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An Analysis of Global Intellectual Property Strategy: Organizational Learning Approach and its Practices for Education

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Abstract

This study considers the required capacity and education for the students who majoring in management information through describing the patent analysis of the company and the idea creation and prototypic implementation at classroom practice. This patent analysis of the company is a single case study of Hon Hai Precision which has received much attention in recent years. During the classroom practices, we put the idea creation called Idea Sketching into practice. Moreover, we practice prototypic implementation at the seminar which focusing on the knowledge based in the industrial technologies. In the light of the intellectual property strategies and the trend of information technology, we consider above and refer to the education which applied the practice of Exploration and Exploitation of knowledge to classroom. We insist that bringing up the person with talent on innovation is important for our country's education system and then suggest the required capacity and education for the students who majoring in management information. Moreover, we discovered the new direction to connect the knowledge in practice and college education, and found out the useful insights for both industrial and educational world through the light of the intellectual property strategies in companies.

Keywords: EMS companies, Globalization, Innovation, Paten, Knowledge Flow

1 Introduction

In recent years, a change is pressed for in every field with the progress of the digital technology accelerating. Thus, for planning a creative solution to the problem, value is found by a correct answer that may not be one. Moreover, it seems to call for the education or human resources development that can share the value and promote the international activities.

It also shows a similar tendency in the education of management information. The activities that take root in the local area such as the workshop of idea creation, ideathon or hackathon have become an issue of immediate concern to us in the field of management information [1]. The

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implementation of ideas has been referred the education of science so far in Japan. Furthermore, through the trend of openness of development environment such as Maker Movement [2], it becomes possible to do the implementation of ideas in the education of humanities or social science. It is called for the Exploration and Exploitation of knowledge by using patent as an indicator in companies. As discussed in Section of Overall Discussion, The perspective of Exploitation and Exploration is published on March's pioneering article [3]. Previous studies appear to treat all activities associated with innovation as instances of "Exploration" and to treat the term "Exploitation" for activities associated with using past knowledge. Accordingly, the development of education that paid its attention to the companies' intellectual property as output of the idea reflected the analysis of the patent application trend and begins to be considered in.

The education of idea creation or prototypic implement has become the present circumstance such as Design Education [1], Education of Manufacturing Technology [2], STEM Education [4]. Meanwhile, the development of the methodology that can administer or succeed the practice continuously and the construction of education that educator or instructor can work on are problems for future exploration [1]. Moreover, as discussed in this paper (Mainly in Section 5), the construction of the education system that links industry with management that takes a hard look at intellectual property strategy is a problem that doesn't begin to start.

As discussed in this paper, this study considers the knowledge and a skill necessary for students majoring in management information based on the above-mentioned background. We consider above issue with the patent analysis of the Hon Hai Precision that focuses on companies' intel-lectual property strategy, education of idea creation and prototypic implement in classroom prac-tice. Through considering these examples generally, we comment on the switches from "educa-tion to accumulate knowledge" to "education to create knowledge" which is called for the 21st century in the light of the global intellectual property strategy trend of the company. By this, as discussed in this paper, we discover the finding that is useful for the construction of the new management information education system that connected educational industry to industrial world.

The patent analysis of Hon Hai Precision that focused on intellectual property strategy is discussed in Section2. In Section 3, we mention the students' idea creation during classroom practices of information field. In Section 4, we describe the education of prototypic implementation based on the industrial technologies. Finally, we consider above discussion generally in Section 5 and summarize it in Section 6.

2 THE PATENT ANALYSIS OF THE COMPANY

2.1 The previous research about EMS

This patent analysis of the company is a single case study of Hon Hai Precision, a Taiwanese EMS company. [5]. EMS is the abbreviated name for "Electronics Manufacturing Services", and relates the business model by which activities, from the design of a product, to their development for trial purposes, production, shipping, and repair related manufacturing [6]. That is, in electronic industry, an EMS firm is a recipient for an outsourcing arrangement made by a recognized electronics brand owner.

EMS industry is a new business model that was born in the 1980's in the United States, and came to be known by the name of EMS by the mid-1990's. The ratio of electronic products that was produced by EMS companies compared to all electronic products used today is about 1:4. It is no exaggeration to say that EMS has developed as an industry to the point that cooperating with EMS companies has become essential to maintain a competitive advantage for electronic

firms which owns these brand names [7].

There has been little research concerning EMS worked on from an academic perspective in the latter half of the 1990's, however, these researches are described by fragmentary views. First, existing research on EMS defines EMS as a new productive system emerged from the electronic industry[8][9][10][11]. Sturgeon (2002) describes the widespread outsourcing by US firms and pays special attention to the arising suppliers in response to the shedding of non-core assets from US firms. Second, the literature focuses on EMS mainly on major EMS companies [12]. Zhai, Shi, & Gregory (2007) described the firm growth model in EMS companies and its link with their internal capability developments.

In addition, Taiwan's EMS company, Hon Hai has also largely drawn from the view of competitive strategy [7][13][14]. They argued that Hon Hai has grown rapidly through vertical integration and diversification. Moreover, some papers argued that Hon Hai's competitive advantage rests on the metal mold technology and supply-chain management that acquires cost leadership and can respond to customers' needs more swiftly.

In summary, these case studies only referred to the business expansion or competitive strategies mainly. In addition, an EMS company is a recipient for an outsourcing arrangement made by a recognized electronics brand owner in electronic industry, so that EMS companies are not considered to do innovative activities.

From the above studies, the existing research of Hon Hai leaves two remaining issues. The first issue is the limited details of Hon Hai's rapid growth in the existing research. The other issue is that in spite of Hon Hai's patent power, there is no existing research trying to interpret it.

2.2 The introduction of Taiwanese EMS company: Hon Hai Precision

Hon Hai headquartered in Taipei, Taiwan and had founded by Chairman Terry Gou in 1974 to make plastic switches for TVs. According to the annual report of 2015, the market share reached 4,213,100 million NT dollars (approximately 15,800 billion yen) in 2014, growing at 7% compared to the previous year. Additionally, Hon Hai ranked 25th based on the Top-500 for 2016 of Global Fortune, while GE (General Electric) ranked 26th.

According to the ranking of EMS companies from IHS iSuppli Market Research, we can see about the same American companies including Solectron, Celestica, Sanmina-SCI, Jabil Circuit and Singaporean Flextronics occupied five high ranks before 2004 [See table 1]. However, these excellent American and Singaporean EMS companies had affected by the collapse of the IT bubble in 2000 and showed a decline. The progress of the Taiwanese companies came to be outstanding instead. Furthermore, Hon Hai achieved a sustained and explosive growth rate after 2001 while other American major EMS companies declined [See figure 1]. As described in the foregoing paragraph, an EMS company is a recipient for an outsourcing arrangement made by a recognized electronics brand owner in electronic industry. In other words, EMS companies are the enterprises that specialize in contract manufacturing services so that EMS companies are regarded as not having innovative capabilities. However, table 2 shows the differences of Hon Hai's patent count compared with other major EMS companies showed as table 1. It can be observed that Hon Hai's patent count that is issued by WIPO (World Intellectual Property Organization) and the American Patent office is much larger than the other American EMS companies.

From above studies, I have made two assumptions here in the light of the above discussion. First, I assumed that Hon Hai's continuing growth is involved in the patent power. The second assumption is that Hon Hai achieved prosperity due to efficient adaptation through the use of managing the exploitation and exploration of innovation simultaneously.

Table 1: EMS ranking of year 2000 and year 2005

Year 2000			
Rank	Company name	Headquarter	Sales ($mil.)
1	Solectron	USA	17,057.4
2	Flextronics	Singapore	10,368.8
3	Celestica	Canada	9,752.1
4	SCI Systems	USA	9,146.6
5	Sanmina	USA	4,887.3
6	Jabil Circuit	USA	3,997.5
7	Elcoteq Network	Finland	2,060.0
8	Manufacturers' Services	USA	1,758.1
9	Benchmark Electronics	USA	1,704.9
10	C-MAC	Canada	1,702.2
Year 2005			
1	Hon Hai precision	Taiwan	27,751.4
2	Flextronics	Singapore	15,297.0
3	Sanmina-SCI	USA	11,734.7
4	Solectron	USA	10,400.0
5	Celestica	Canada	8,471.0
6	Jabil Circuit	USA	7,524.0
7	Inventec	Taiwan	6.048.7
8	BenQ	Taiwan	5,389.6
9	Elcoteq	Finland	4,938.0
10	Wistron	Taiwan	4,700.0

Source: IHS iSuppli Market Research

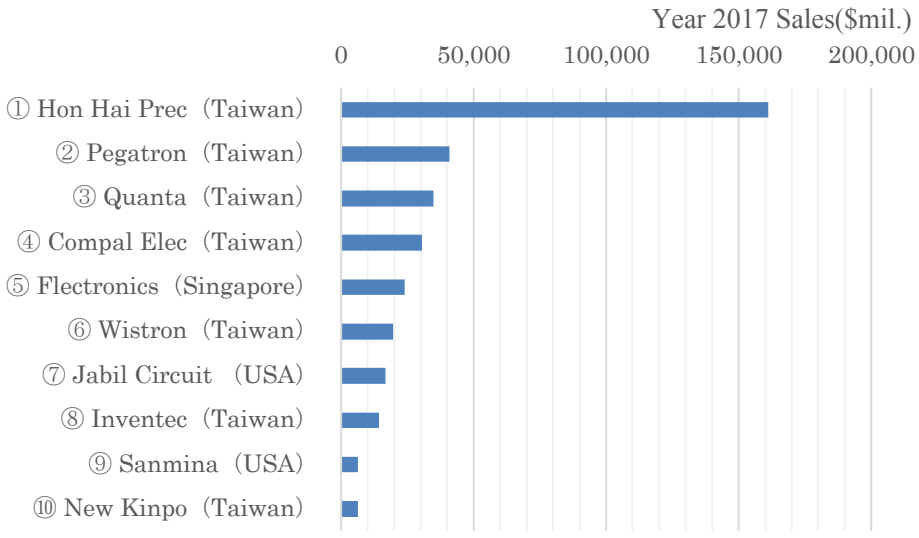

Figure 1: EMS ranking of year 2017

Source: Annual Reports from each EMS companies

Table 2: Comparison of patent accumulation issue numbers of Hon Hai and other major EMS companies

EMS enterprise	Hon Hai	Solectron	Flextronics	Sammina-SCI	Jabil	Celestica
Accumulation issue number in World Intellectual Property Organization	971	7	29	52	15	17
Accumulation issue number in American Patent Office	11,771	18	38	54	31	20

Source: PATENTSCOPE search engine (http://patentscope.wipo.int/search/en/search.jsf) of World Intellectual Property Organization and United Stated Patent Office (http://patft.uspto.gov/) from accumulation issue patent number (Until December 31, 2012) retrieved by Assignee Name: "Hon Hai", "Solectron corporation", " Flextronics International", " Sanmina-SCI", "Jabil Circuit", and "Celestica"

2.3 The paten analysis of Hon Hai Precision

According to the survey of patent application that Taiwan Patent Office performs every year, Hon Hai ranked first both in the annual number of patent application and issue for 13 consecutive years from 2003 through 2015 [15]. Furthermore, figure 2 shows the patent count Hon Hai applied every year in Taiwan and the United States. It can be observed that both patent count Hon Hai applied in Taiwan and America are increasing.

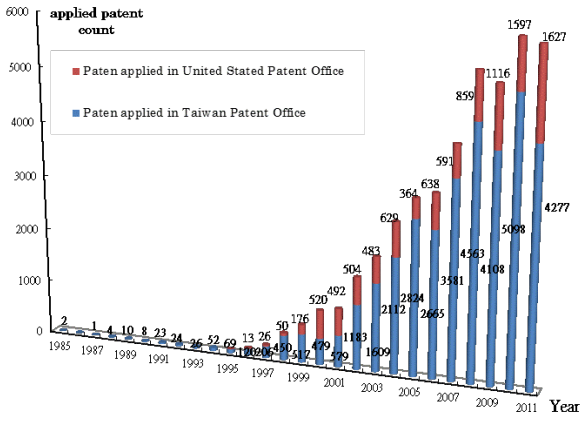

Figure 2: Patent count applied in Taiwan and United Stated Patent Office
Source: Taiwan Patent Office (http://www.tipo.gov.tw/ch/);United Stated Patent and Trademark Office: (http://patft.uspto.gov/)

What patents Hon Hai applied have been issued? Hon Hai's patent contents can be shown by means of International Patent Classification (IPC). As Figure 3 shows, the patent count related to connector products account (H01R) for more than half of the total count during the 1990's. On the other hand, as it can be seen on Figure 4, the issued patent contents Hon Hai applied in Taiwan

appear to be mixed. It can be inferred that Hon Hai continued the exploitation of connector technology during the 1990's, whereas the exploration of diverse technology continued after 2001.

The following table (see Table 3 and Table 4) of the ranking of Hon Hai's patent count based on IPC is indicating the section type of patent Hon Hai has applied and issued the most by Taiwan and United Stated Patent and Trademark Office. The most patent issued to Hon Hai applied in United Stated Patent and Trademark Office is H01R, the patent contents related to connector products. The patent account following the H01R is the category of G06F, the digital computing or data processing equipment or methods. Furthermore, the patent belonging to the category of G06F and H01R also rank within the top 3 of Hon Hai has applied and issued the most by Taiwan Patent Office.

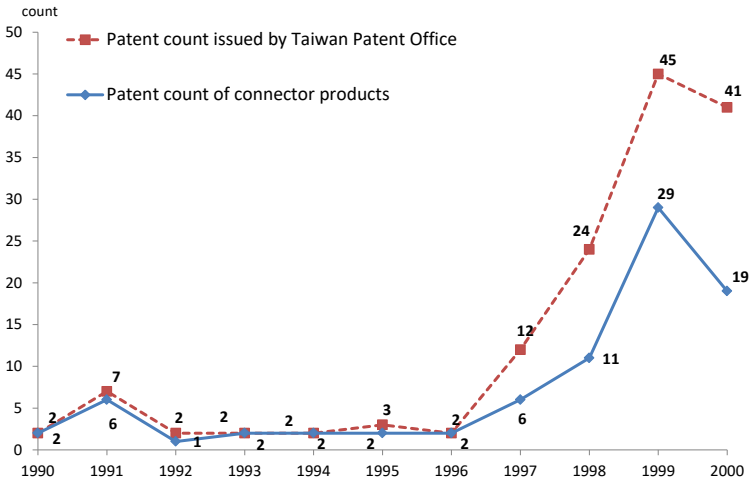

Figure 3: Contents of patents issued by Taiwan Patent Office against time distribution (before 2000)
Source：Taiwan Patent Office (http://www.tipo.gov.tw/ch/)

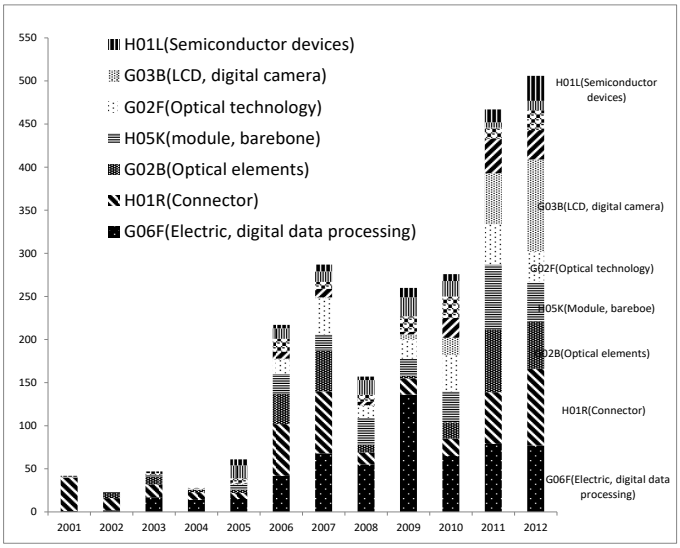

Figure 4: Contents of patents issued by Taiwan Patent Office against time distribution (after 2001)
Source：Taiwan Patent Office (http://www.tipo.gov.tw/ch/)

Table 3: Ranking of Patent contents based on IPC issued by United Stated Patent and Trademark Office (Until December 31, 2013)

IPC	Patent Information	Count
H01R	Electrically-conductive connections	4638
G06F	Digital computing or data processing equipment or methods, especially adapted for specific functions	2859
H05K	Manufacture of assemblage of electrical components	2628
G02B	Optical elements, systems, or apparatus	1029
H04N	Details of television systems	723

Source: United Stated Patent and Trademark Office

Table 4: Ranking of Patent contents based on IPC issued by Taiwan Patent Office (Until December 31, 2013)

IPC	Patent Information	Count
G06F	Digital computing or data processing equipment or methods, especially adapted for specific functions	4419
H05K	Manufacture of assemblage of electrical components	2490
H01R	Electrically-conductive connections	1779
G02B	Optical elements, systems, or apparatus	1535
G03B	LCD, digital camera	945

Source: Taiwan Patent Office

Figure 5 and 6 displays the inventors' nationality of patent issued by Taiwan and the United States. As it can be seen on Figure 2, the inventors' nationality of patent count issued by Taiwan are almost all non-Taiwanese/Chinese before 2002. Moreover, as it can be seen on Figure 3, the non-Taiwanese/Chinese inventors account for 1/2 of the total count before 1996. This data can be said that Hon Hai relied on the knowledge from foreign countries. In reality, Hon Hai placed the R&D base in Cypress, United States in 1985. It can be observed from Figure 4 and 3 that the Taiwanese/Chinese inventor of patent count is increasing as time goes by. Hence, it could be argued that Hon Hai absorbs knowledge from foreign countries and takes it into R&D capability for itself.

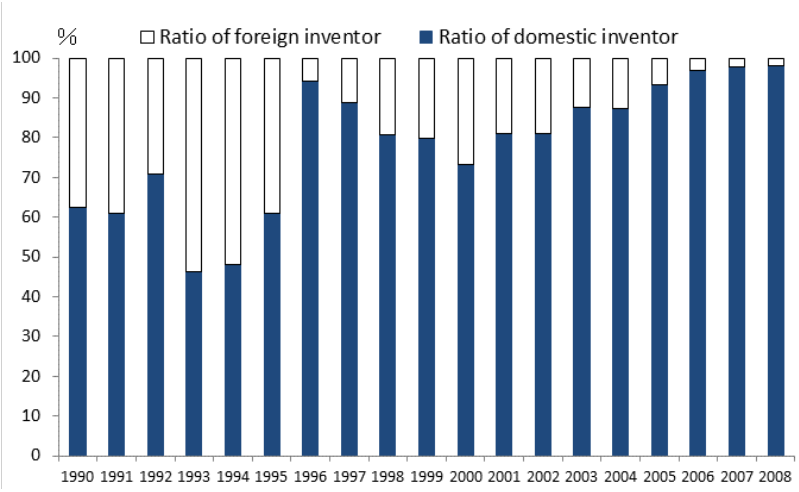

Figure 5: Ratio of Patent count of domestic inventor vs. foreign inventor issued by Taiwan Patent Office

Source：Taiwan Patent Office (http://www.tipo.gov.tw/ch/)

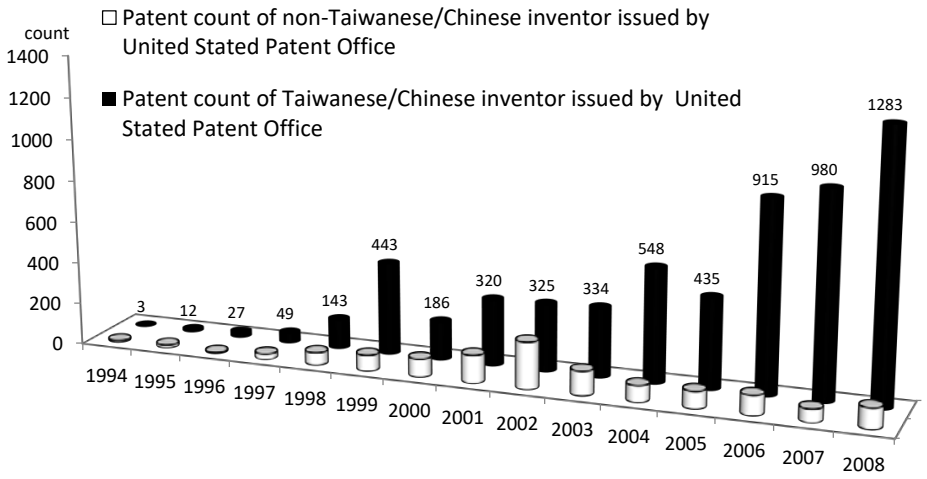

Figure 6: Patent count of non-Taiwan/Chinese inventor vs. Taiwan/Chinese inventor issued by United Stated Patent Office
Source：United Stated Patent and Trademark Office：(http://patft.uspto.gov/)

Finally, here is the reckoning of ranking of self-citation based on IPC for patent count issued by the Taiwan Patent Office until 2005 (see Table 5). As Table 5 shows, Hon Hai's the most frequent self-citation based on IPC is H01R of connector products. Following H01R are IPC of G02B、G02 and G03B of optics-related technology such as a digital camera, a projector product, the liquid crystal panel product.

Table 5: Ranking of self-citation of Hon Hai's patent contents based on IPC(until 2005)

	Ranking of self-citation based on IPC
1	H01R: Electrically-conductive connections
2	G02B: Optical elements, systems, or apparatus
3	G03B: Apparatus of arrangement for taking photographs of projecting
4	G02F: The optical operation of which is modified by changing optical properties
5	H04N: Details of television systems

Source：Taiwan Patent Office (http://www.tipo.gov.tw/ch/)

2.4 Discussion

So far, Hon Hai's detailed patent condition about count and contents issued by the Taiwan Patent Office and the United States Patent and Trademark is mentioned. In sum, this research can be summarized into findings as described below.

First, Hon Hai had applied patent related to connector products during the 1990s'. It can be inferred from the high share of patent count related connector products and the characteristic of self-citation of patent. More specifically, the patent count related to connector products account for more than half of the total count during the 1990's. After 2001, Hon Hai continued the exploitation of connector technology, whereas the exploration of diverse technology continued. Moreover, the highest ratio of elf-citation of patent is H01R category of IPC, related Electrically-

conductive connections particularly.

In the field of patent study, the ratio of the self-citation is considered for an index to consult with about the focus of research and development [16][17].In particular, the research of Katila and Ahuja (2002) published by Academy of Management Journal is often taken up as a representative study of analyzing the influence of a company's range of intellect on innovation. They calculated a company's range of the intellect by using data of the patent citation of 124 industrial robotics companies in Europe, Japan, and North America. And conducted analysis of the relationship between the number of new products and the range of intellect.

Referring back to Katila and Ahuja (2002), they argued that search depth is positively related to the number of new products introduced by a firm. Moreover, the interaction of search depth and scope is positively related to the number of new products introduced by a firm. That is to say, balancing the search depth and scope result in innovation performance is confirmed.

Take a look a Hon Hai's case study, it can be inferred from that Hon Hai continued the exploitation of connector technology during the 1990's, whereas the exploration of diverse technology continued after 2001. More specifically, Hon Hai spread the range of research from the major field of H01R and H05K of IPC category over G02B, G02F and G03B witch related with optical technology. Moreover, due to the high ratio of self-citation form IPC category of G02B, G02F and G03B, it can be said that Hon Hai tried to understand how connector products and optical technology are related. In other words, even Hon Hai switch the R&D strategy of wide scope of search, Hon Hai also attached importance to depth of search. It can be seen that Hon Hai applied an optical technology to connector products and developed the production with a high value-added connector products consistently.

Second, Hon Hai relied on the knowledge from foreign countries during the 1990s', whereas it diversified the scope of patent contents and also continued the exploitation for connector product technology after 2001. As it can be seen on Hon Hai's patent research, the inventors' nationality of patent count issued by Taiwan are almost all foreign inventors before 2002. However, the ratio of foreign inventors was decreasing after 1996, whereas the ratio of domestic inventors was increasing rapidly.

It can be said that the accumulation of the R&D ability in Taiwan advanced because the number of domestic inventors increased in both Taiwan and American Patent Office from 1997. In other words, Hon Hai had relied on technology from foreign countries at the beginning and then absorbing it. Since Hon Hai's R&D base was placed in Cypress, United States in 1985, and the foreign inventors comprised of more than half of the patent count, these phenomenon purport to support this finding of knowledge flow from advanced countries to Hon Hai.

3 THE IDEA CREATION IN CLASSROON PRACTICE

In the field of software development, like agile software development and DevOps, the acceleration of R&D period and the agility efficiency of R&D can be observed in the world. Furthermore, because there has a tendency to attach importance to User Experience (UX) [18], it seems to call for the notion of needs of exploration in the field of software development. In view of above discussion, we carried out idea creation technique called the Idea Sketching, as discussed in Section 5, during the process of software development. We assume the application of the Exploitation of knowledge from the phase of plan making before demand specifications to the phase of demand acquisition and analysis particularly.

The Idea Sketching has been practiced in a variety of technique by different field. In this research, we performed the practice by considering a sheet that you could begin to write a headline

and just write three sentences in turn, so that everyone could create ideas easily even you are not a designer (See Figure 7). In addition, there is the blank on the sheet so that everyone can insert a figure or a picture in and can describe an idea or the explanation just comes to your mind freely.

At the classes, we featured the theme of developing an application to come and go for reality and imagination that utilized a smartphone function for the students who have learned the basics of programming.

A variety of ideas were created during the classroom practice of Idea Sketching. We formed the impressions of Idea Sketching from students as following.

a. Through the technique of Idea Sketching, I can see general construction by making my image to the figure.
b. It is a figure that shows what a designer or creator is imaging. As the figure is embodying someone's images, it is not suitable for team work.
c. The advantage is what it is easy to see. It is expressed through the figure and keep the words to a minimum. Furthermore, the figure is drawn by the headline of the theme of idea so that it is consistent with the theme. It's an effective way to express one's ideas briefly.
d. We can shorten the period of development through developing the software according to the inventor's intention.

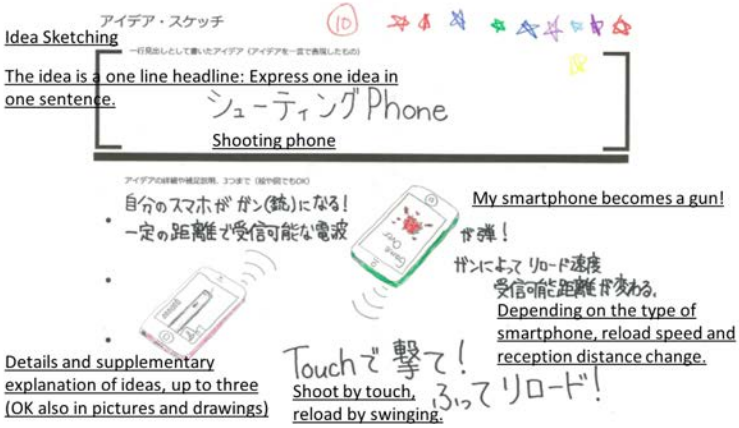

Figure 7: The example of Idea Sketching during classes

As the impressions mentioned above, we consider the characteristics of the Idea Sketching as follows. As expressing like answer (a) " making my image to the figure ", answer (b) " the figure that shows what a designer or creator is imaging ", and the answer (c) " It is expressed through the figure ", we can assume the description is based on what is visualized

Furthermore, inferring from the answer (a) " my image ", answer (b) " what a designer or creator is imaging ", and the answer (c) " the inventor's intention ", we suggest that the subject of the thought expression is an individual, and the tendency that subjectivity is easy to be reflected. In addition, the description about the characteristic to clarify a concept by words, and a description about the shortening of the development time were seen in the answers. We consider the descriptions come from the sheet which are written at the headline clearly. Those are expressions of an individual's thought, and relevant to the internalization of thought by using words.

4 PROTOTYPIC IMPLEMENTATION IN CLASSROOM PRACTICE

We put prototypic implementation into practice at the classes of teaching the knowledge based on the industrial technologies. Figure 8 shows the circumstance in the classroom of the course of industrial technologies. It is a class of programming for prototype implementation. It is a class that 314 students are taking. Generally, in this large class, attitudes of students to attendees may be loose, but in this class there is no possibility. Students are trying to absorb core wisdom towards the implementation of prototypes. From the photograph, attitudes of attendees are highly motivated, active, and serious. The students show interests in the technologies and put idea creation into practice with taking this class as a start. Figures 9 to 12 show some examples are taken from the students utilized the knowledge from Kinect, Wii balance board and AR to produce a system for medical technology in practice.

Figure 8: The circumstance in the classroom of the industrial technologies

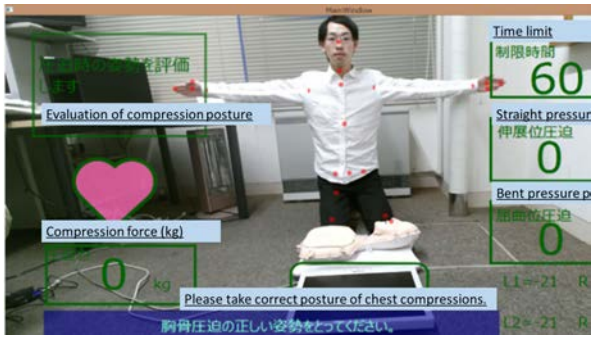

Figure.9 You have to be a pose of T to make our system operated before using the system.

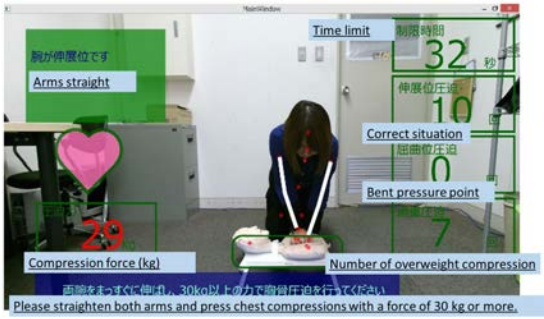

Figure 10: The screen of a system witch combined the technology of Kinect, Wii balance board and AR

Figure 11: An example of prototypic system in practice

Figure 12: This picture means basic setting of CPR training to babies. People who do CPR to babies have to only use two fingers in order not to push their chest excessively.

5 OVERALL DISCUSSION

The viewpoints of knowledge/information is defined variously from different disciplines. This study considers knowledge/information based on the field of organizational learning.

The Exploitation and Exploration perspective is published on March's pioneering article and have increasingly dominated organizational analyses of technological innovation, organization design, organizational adaptation, organizational learning, competitive advantage and, organizational survival [3]. Exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, execution.

Based on the framework of exploitation and exploration, a line of literature places emphasis on the relation of both concepts [19] [20] [21]. For example, Gupta et al. paid special attention to these four related questions: What do exploration and exploitation mean? Are they two ends of a continuum or orthogonal to each other? How should organizations achieve balance between exploration and exploitation—via ambidexterity or punctuated equilibrium? Finally, must all organizations strive for a balance, or is specialization in exploitation or exploration sometimes sufficient for long-run success?

Additionally, there are researches build on the position that treat role of exploitation and ex-

ploration as a dependent variable [22] [23] [24] [25] [26] [27] [28]. The literature has paid atten-tion to the organizational/strategic factors to achieve such balance between exploitation and exploration. On the other hand, the literature that treats role of exploitation and exploration as an independent variable gave attention to whether it contributes to high performance or what ratio compared to each other distributed to success [29] [30].

To keep changing constantly is the fate of organizations is evident from Dodgson's extensive research [31]. We consider the Exploration and Exploitation of knowledge in field of organiza-tional learning through the patent analysis of Hon Hai Precision in Section 2. This research quotes the concepts of exploitation and exploration to clarify Hon Hai's patent data. More specifically, this research aims to clarify that the depth and scope of Hon Hai's search on the basis of Hon Hai's patent data. Furthermore, idea creation in classroom practice in Section 3 corresponds with the Exploration of knowledge, and prototypic implementation in Section 4 corresponds to the Exploitation of knowledge.

The students attending above lectures can form an endogenous motive on the basis of industry's trend through learning global intellectual property strategy in classroom practice. In other words, this is available for developing the education on the basis of the companies' trends, and this might lead to a better understanding of the companies' management for the students while they are working in a company in the future. Therefore, the classroom practice suggests the pos-sibility that it is useful for both companies and universities.

The companies' competence of broadening and utilizing the existing knowledge is demanded for management. On the other hand, the development of class curriculum which focused on the Exploration and Exploitation of knowledge on the basis of companies' intellectual property strategy is not sufficient. That is, consider as follows. Building an educational system that connects to the industrial community is an unsettled problem so that the educational community leads to corporate management with a view to the global intellectual property strategy. Of course, classes targeting intellectual property strategies, intellectual property strategies of global enterprises, and others are implemented depending on the major of university education. For example, there are classes that learn about relationships between intellectual property strategies and intellectual property strategies, intellectual property strategies according to business strategies, intellectual property management, etc. However, classes that learn about laws and business contents based on each of these theories are not subject to this study. This paper aims to develop product products practiced by companies with global intellectual property strategies. In other words, it is targeted at educational systems that undergraduate students in the management information field practice to develop product products practiced by companies with global intellectual property strategies. Until now, the construction of an educational system with such a viewpoint has not been undertaken within our research scope. The reason is that in the Japanese education system, as seen in examination guidance, high school education system traditionally had a division between humanities and science. However, enterprises form an organization whose major accepts diverse human resources. In other words, the traditional school education system and enterprise system are not always the same system. For example, it has been pointed out that there has been a gap between human resources required by companies and human resources nurtured by universities. In recent years, as one of the grounds, studies of educational programs with professionals as degrees are under way. This is because cases of educational contents are being examined under the request of enterprises. Accordingly, it will be helpful to raise these ability as university education for the students majoring in management information. As a limitation of the scope of this research, a method to consider based on practical cases is adopted. It is not a thesis intended to demonstrate the contents of each case. The main purpose of this research is to find useful knowledge for con-

structing management information education system connecting industrial community and educational community as undergraduate education majoring management information. However, in these cases, contents that are found to be novelty or usefulness as a methodology are probably included, and future research is expected to derive and verify educational methods based on individual cases.

It can be said that building an ambidextrous organization is a methodology to maintain and facilitate the balance of Exploration and Exploitation of knowledge in management [32]. To arrange the precedent example of companies and reflect this situation in classroom practice at universities will be one the issues in the future.

6 CONCLUSION

This study focuses on patent analysis of companies and considers the education of idea creation and prototypic implementation. In terms of the trend of companies' intellectual property, we analyzed Hon Hai Precision which is drawing attention in recent years and consider that knowledge flow will be the key in the global society. In addition, we mention an example to educate the Exploration and Exploitation of knowledge and consider connection to the education that is reflecting the industry's movement in classroom practice. The education on the basis of the intellect property strategy and a trend of the information technology is important to our country's education of innovation oriented. This study revealed that these are necessary knowledge and capacity for the students who are majoring in management information. Furthermore, we found the new direction of connecting practice to the education which is useful for both companies and universities. The analysis of universities' classroom practice in the light of case studies of existing companies need to be addressed in future research.

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