MODESTUM
OPEN ACCESS

EURASIA J Math Sci and Tech Ed, 2018, 14(5), 1945-1962
ISSN:1305-8223 (online) 1305-8215 (print)
Research Paper https://doi.org/10.29333/ejmste/83608

Exploring the Most Decisive Online Education Determinants as Impacted by Taiwan's New Southbound Policy

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Received 8 November 2017 ▪ Revised 12 December 2017 ▪ Accepted 18 January 2018

ABSTRACT

This research cross-employed the Factor Analysis (FA) approach and the Entropy Compared Analysis (ECA) model of quantitative analysis and the fuzzy set Qualitative Comparative Analysis (fsQCA) method of qualitative analysis to creatively pioneer the most effective and efficient Comprehensive Online Education Competitive Evaluation Model (COECEM). This was done in order to conduce the most Valuable Online Education Determinants (VOED) for exploring the most decisive online education determinants of sustainable strategy in the New Southbound Policy introduced in Taiwan. The most valuable findings are that "Keyword-search Engine (KE) and Web 3.0 (W3) of core factors of Social Media Technology (SMT)" and "feedback technology function (FTF) and Course Complete Rate (CCR) of critical factors of Massive Open Online Course (MOOCs)" directly and inductively influence "Teaching Resource Distribution Administrative Consensus (TRDAC) of Resource Satisfaction Competency (RSC)". The reason is that feedback technology function and course completion rate with keyword-search engine and Web 3.0 in online education technological supporting in taking online education courses are the most considered key factors during corporate employees selecting online education MOOCs for higher education institutes sustainable operation in support of the New Southbound Policy.

Keywords: higher education student studying interests (HESSI), corporate employee on-the-job participated desires (CEOTPD), higher education institute sustainable development strategy (HEOSDS)

INTRODUCTION

After the worldwide financial crisis in 2008, the economy of the Asia Pacific regional economy has become the most decisive engineer in driving the worldwide macroeconomy (Hsieh, 2012). In order to promote macroeconomic integration, a majority of Asian nations have commenced to make diversified trade agreements for organization of the Free Trade Area of the Asia Pacific (FTAAP) and these trade agreements include the World Trade Organization (WTO), Trans-Pacific Partnership (TPP), Regional Comprehensive Economic Partnership (RCEP), Economic Cooperation Agreement (ECA), Asia-Pacific Economic Cooperation (APEC), Agreement between Singapore and the Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu on Economic Partnership (ASTEP), Agreement between New Zealand and the Separate Customs Territory of Taiwan, Penghu, Kinmen, and Matsu on Economic Cooperation (ANZTEC). However, taking the culture, language, and market scale into consideration, the majority of Taiwanese companies selected China to be a branch location in order to minimize operation expenditures specifically in manpower capital. Significantly, the majority of Taiwanese companies operating in China has suffered the external issues such as political standpoint difference and has confronted many potential issues based on the political standpoint differences between Taiwan and China. In recent years, the Taiwanese government issued "The Southbound Policy" to be the most critical economic, diplomatic and educational developed plan in order to decrease the country's dependence on China and lessen China's diplomatic and economic effects on the majority of Taiwanese investors and international companies. Beyond party alternation in 2016, the new Taiwanese government has issued the enhancing Southern Economic Cooperation Guiding Principle

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Contribution of this paper to the literature

- The autocorrelationships among large-scale 200 students interviewed and expert's weighted questionnaires were systematically and hierarchically testified to empirically and efficiently fulfill corporate manpower demands.
- The most valuable finding is that "keyword-search engine (KE) and Web 3.0 (W3) of core factors of social media technology (SMT)" and "feedback technology function (FTF) and course complete rate (CCR) of critical factors of Massive Open Online Course (MOOCs)" directly and inductively influence "teaching resource distribution administrative consensus (TRDAC) of resource satisfaction competency (RSC)".

Table 1. The fourth Strategy of the seventh "Enhancing economic and trade cooperation guide

Items	Concrete Implementation	Quantified and qualified Indicators	Responsible Government Institutes	Target Nations
Enhance Education Cooperation	Arise the Taiwanese recognition regarding each nation in Southeast Asia	Implementing Emerald Initiative Program: 1.Inviting professionals from Southeast Asia to come to Taiwan in order to add cooperative opportunity every year 2.Holding the six results of published events of education and culture exchange activity (Ministry of Culture) 3.Offering grants to handling diversified culture learning activity and the study of native language studying in 696 Taiwanese education institutes for new immigrant residents from Southeast Asia 4. Organizing diversified cultural activities, including delicacy food competitions for predicted 3,000 new immigrant residents from Southeast Asia 5.Implementing "New Immigrant Residents Native Language Teaching program" through numerous new immigrant residents for training 600 new immigrant residents from Southeast Asia in order to enhance Taiwanese manpower of national competition 6. Hosting the employment forum to provide interactive platforms for 300 second generation of Taiwanese new immigrant residents from Southeast Asia (Interior Ministry) 7. Holding 10 forums to promote Taiwanese trade cooperation with each nation of Southeast Asia in each new media (Ministry of Economic Affairs)	Ministry of Culture; Interior Ministry; Ministry of Economic Affairs	Each nation in Southeast Asia
	Designing classes in order to advance the Taiwanese recognition regarding each nation in Southeast Asia	1. Encouraging each education institute to set up the Southeast Asia language and culture classes through various aggressive propaganda conferences. 2. Counseling and offering grants to each Taiwanese city and county to open relative classes in new immigrants centers regarding Southeast Asian culture and the total number of handling up to 50 events and classes in 28 new immigrant centers from 2014 to 2016	Ministry of Education	Vietnam, Indonesia, Thailand, Myanmar, Cambodia, Philippines

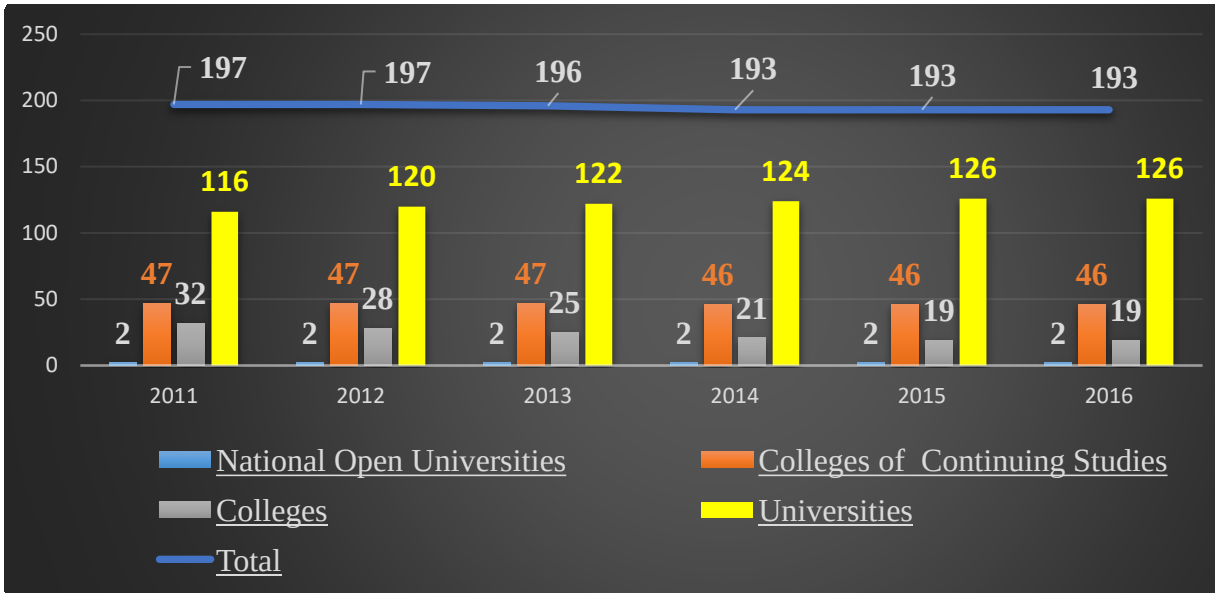
Source: The fourth Strategy of "Enhancing economic and trade cooperation guide principles" of "Southbound Policy"

of "New Southbound Policy" to extensively and aggressively enhance cooperation with other nations (including Singapore, Myanmar, Philippines, Malaysia, Indonesia, Thailand, Vietnam) in Southeast Asia to effectively decrease Taiwanese companies dependence on Chinese labor in order to solve the rapid increase of corporate operational expenditures as a result of the increasing labor costs in China. As a result, the majority of Taiwanese companies have commenced to transfer their businesses from China to these nations in Southeast Asia that, in spite of racial background differences, have resulted in many issues like the obstacle in different language systems, customs barriers in cultural exchange, employee's competency disorder in education system disturbance, staff's insufficiency in information technology training (Hsieh, 2014) and so forth. In order to surmount these obstacles in running businesses in each nation in Southeast Asia, the Taiwanese government has adopted the "cross-ministry" methods to integrate each ministry's resources and features to institute a series of regulations, rules, and guiding principles in order to assist the majority of Taiwanese companies in South Asia. In connection to overcome the most essential manpower issues, the fourth strategy of the seventh "Enhancing economic and trade cooperation guide principles" of the "New Southbound Policy" focused on "the connection of education and culture among each nation in Southern Asia" to advance labor cooperation for discovering the best solutions for managerial and administrative shortages in human resources. The political details of this fourth strategy are described in **Table 1**.

Table 1 (continued). The fourth Strategy of the seventh "Enhancing economic and trade cooperation guide

Items	Concrete Implement	Quantified and qualified Indicators	Responsible Government Institutes	Target Nations
Enhance Education Cooperation	Promoting Chinese teachers to go to Southeast Asia for education and cultural exchange	Selecting three Chinese-lecturing teachers and eighteen Chinese-teaching assistants to go to Thailand, seventeen Chinese-lecturer to go to Vietnam and one Chinese-lecturer to go to Indonesia	Ministry of Education; Ministry of Education overseas embassies; Ministry of Foreign Affairs overseas embassies	Singapore, Myanmar, Philippines, Malaysia, Indonesia, Thailand, Vietnam
	Strengthening effectiveness of Taiwanese education exhibition and higher education forum	1. Handling 10 Taiwanese education exhibitions or recruiting propaganda seminars in oversee 2. Holding one education forum in Thailand in 2014, one in Indonesia in 2015, one in Vietnam in 2016	Ministry of Education; Ministry of Education overseas embassie; Ministry of Foreign Affairs overseas embassie	Singapore, Myanmar, Philippines, Malaysia, Indonesia, Thailand, Vietnam
	Fulfilling Taiwanese teachers' professionals and learning environment in English teaching in order to attract overseas students to study in Taiwan	1. Increasing 10% of learning credits and 5% of studying classes in English-teaching courses 2. Increasing 1% of the total number of students taking English-teaching courses 3. Reaching 90% of the total English literature course in English-teaching 4. Setting up English-teaching professional park or one education institute for providing international studying courses 5. Reaching 98% passing rate of English evaluation test in college and university recruitment examination 6. Increasing 3% passing rate of CEFR (Common European Framework of Reference for Languages: Learning, Teaching, Assessment) at B1 level for college or university students. 7. Achieving 97% passing rate for the graduation condition of each student in the entire Taiwanese colleges and universities 8. Hosting the evaluation of collaborating-colleague workshops in the English-teaching resource centers in order to provide the in-working-training opportunities for education institutes in Taiwanese North, middle and South sectors 9. Increasing 3% passing rate of CEFR (Common European Framework of Reference for Languages: Learning, Teaching, Assessment) at A2 level for college or university students	Ministry of Education Ministry of Education overseas embassie; Ministry of Foreign Affairs overseas embassie; Overseas Community Affairs Council	Singapore, Myanmar, Philippines, Malaysia, Indonesia, Thailand, Vietnam
	Promoting internship opportunities for graduated oversees students in order to attract them to work in Taiwan companies	1.Assisting the internship applications of overseas students to be of up to 60 cases 2. Encouraging overseas students to register in the "HiRecruit Talent Websites of Ministry of Economic Affairs in order to increase the talent matchmaking opportunity with Taiwanese companies (Ministry of Education) 3. Researching and coordinating relative ministries for promoting value-added policies for overseas students (Overseas Community Affairs Council) 4. Reviewing and adjusting the regulations of staying and working in Taiwanese for overseas students (Ministry of Labor)	Ministry of Education; Ministry of Education overseas embassie; Ministry of Foreign Affairs overseas embassie; Overseas Community Affairs Council; Ministry of Labor	Singapore, Myanmar, Philippines, Malaysia, Indonesia, Thailand, Vietnam
	Relaxing restrictions of recruiting conditions and quantity for oversees students in Southeast Asia	Reviewing restrictions of recruiting conditions and adding the 10 % of original recruiting quantity for overseas students in Southeast Asia	Ministry of Education; Overseas Community Affairs Council	Singapore, Myanmar, Philippines, Malaysia, Indonesia, Thailand, Vietnam
	Promoting the student's exchange program in order to form the cooperative bridge among nations in Southeast Asia	1. Handling over one class, empirical a seeded teacher program that invites 10 overseas students from 5 nations in Southeast Asia 2. Arranging the suitable training classes including empirical corporate visits and off-site training in order to raise cultural exchange and national diplomacy. (Ministry of Education) 3. Organizing the official alumni association of overseas students of Southeast Asia in order to increase the Taiwanese coherence. (Ministry of Education) 4. Strengthening the connection with the official alumni association in order to encourage the exchange of each business activity among the people and government. (Ministry of Foreign Affairs; Ministry of Education overseas embassies)	Ministry of Education; Ministry of Education overseas embassies; Ministry of Foreign Affairs; Ministry of Economic Affairs; Overseas Community Affairs Council	Singapore, Myanmar, Philippines, Malaysia, Indonesia, Thailand, Vietnam

Source: The fourth Strategy of "Enhancing economic and trade cooperation guide principles" of "Southbound Policy"



Resource: Ministry of Education, Taiwanese Executive Yuan

Figure 1. Overview of current Taiwanese HE institutes from 2011 to 2016

In connection to resource demands and necessaries of the fourth Strategy of the seventh "Enhancing economic and trade cooperation principles" of the "New Southbound Policy", the Ministry of Education, Taiwanese Executive Yuan has started to utilize these Taiwanese rich in Higher Education (HE) resource to variously institute online education development policies and grant regulations to provide the powerfully education resources for the majority of Taiwanese companies in Southeast Asia. In view of the rich Taiwanese HE institutes, it was up to 197 HE institutes from 2011. Theses Taiwanese HE institutes, in 2016, included 2 national open universities, 46 colleges of continuing studies, 19 colleges, 126 universities in 2016 (as described in **Figure 1**).

Up to the present, with reference to the swift development and popularization of IT, wireless transmission and telecommunication technologies, the Ministry of Education and Ministry of Economic Affairs, Taiwanese Executive Yuan has effectively and systematically constructed main online education websites to openly provide a series of professional courses and training programs for not only HE students but also corporate employees as well as public people in Taiwan. These online education websites definitely include the small and medium enterprises learning website ("Smelearning") and the industry-university cooperation talent training information website ("IUCTTI") of commercial pursuits (as expressed in **Table 2**).

Subsequently, the majority of HE students only not one-way surf and download public up-to-date news and knowledge but they can also two-way share and upload private messages and information from various websites at anytime and anywhere through various Computer, Communication and Consumer Electronics ("3C") devices with Information Technology ("IT") functional services (Liyanagunawardena, 2012), such as notebooks, tablets, smart phones and so on. This makes each course attendant not only able to be a single learner but also to be an educator by providing their own personal experience and professional knowledge in online education courses without the geographic and time limitations of traditional face-to-face educational institutes. Furthermore, as for education-cost structures of online education, its digital technological system costs are definitely lower than the traditional face-to-face teaching system because not only online education can provide as much as to higher-education students at the same time through IT internet without time and space restrictions (Martin, 2012). The online education system is repeatable for these students but also these students are further able to save a series of educational expenses, such as transportation fee. The online education system is easy to create the most marginal profits by means of minimization of the relative costs and expenditures for each Taiwanese HE institute in this lowest-birth-rate and hyper-dynamic-competitive era. Therefore, ***"how to provide the most high-quality online education courses to directly stimulate the highest education studying interests"*** (Kirkwood, 2010) ; ***"how to offer the most effective digital on-the-job training programs to drive corporate employee's learning desires"*** (Bull, 2012) and ***"how to supply the most effective and efficient online education and websites to aggressively construct the most synergic sustainable development strategy and policy for higher education"*** (Kirkwood, 2010) have been the research mainstream in this research project to induce the most valuable and contributing solution for achieving the research topic (as demonstrated in **Figure 2**)

Table 2. Summary of current Taiwanese online education websites

Attributes	Taiwanese Massive Open Online Courses ("MOOCs")	Brief Description
commercial pursuits	Smelearning (https://www.smelearning.org.tw/)	Smelearning was founded from the online education website of "Promoting small and medium enterprise online education program" of "Small and Medium Enterprise Administration" of "Ministry of Economy Affairs". Momentously, Smelearning was established for constructing a high quality online education environment and stimulating participant's learning motivation in order to drive the corporate employee's learning behaviors of lifelong education through the integration of concrete and abstract learning methods and record-passport. Subsequently, Smelearning covers the main six learning dimensions: young entrepreneurship learning assessment, the previous preparation learning for job search and posts, knowledge learning advance for various industrial practitioners, talent learning training for diversified companies and self-learning courses for SOHO (small office home office) group.
	IUCTTI (http://hrd.college.itri.org.tw/coedu/)	IUCCTTI was resulted from the industrial professionals' promoting program of Industrial Development Bureau and Industrial Technology Research Institute, Ministry of Economic Affairs in order to create an interactive platform between academic institutes and empirical companies because the talent employee development is the most critical factor in industrial competition. The main goal of IUCCTTI is to assist Taiwan companies to obtain the industry-university cooperation talent training information in order to fulfill the professional training integrity. The most essential feature of IUCCTTI is not only to provide in-working-training programs and self-learning courses but also offer a comprehensive mature platform for Taiwanese industry-university cooperative development.

Figure 2. The main concept

Significantly, there is a lack of accurate research to be able to vigorously manifest the correlationship among HESSI in sight of empirical conditions among HE student digital effections, CEOTPD in view of corporate digital on-the-job digital training demands and HEOSDS in terms of HE institute sustainable development requirement under the lowest birth-rate pressure in Taiwan Hsieh (2016a). Hence, in response to these research questions, not only the factor analysis ("FA") approach and entropy compared assessed ("ECA") model of qualitative analysis of multiple criteria decision making ("MCDM") methodology but also research concept, theories and methodologies regarding technological education from the extension of online education research results of Hsieh (2016b, 2017), are systematically and extensively cross-employed, deeply discussed, hierarchically testified and comprehensively induced the best solution of this research topic for the majority of academic HE students, empirical corporate on-the-job training employees and the general public. Subsequently, in terms of the rapid development and popularization of IT, wireless transmission and telecommunication technologies for online education comprehends the digital support for the digital technological features of voting, scaling, hypertext (relationship analysis), visualization, and the structuring of collaborative communication protocols (for example, Roberts Rules of Order in 1876), and the structuring, filtering, and organization of collaborative discourse content (Hsieh & Chan, 2016). These digital technological features can be used in the following manners (Bennett & Maton, 2010): "(1) voting to direct or focus the discussion on areas of group differences and to allow for dynamic (ongoing) changes in

evaluation of contributed material; (2) scaling to promote collective understanding of the group's views, degrees of agreement, and shared meanings; (3) hypertext (the two-way linking and typing of both links and nodes) to allow the construction and expression of complex relationship structures and individual and collective cognitive maps; (4) visualization to develop the functional equivalent of the periodic table of the elements for all other fields of human endeavors; (5) communication protocol structuring to allow for equality of participation by type of communications structuring; and (6) content structuring to allow asynchronous contributions to be automatically categorized and organized and to facilitate individual problem solving within a group process. (Bennett, Maton, & Kervin, 2008)." In response to these digital technological features, the most critical principles of social media technology ("SMT") are considered as the evaluated criteria to appraise HESSI in sight of empirical condition among HE student digital effections and furthermore, these appraised criteria are "application programming interface ("API"); content reality ("CR"); conversations feature ("CF"); device accessibility ("DA"); identity features ("IF"); individual social features ("ISF"); keyword-search engine ("KE"); multiple device accessibility ("MDA"); social networking communication channel ("SNCC") and Web 3.0 (W3)" (Hsieh, 2016). Otherwise, not only the bulk of companies want to productively reduce the operation expenditures and expenses on on-the-job of human resource management but also each employee is willing to pursue their further education, these public and open online education courses have become the most beneficial selection for corporate on-the-job training program and employee individual studying desires on the job. Significantly, Massive Open Online Course ("MOOCs") has been streammain digital studying and learning courses on public and open online education systems. Hence, in view of the complete acquirement and learning efficiency of corporate employee on-the-job training, the most potential features of MOOCs are deemed as the evaluated criteria to assess CEOTPD in view of corporate digital on-the-job digital training demands and then, these assessed criteria are: "the user completely unrestricted operation ("UCUO"), convenience ("C"), connectionization ("CZ"), openness ("O") and course complete rate ("CCR"), feedback technology function ("FTF"), course evaluation technology function ("CETF"), aggregation technology function ("ATF"), course professionalization technology function ("CPTF") and re-purposing technology function ("RTF")" (Hsieh, 2016). Particularly, in order to effectively confront the most serious predicament of the highest living expenses and lowest birth-rate dual pressures, the most decisive operation capital for the sustainable development strategy of each HE institute is the capability and competence of each HE faculty (Barth, Godemann, Rieckmann, & Stoltenberg, 2007) and hence, the capability and competence of each HE faculty are comprehensively pondered as the evaluated criteria to assay HEOSDS in terms of HE institute sustainable development for New Southbound Policy requirements (as referred to **Table 1**). As a result, these assayed criteria are "teaching resource distribution administrative consensus ("TRDAC") (Berge, 1998) and school's administrative satisfaction ("SAS") (Berge & Mrozowski, 1999) of resource satisfaction competency (RSC); classroom management skills ("CMS") (Moore, 1994), problem-solving techniques ("PST") (Dollard, Wineield, Wineield, & de Jong, 2000) and subject knowledge lecturing ("SKL") (Evers, Brouwers, & Tomic, 2002) of professional knowledge competency (PKC); emotion-control ability ("EA") (Van der Heijden, 2000) and self-transcendence ability ("SA") (Wilson & Pirrie, 1999) of individual demand competency (IDC) as well as interflow communication abilities ("ICA") (Boud, 2000) and social developing techniques ("SDT") (Knight, 2000) of cooperative relationship competency (CRC)" (Chan, Hsieh, Lee, Huang, & Ho, 2017). Therefore, the essentially brief analytical theme is able to be demonstrated in **Figure 3**.

Taking the **Figure 3** into consideration, the most critical streammain of three brief research questions in this research have been assayed for inducing the best solution of the research topic. The reason is that beyond making the comprehensive overlook and survey on the relative researches in the online education relative research fields (Anderson & McGreal, 2012; Casey, 2012; DeWaard *et al.*, 2011; Han, Yalvac, Capraro, & Capraro, 2015; Hyman, 2012), the majority of the related researches always emphasize the traditional physical course's requests, such as the course's professionalization, evaluation and certification (Chamberlin & Parish, 2011; Eilks, 2015) without discussion and analyzing the correlationships between HESSI, CEOTPD and HEOSDS. Therefore, in order to significantly resupply these research gaps that no research can comprehensively analyze and further explore the most decisive online education determinants of sustainable strategy for Taiwanese higher education in the New Southbound Policy through interplay analysis between higher education students' studying interests and corporate employees' on-the-job digital training desires in the contemporary electronic-cloud era in consideration of empirical conditions among HE student digital effections, corporate digital on-the-job digital training demands and HE institute sustainable development for the New Southbound Policy requirements. Materially, in terms of the higher research reliability and structure, this research is firstly to comprehensively cross-employ the factor analysis ("FA") approach and entropy compared assessed ("ECA") model of multiple criteria decision making ("MCDM") methodology of quantitative analysis for the appraised measurements of the total valid 267 interviewed questionnaires, including random 138 HE students who has online education experience and 129 corporate industrialists who currently works in the top 100 manufacturing companies in Taiwan from the North, Middle, South and the East sessions, and the fuzzy set qualitative comparative analysis ("fsQCA") method of qualitative analysis for weight-questionnaires of 30 experts in order to systematically induce the most valuable online education determinants ("VOED") and the most effective and construction of the most efficient comprehensive

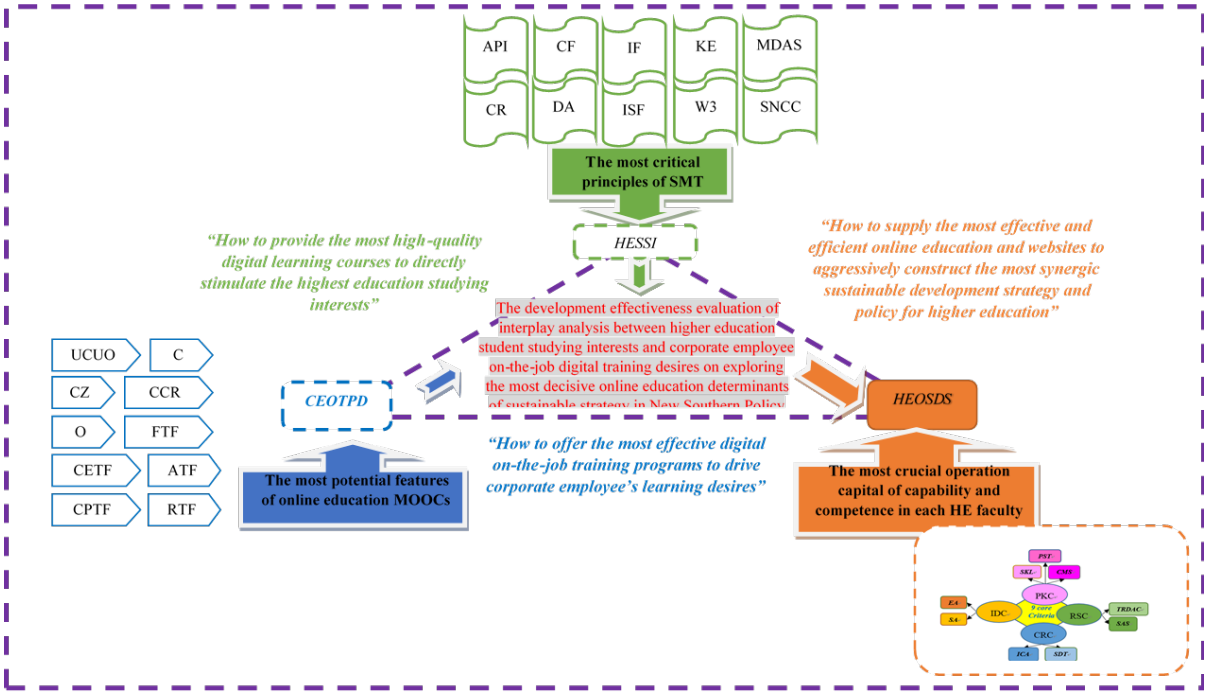


Figure 3. Brief analytical theme

online education competitive evaluation model ("COECEM") for the best solution for research questions and topic: "*The development effectiveness evaluation of interplay analysis between higher education students studying interests and corporate employee on-the-job digital training desires on exploring the most decisive online education determinants of sustainable strategy in the New Southbound Policy*".

LITERATURE REVIEW

This research organized the principal three perspectives by integrating the three theoretical concepts among HESSI in sight of empirical conditions among HE student digital effections, CEOTPD in view of corporate digital on-the-job digital training demands and HEOSDS in terms of HE institute sustainable development requirement under the lowest birth-rate pressure in Taiwan through cross-employment of the FA approach and ECA model of quantitative analysis and the fsQCA method of qualitative analysis for sieving the usefully assessable criteria from the congregate analytical elements as well as establishing the most effective evaluation-model. Hence, the relative literature reviews focus on research theories, methodologies and models.

Literature Review on Research Concepts

Online education has substituted the traditional face-to-face class to be a new social process lecturing method by adding various augmentations, substitutions, or blending of new pedagogical approaches and technologies without space and time restrictions in the contemporary rapid development of information, wireless-transmission and social media technologies (Bullen, Morgan, Belfer, & Qayyum, 2009). In general, online education includes correspondence courses, physical mail, and printed matter, telephone and/or audio recordings, television and/or video recordings, computer-assisted instruction, group communications (asynchronous and synchronous) (Jones & Healing, 2010), the Web and multimedia materials, simulation and gaming, collaborative learning, asynchronous learning networks (ALN), collaborative knowledge systems, immersive simulations, wireless and handheld electronic and electric devices (Palfrey, Gasser, Simun, & Barnes, 2009). Significantly, the majority of online education courses in higher education have provided professional knowledge courses for people who registered in these courses (JKennedy *et al.*, 2007). Furthermore, with respect to swift development and popularization of underlying digital technologies, each lecturer in higher education institutes is also easily and conveniently updates their information and knowledge teaching through the various public open courses of online education platforms (Kennedy, Judd, Dalgarnot, & Waycott, 2010). Otherwise, in order to productively reduce the operation expenditures and expenses on on-the-job of human resource management, companies and employees take some digital courses for on-the-job training or pursuing further education through these public and open online education courses (Prensky, 2005; Rickes, 2009). Currently, MOOCs has been streammain digital studying and

Table 3. The fourth Strategy of the seventh "Enhancing economic and trade cooperation guide

Advantages of MOOCs	Disadvantages of MOOCs
(1) MOOCs does not need to lecture in the traditional physical classroom and does not use full-length class syllabuses for face-to-face teaching without space and time restrictions (Martin, 2012);	(1) The interactions between teachers and students may be a few because there is no passively enforced request in taking courses period on MOOCs (Robbins, 2013);
(2) The majority of MOOCs courses are based on free-surfing, free-sharing and free-criticizing of each course participant;	(2) There is a lack of academic rigorous mechanism to confirm the lecturing reality on MOOCs;
(3) Each online-learning participant is easily and conveniently able to start without the traditional physical classroom limitations (Mak, Williams, & Mackness, 2010);	(3) The academic fraudulent conducts of examinations in MOOCs courses may be increased due to a lack of assessed effectively online-examination norms and supervised rules;
(4) The taking course costs of MOOCs are much lower than the traditional physical classroom; even it is for free.	(4) There is no academic rigorous assess mechanism for the evaluation of learning consequences of each MOOCs participant;
(5) Each MOOCs participant is effortless to take courses without official registration	(5) The most serious disadvantage of MOOCs courses is "the lowest course completion rate" because there is no official request in each MOOCs course (Mehaffy, 2012).
(6) Each MOOCs participant can both be teacher and student at the same time e	
(7) Language barrier is conquered by the free translation of each MOOCs participant	
(8) MOOCs is able to be comprehensively associated with any kind of education institutions and studying organizations	
(9) Each MOOCs participant can directly discuss the various issues and topics through each MOOCs platform (Masters, 2011).	

learning courses on public and open online education systems. In consideration of definition of MOOCs, "M" presents massive participants that illustrates the numerous teachers, students and supporters; "O" expresses open registration that means course open content and materials and lowest costs for participants' affordability; "O" displays online education that describes real-time interaction among each extensive participant and "C" clarifies free-kind courses materials that demonstrates self-paced requests, start/end period, college credits certificate, badges, role of the instructors, learning community and scripted assessments and course feedback (Mehlenbacher, 2012). Moreover, potential advantages and disadvantages of MOOCs are organized in **Table 3**.

In addition, beyond making a comprehensive survey (Shulman, 1986; Gay, 2000; Grindsted, 2011; Grindsted & Holm, 2012; Karatzoglou, 2013; Adomßent *et al.*, 2014) on the sustainable development strategy of each HE institute. The most decisive operation capital for the sustainable development strategy of each HE institute is the capability and competence of each HE faculty (Lang *et al.*, 2012) in order of effectively solving the most serious predicament of the highest living expenses and lowest birth-rate dual pressures (Lambrechts, Mulà,; Ceulemans, Molderez, & Gaeremynck, 2013). Hence, each HE teacher capability consideration as well as a series of the lack of development and maintenance time have both always been the greatest restrictions and barriers for digital studying and online education (Stephens & Graham, 2010; Wals, 2010). Eventually, there are four analytical dimensions of each HE faculty. These are resource satisfaction competency (RSC) (Kirkham, 2004; Rieckmann, 2012); professional knowledge competency (PKC) (Kirby et al., 2011); individual demand competency (IDC) (Shulman, 1987; Shephard et al., 2011) and cooperative relationship competency (CRC) (Lunn & Bishop, 2002; Yorio & Ye, 2012; Gliniecka, 2016).

Literature Review on Statistic Methodology

In terms of conduction the principal three analytical dimensions: HESSI, CEOTPD and HEOSDS, this research firstly cross-employed the FA approach and ECA model of quantitative analysis and the fsQCA of qualitative analysis to creatively construct the most effective COECEM model for 267 large-scale interviewed questionnaires and 25 experts weight questionnaires for increasing research validity and reliability. Accordingly, with reference to the higher research validity, the FA approach and the ECA model of quantitative analysis were hierarchically cross-employed in assessments of 267 large-scale interviewed questionnaires. In view of theoretic source of the FA approach, exploratory factor and ("EFA") and confirmatory factor ("CFA") analyses were formed into FA approach to identify and verify segmentation and dimensionality of analytical variables factor assessed scores. Academically, Sheppard (1996) clearly two analytical principle dimensions in the FA approach exploratory factor analysis ("EFA") and confirmatory factor analysis ("CFA") from the assayed correlation coefficient among each analytical variable formed from the category of common factor (or latent factor) and unique factor of analytical objectives in assumption to the four main concepts: (1) the assessed variables are supposed to be the same with two groups: "the same set of measures might be taken on men and women, or on treatment and control groups and then, the question arises whether the two factor structures are the same"(Sheppard, 1996) ; (2) assessed variable in two conditions or

sets of variable in the one group, for example: "two test batteries might be given to a single group of subjects, and questions asked about how the two sets of scores differ. Or the same battery might be given under two different conditions" (Sheppard, 1996); (3) a multiple research problem can be measure by FA: "how many different factors are needed to explain the pattern of relationships among these variables, what is the nature of those factors, how well do the hypothesized factors explain the observed data and how much purely random or unique variance does each observed variable include" (Sheppard, 1996) and (4) in sight of statistic measurements, the directly observed impact-measured factors are defined as $y_1, y_2,\ldots, y_k$, directly unobserved influenced factors are defined as $x_1, x_2,\ldots, x_k$ and the assessed constants are displayed as w_{ij} which presents the assessed factor loading in FA approach as well as the assessed weights of each influenced factor under linear combination basic equation to be presented as

$$y_k = w_{k1}x_1 + w_{k2}x_2 + \cdots + w_{kL} + n_k \quad (1)$$

Subsequently, in association with statistical calculations, the linear combination equation of FA approach was illustrated as $y_k = w_{k1}x_1 + w_{k2}x_2 + \cdots + w_{kL} + n_k$ (where. (1) k is the numbers of common potential factors that are organized from the L numbers of general influenced factors and (2) n is the numbers represents more than the numbers of K numbers). The direct depended variables were displayed as $y_1, y_2,\ldots, y_k$; indirect independent variables are described as $x_1, x_2,\ldots, x_k$ and the combined assessed constants are demonstrated as w_{ij} (where the factor loading by computing assessed weights of overall factors). Subsequently, the assessed variables were able to be hierarchically categorized into assessed correlation and regression measurements. For more complex research questions, research methodology for assessed measurements in FA approach, the linear combination of the elucidated percentage of coefficient of variations were able to be expressed as

$$y_1 = w_{j1}x_1 + w_{j2}x_2 + \cdots + w_{jm}x_m \quad (2)$$

where y_1 is the first assessed variable of principal component; m $(i = 1,2,\ldots,m)$ is the number of assessed variables; w_{ji} $(w_{j1}^2 + w_{j2}^2 + \cdots + w_{jm}^2 = 1)$ is the weight-loading of assessed variables.

The variations of first assessed variable of principle components are produced as

$$Var(y_1) = Var\left(w_{j1}x_1 + w_{j2}x_2 + \cdots + w_{jm}x_m\right) = w_{j1}^2 Var(x_1) + w_{j2}^2 Var(x_2) + \cdots + w_{jm}^2 Var(x_m)$$

$$\left(w_{j1}w_{j2}\ldots w_{jm}\right)\sum\left[w_{j1}w_{j2}\ldots w_{jm}\right], W^t = \left(w_{j1}, w_{j2}, \ldots, w_{jm}\right)$$

In succession, when $W_j^t W_j = 1$, the variations $(Var(y_1) = W_j \sum W_j)$ of principle components of first assessed variable for the maximum and the elucidated percentage of coefficient of variations was up to the maximum and the assessed variations $(Var(y_1) = W_j \sum W_j)$ was equal to the features of each assessed factor as λ_j $(\lambda_j = \lambda W_j^t(W_j) = W_j^t \sum(W_j))$. The elucidated percentage of coefficient of variations in first principle component (y_1) of first assessed factor was able to be displayed as $Var(y_1)/\sum_j Var(y_j) = \lambda_1/\sum_j \lambda_j$ and then, elucidated percentage of coefficient of variations in first principle component (y_2) is calculated as $(Var(y_1) + Var(y_2))/\sum_j Var(y_j) = (\lambda_1 + \lambda_2)/\sum_j \lambda_j$. Eventually, in order to refine the numbers of assessed factors, the principal components of assessed factors focus on the maximum numbers to substitute the incipient numbers v in order to elicit the most critical elucidated percentage of coefficient of variations as P-value:

$$P = Var(y_1) + Var(y_2) + \cdots + Var(y_t)/\sum_{v}^{i=1} Var(y_j) = (\lambda_1 + \lambda_2 + \cdots + \lambda_t)/(\lambda_1 + \lambda_2 + \cdots + \lambda_V) \quad (3)$$

McArdle (1990) illustrated that the total number of surveyed data have to be more than 100 based on their research result of over 400 surveyed data over. Then, Snock and Gorsuch (1989) addressed the elucidated percentage of coefficient of variations as (1) the elucidated percentage of coefficient of variations is under 49% during assessed criteria factor loadings is up to 0.7, (2) the elucidated percentage of coefficient of variations is to 64% (over 50%) during assessed criteria factor loadings is up 0.8 and (3) the elucidated percentage of coefficient of variations is up to 81% during assessed criteria factor loadings achieves 0.9. Eventually, Widamam (1993) apparently concluded that the evaluated condition of the FA approach that KMO testified score of surveyed data have to be bigger than 0.7 and the significance p-value of Bartlett's globular verification is simultaneously lower than 0.005 (Hair, Anderson, Tathan, & Black, 1998). With respect to the ECA model of quantitative analysis, entropy theory was the originality of entropy evaluated analysis model for calculate quantity of information content and reduced information uncertainty in transmission processes. In connection with information transmission processes, the expected information quantity can be distributed as "discrete probability distribution" $(P_1, \ldots, P_k;$ the variate breadth of $P_1, \ldots, P_k$ is relative with the information quantity) as well as further defined the expected information quantity as $E(p_1, \ldots, p_k) = -\phi_k \sum_{i=1}^{k} p_i \ln(p_i)$ (s.t. $\phi_k = 1/I(k)$ is the normal quantity and $0 \le E(p_1, \ldots, p_k) \le 1$. Peculiarly, the number of $E(p_1, \ldots, p_k)$ is oppositely relative with the information) in the statistic entropy method. In succession, the expected information quantity of the statistic duality equation of conditional entropy method is already applied in the statistic measurements conditional entropy number $(H(YIX))$ illustrated as

$$H(Y|X) = \sum_{x \in X} p(x) H(Y|X = x)$$
$$= -H(Y|X) = \sum_{x \in X} p(x) p(y|x) \log p(y|x)$$
$$= -\sum_{x \in X} \sum_{y \in Y} p(x,y) \log p(y|x)$$
$$= -\sum_{x \in X, y \in Y} p(x,y) \log p(y|x)$$
$$= -\sum_{x \in X, y \in Y} p(x,y) \log(p(x,y)/p(x))$$
$$= \sum_{x \in X, y \in Y} p(x,y) \log(p(x)/p(x,y)) \quad (4)$$

In view of the higher research reliability and validity, the fsQCA method of qualitative analysis was further utilized to define the a series of evaluated consequences of the FA approach and the ECA model of quantitative analysis because the fsQCA method was comprehensively adopted to fuzzify a series of measured results by appraising the linear interactions between each evaluated criterion (independent variables: "in" variables ($X_1, X_2, \ldots, X_n$)) and each evaluated solution (dependent variable: "out" variables ($Y_1, Y_2, \ldots, Y_n$)) in connection essential to a set of theorem of the Boolean Algebra Theory ("BAT") (Vink & Van Vliet, 2009). Two major analytical situations were explored into the theoretical calculations: (1) "sufficient analysis": any "in" variable can be only "possibly" and not be "necessarily" bring about "out" variables and (2) "necessarity analysis": any "in" variable is necessary to lead to "out" variable. Continuously, in response to statistical calculations, the "consistency" and "coverage" are both computed to verify the surveyed data because "consistency" is the extent to which a causal combination produces an outcome and "coverage" is how many surveyed samples with the outcome are represented by a causal condition. The equations of ""consistency" and "coverage" is demonstrated as

$$consistency(X_i \leq Y_i) = \sum(\min(X_i, Y_i)) / \sum(X_i)$$
$$coverage(X_i \leq Y_i) = \sum(min(X_i, Y_i)) / \sum(Y_i) \quad (5)$$

Successively, "if X_i values are all less than or equal to their corresponding Y_i values, the consistency score of sufficient analysis is 1; if there are only a few near misses, consistency score of sufficient analysis is slightly less than 1 and if there are many inconsistent scores, with some X_i values greatly exceeding their corresponding Y_i values, the consistency score of sufficient analysis drops below 0.5" (Vink & Van Vliet, 2013). Successively, the consistent level of "in" is added when the numbers of "in" variables are larger than the numbers of "out" variables and then, a set of the level of "in" variables is going to belong to "necessity analysis" to a set of "out" assessed variables when the ''min'' indicates the selection of the lower of the two values of "in" and "out" assessed variables. The "consistency" and "coverage" of necessity analysis are measured as

$$consistency(X_i \text{ f } Y_i) = \sum(min(X_i, Y_i)) / \sum(X_i)$$
$$coverage(X_i \text{ f } Y_i) = \sum(min(X_i, Y_i)) / \sum(Y_i) \quad (6)$$

In the equation (5), the three measured conditions are "(1) the consistency score of sufficient analysis is equal to 1 when the X_i values are all less than or equal to their corresponding Y_i values; (2) the consistency score of sufficient analysis is slightly less than 1 which means a few near misses have been appeared and (3) the consistency score of sufficient analysis drops below 0.5 during some X_i values greatly exceeding their corresponding Y_i values" (Vink & Van Vliet, 2013). Ultimately, the consistent level of a combination set "in" variables is further to be increased when the numbers of a combination set "in" assessed variables are bigger than the numbers of a combination set of "out" assessed variables and hence, a set of the level of a combination set "in" variables is going to be "necessity analysis" to a combination set "out" variables. The equations of "consistency" and "coverage" of necessity analysis are described as

$$consistency(X_i \text{ f } Y_i) = \sum(min(X_i, Y_i)) / \sum(X_i)$$
$$coverage(X_i \text{ f } Y_i) = \sum(min(X_i, Y_i)) / \sum(Y_i) \quad (7)$$

In the equation (6), the three conditions are (1) all Y_i values are less than or equal to their corresponding X_i values, this equations returns a value of 1 and (2) many Y_i exceed their corresponding X_i values by wide margins, it returns a value less than 0.5).

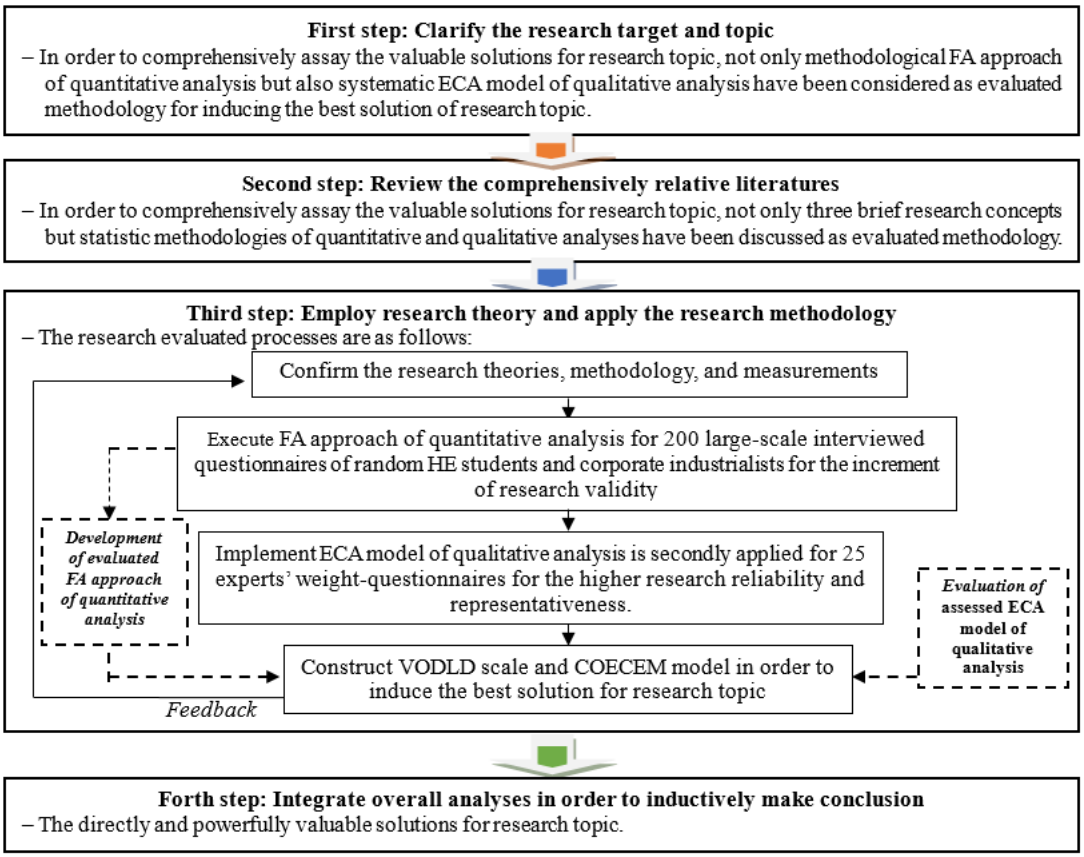


Figure 4. Research design framework

RESEARCH DESIGN

This research cross-integrates not only evaluated the FA approach and the ECA model of quantitative analysis for the total 200 large-scale interviewed questionnaires of random 100 current HE students who have token digital courses and 100 corporate industrialists who currently work in the top 100 manufacturing companies, from the North, Middle, South and the East of Taiwan in order to effectively and efficiently increase the research and teach capacities but also assessed the ECA model of qualitative analysis for 25 experts' weight-questionnaires based on the three analytical perspectives: HESSI in sight of empirical condition among HE student digital effections, CEOTPD in view of corporate digital on-the-job digital training demands and HEOSDS in terms of HE institutes sustainable development requirement under the lowest birth-rate pressure in Taiwan. Apparently, the research design process is step-by-step constructed in **Figure 4**.

Research Steps

In terms of the comprehensive consideration of the overall research steps, the four principle research design steps comprises of identifying the motivation, selecting the methodology, utilizing the methodology to analyze the empirically collected data and to appraise overall assessable criteria by applying the Delphi method in order to make a comprehensive conclusion and suggestion. Furthermore, there are four brief research steps: (1) First step: Clarify the research target and topic; (2) Second step: Review the comprehensively relative literatures; (3) Third step: Employ research theory and apply the research methodology and (4) Fourth step: Integrate overall analyses in order to inductively make conclusion, according to the **Figure 4**.

Research Collection

Taking the four brief research steps into consideration, the three analytically evaluated measurements of the first pre-test expert's assessments are enforced through establishing fuzzy transitivity, comparing weights principle, evaluating criteria, and estimating positive reciprocal matrix and supermatrix, research data source that must collectively and statistically comprised of all impacted experts' opinions related to each assessable criterion.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin measure of sampling adequacy		.853
Bartlett test of sphericity	Chi-squared test	475.545
	df	45
	Sig.	.000

Valid 138 interviewed questionnaires of HE students

KMO and Bartlett's Test

Kaiser-Meyer-Olkin measure of sampling adequacy		.705
Bartlett test of sphericity	Chi-squared test	283.341
	df	45
	Sig.	.000

Valid 129 interviewed questionnaires of corporate industrialists

Figure 5. Assessed consequences of KMO and Bartlett's test

Therefore, a total of 267 interviews were conducted that comprised of 138 randomly-selected HE students who had experience in online education and 129 corporate industrialists who currently work in one of the top 100 manufacturing companies in Taiwan. These interviews were collected and appraised employing measurements of the FA approach. Furthermore, the weight-questionnaires of 25 experts were collected by means of the Delphi method for the evaluated calculation of the ECA model for the purpose of higher research reliability, validity and representativeness because there are the least errors of validity and reliability in using the Delphi method when the collected questionnaires are at least 20 or more (Dalkey & Helmer, 1963). Subsequently, these weight interviews from 25 experts were formed from the professional groups consisted of the 5 HE senior faculties who had over 10 years teaching experience in HE institutes; 5 senior managers who had over 10 years working experience in human resources; 10 senior government officials who had over 10 years working experience in the Ministry of Education, Labor and Economic Affairs and the last 5 were academic scholars who had over 10 years' experience in relative HE online education and corporate on-the-job training research fields. Additionally, large-scale and weight questionnaires were elicited and designed from Likert's 5-level selection in order to obtain higher research reliability.

EVALUATED MEASUREMENTS

In this session, the evaluated measurements were calculated by means of the FA approach and the ECA model from the two-hierarchy random large-scale and expert interviewed questionnaires. Based on the **Figure 4**, the four measured steps, in the third brief analytical procedure, were hieratically and systematically implemented as:

Third research step - Collect up to first hierarchical 100 interviewed questionnaires of manufacture industrialists and customers. In consideration of equation (1) and (2) and (3), each valid interviewed questionnaires was valid 138 interviewed questionnaires of 150 of current HE students and 129 interviewed questionnaires of 150 corporate industrialists and the overall recovery ratio was 92% and 86%. In **Figure 5**, the assessed numbers of KMO and Barletta test of each extensive interviewed questionnaires of valid 138 interviewed questionnaires of HE students and valid 129 interviewed questionnaires of corporate industrialists were 0.853 and 0.705 and furthermore, the significance of each extensive 100 interviewed questionnaires of valid 138 interviewed questionnaires of HE students and valid 129 interviewed questionnaires of corporate industrialists were both lower than 0.05 that apparently expressed that these valid interviewed questionnaires data were adopted for the FA approach.

In **Table 4**, the highest commonality of ten assessed criteria of the most core factor of HESSI through measurements of valid 138 interviewed questionnaires are MDAS (0.714), IF (0.686), W3 (0.661), CR (0.578) and KE (0.547) which expresses that these most core criteria are able to represent as the most respected factors for HESSI in sight of empirical condition among HE student digital effections. Continuously, the highest five assessed numbers of commonality of ten assessed criteria of the most core elements of HEOSDS through computation of valid 129 interviewed questionnaires are FTF (0.79), CCR (0.777), O (0.722), CPTF (0.715) and C (0.711) which describes that these most core criteria are able to represent as the most critical factors for CEOTPD in view of corporate digital on-the-job digital training demands.

Table 4. The Commonality of assessed consequences of KMO and Bartlett's test

Commonality		
	Initial	Extraction
API	1.000	.426
CF	1.000	.408
IF	1.000	.686
KE	1.000	.547
MDAS	1.000	.714
CR	1.000	.578
DA	1.000	.439
ISF	1.000	.518
W3	1.000	.661
SNCC	1.000	.534
Extraction: PCA of FA approach.		

Twelve assessed criteria (a) of HE Student's digital studying interests

Commonality		
	Initial	Extraction
UCUO	1.000	.44
CZ	1.000	.686
O	1.000	.722
CETF	1.000	.681
CPTF	1.000	.715
C	1.000	.711
CCR	1.000	.777
FTF	1.000	.79
ATF	1.000	.617
RTF	1.000	.584
Extraction: PCA of FA approach.		

Fourteen assessed criteria (b) of corporate employee's on-the-job digital training desires

Table 5. Cross-measurement results of ECA model of 25 experts' surveyed questionnaires

CEOTPD					HEOSDS	HESSI				
FTF	**CCR**	**O**	**CPTF**	**C**		**MDAS**	**IF**	**W3**	**CR**	**KE**
0.0248	0.1148	0.1994	0.0896	0.2241	SKL	0.1728	0.2272	0.1492	0.2442	0.2236
0.2132	0.165	0.1972	0.1884	0.0717	PST	0.1658	**0.2862**	0.1064	0.236	0.1037
0.1395	0.1168	0.1168	0.1549	0.0271	CMS	0.193	0.1865	0.1332	0.1178	0.0457
0.2438	**0.2019**	**0.3409**	0.138	0.1361	TRDAC	0.1275	0.1275	**0.3546**	0.0431	**0.2942**
0.055	0.1801	0.0925	0.0421	0.0352	SAS	0.0229	0.008	0.1792	0.0341	0.1461
0.1909	0.1395	0.2019	**0.2878**	**0.1373**	SDT	0.2139	0.2442	0.2488	**0.3359**	0.1658
0.1764	0.0524	0.2044	0.1029	0.0814	ICA	0.2123	0.1432	0.1905	0.1945	0.1658
0.1549	0.1373	0.1884	0.1578	0.0925	EA	**0.3359**	0.0921	0.1559	0.2734	0.1425
0.2199	0.1801	0.1395	0.2344	0.0944	SA	0.1596	0.0431	0.0457	0.2089	0.2862

In order of HE institute sustainable development requirement under the lowest birth-rate pressure in Taiwan, *Forth research step* (Collect up the second interviewed weight-questionnaires of 25 experts through the Delphi method) and *Fifth research step* (Synthetically conduct criteria-measured of two hierarchical interviewed questionnaires) were conducted in this session. In association with manifesting the correlationship among HESSI in sight of empirical condition among HE student digital effections, CEOTPD in view of corporate digital on-the-job digital training demands and HEOSDS in terms of HE institute sustainable development requirement under the lowest birth-rate pressure in Taiwan, the equation (4) of ECA model of qualitative analysis, was hyper-applied for the cross-evaluated measurements of these ten highest appraised criteria through the second interviewed weight-questionnaires of 25 experts. As a result, **Table 5** clearly demonstrates "teaching resource distribution administrative consensus (TRDAC) of resource satisfaction competency (RSC)" does deeply affect not only W3 and KE of HESSI but also FTF, CCR and O of CEOTPD. Furthermore, "social developing techniques (SDT) of cooperative relationship competency (CRC)" also impact on CR of HESSI as well as CPTF and C of CEOTPD. Eventually, MDAS and IF of HESSI were influenced by "EA of individual demand competency (IDC)" and "PST of professional knowledge competency (PKC)"

Taking higher research validity and reliability in account, the Fifth research step (Synthetically conduct criteria-measured of two hierarchical interviewed questionnaires and Sixth research step (Conscientiously assay weight-questionnaires through the fsQCA method): In association with equation (5), (6) and (7), the measured results of the fsQCA method are systematically described in **Table 6** and **Figure 6**. The solution coverage and consistency of the solved combination, "a2*a3*a4*a5*b1*b2*~b3*b4*b5", are 0.659193 and 1 for detecting the correlationships among HESSI in sight of the empirical conditions among HE student digital effections, CEOTPD in view of corporate digital on-the-job digital training demands and HEOSDS in terms of HE institute sustainable development requirements under the lowest birth-rate pressure in Taiwan. In succession, "a2*a3*a4*a5*b1*b2*~b3*b4*b5" means "I&E*SD*HR*SI*C&R*C*CPTF* no O*CCR*FTF" that illustrates only "openness (O) of CEOTPD in view of corporate digital on-the-job digital training demands" do not show positive dependence with other nine evaluated criteria in the cross-assessments. Eventually, "1): HR, 3): O,10): C&R, 5): FTF;

Table 6. Consequences of the fsQCA method in response with to the results of the FA approach and the ECA model

	raw coverage	unique coverage	consistency
a2*a3*a4*a5*b1*b2*~b3*b4*b5 (Cases with greater than 0.5 membership in term a2*a3*a4*a5*b1*b2*~b3*b4*b5: 0.97 (0.95,0.97)	0.659193	0.659193	1
solution coverage: 0.659193 solution consistency: 1			
Definition1: a1: I&E; a2: SD; a3: HR; a4: SI; a5: C&R; b1: C; b2: CPTF; b3: O; b4: CCR; b5: FTF Definition2: 1): HR, 3): O,10): C&R, 5): FTF; 6): CCR, 8): SI, 7): CPTF, 2): C, 4): I&E, 9): SD			

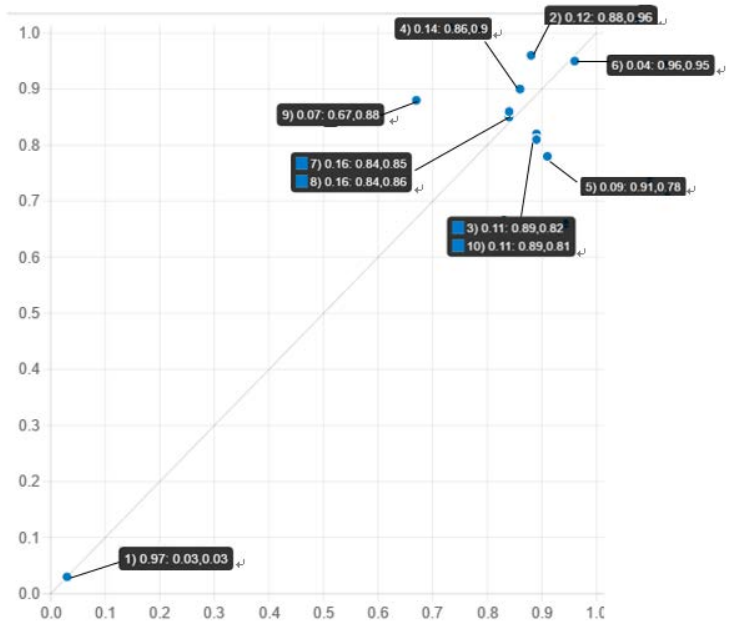


Figure 6. Analysis results of fsQCA method

6): CCR" were located at under the X-Y line position that means " HR, O, C&R, FTF and CCR" belong "necessarity analysis" and "8): SI, 7): CPTF, 2): C, 4): I&E, 9): SD" were located at over the X-Y line position that means "SI, CPTF, C, I&E, SD" belong to "sufficient analysis".

CONCLUSION AND RECOMMENDATIONS

In order to effectively detect interplays and correlationships among HE students' studying interests (HESSI) in sight of empirical condition among HE student digital effections, corporate employee on-the-job training participated desires (CEOTPD) in view of corporate digital on-the-job digital training demands and higher education institute sustainable development strategy (HEOSDS) in terms of HE institutes sustainable development requirement under the lowest birth-rate pressure in Taiwan, the most valuable contributions in this research are

1. Taking into account the three major research questionnaires conducted, this research cross-employed the FA approach and the ECA model of quantitative analysis and the fsQCA method of qualitative analysis to creatively pioneer the most effective and efficient comprehensive online education competitive evaluation model (COECEM) in order to conduce the most valuable online education determinants (VOED) for exploring the most decisive online education determinants of sustainable strategy impacted by Taiwan's New Southbound Policy.
2. In order to academically resupply the online education research gap and empirically nourish corporate on-the-job training demand, this research cross-employed the FA approach of quantitative analysis to conduct random valid 267 large-scale interviewees and the ECA model of quantitative analysis to deal with 25 experts' weight questionnaire results through the implementation of foreign visits for international exchange and cooperation, the operation of empirical industry-university collaboration projects and the participation in domestic and international conferences. Then, the fsQCA method of qualitative analysis was further employed to manifest the measured results of the FA approach and the ECA model for the highest research reliability and validity.

3. Significantly, the most valuable measured results of the FA approach, the ECA model and the fsQCA method induces "Keyword-search Engine (KE) and Web 3.0 (W3) of core factors of Social Media Technology (SMT)" and "Feedback Technology Function (FTF) and Course Complete Rate (CCR) of critical factors of Massive Open Online Course (MOOCs)" directly and inductively influence "Teaching Resource Distribution Administrative Consensus (TRDAC) of Resource Satisfaction Competency (RSC)" as well as core factors as the most decisive online education determinants of Higher Education Institute Sustainable Development Strategy (HEOSDS) in Teaching Resource Distribution Administrative Consensus (TRDAC) of Resource Satisfaction Competency (RSC). The reason is feedback technology function and course complete rate with keyword-search engine and Web 3.0 in online education technological support in taking online education courses as the most considered key-factor during corporate employee when selecting online education MOOCs. Hence, Taiwanese government education departments are supposed to encourage the majority of Taiwanese higher education institutes to construct more comprehensive online education systems, websites and electronic platforms for not only HE student digital effections but also for corporate digital on-the-job training demands resulting from the New Southbound Policy implemented in Taiwan.
4. Specifically, the COECEM model was constructed to directly identify, refine and explore the most decisive online education determinants of sustainable strategy in the New Southbound Policy through comprehensive analyses of HESSI, CEOTPD and HEOSDS and furthermore, future direction can hyper-apply a couple of assessed methods of the multiple critter decision making (MCDM) methodology and a bulk of evaluated factors of online education to be considered into appraised measurements beyond measured results of this research.

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