, college educators or industrial employers generally believe that it is of great significance to develop the career development of students in higher vocational education.

In this study, recommendations are as follow:

1. Through the learning of art, one of the eight fields in the new curriculum of the 12-year National Education, it is recommended that there should be a total of 432 study hours, of a total of 24 credits

in 12 years in this field. Graphic design, cultural and creative goods, applied arts, and others should be added to be the experiential learning, in order to make even general high school students prepare for going to the related departments in universities. If you consider the students after graduation in junior high school can have advertising design, commercial design and other professional aptitudes, it can also achieve the purpose of appropriate learning.

2. For the technical high school advertising design division, in addition to the traditional grounded foundation course, in response to the widespread use of informational applications, the basic knowledge of future industries such as "digital content", "ICT development" and "brand marketing" is suggested that early integrate into the necessary school-based curriculum, through the 108 curriculum revision or implementation.
3. Advertising design teachers should learn from the job market, enhance the literacy required in the related industries, including professional knowledge, skills and attitudes. Through the design of teaching plan of industry-school connection or industry-school cooperation, assist students in preparing for career development, in order to reduce the gap between "industry demand" and "school education".

It is suggested that future research should be conducted to develop a continuous curriculum for Advertising Design in technical high schools, taking into account the competencies required for further studies and employment, as the basis of course content outline.

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