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CASE STUDIES OF THREE EXCELLENT TVET SCHOOLS¹:

- **China's Agricultural TVET Schools**
- **Korea's Busan Meister Technical High School**
- **Korea's Yeungjin School**

¹ These case studies have been conducted with the support of the Korea-World Bank Partnership Facility Grant to promote job creation and skills development in the East Asia region. Collectively, they provide examples of

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Introduction

Background

East Asian countries are among the fastest growing economies in the world over the last decade. However, as growth continues, the countries in East Asia are faced with a skills shortage and mismatching that has limited their economic growth. To tackle this issue, regional governments are currently restructuring their respective Technical and Vocational Education and Training (TVET) systems to guide schools towards demand-driven education and training.

In this context, the World Bank's East Asia Education team has embarked on an in-depth study of "Excellent Institutions" by selecting particularly outstanding cases in select countries of East Asia to research (1) which factors contribute to a particular school's successful outcomes; (2) how the school developed its demand-driven system; and (3) how the school utilizes finite resources to enhance school performance.

The purpose of this study is to provide policy makers with empirical evidence that will be used to develop new policies to direct schools towards more market-responsive and demand-driven approaches. Specifically, it aims to; (1) offer guidance for individual institutions to develop innovative methods to improve the internal and external efficiency of their programs and determine resource priorities; (2) provide the World Bank with empirical evidence to guide the knowledge services it offers client countries regarding TVET policies and practices; and (3) engender a productive dialogue on the improvement of TVET relevance within the East Asia and the Pacific (EAP) region. This report summarizes the successful experience of a) three Chinese agricultural TVET schools (one secondary vocational school and two tertiary vocational schools), b) Korea's Busan Meister Technical High School, and c) Korea's Yeungjin School. It then analyses the problems they have encountered in their operation, and provides lessons learned to improve vocational education. This research comprises "Excellent TVET Institutions in East Asia and the Pacific (EAP)," a study commissioned by the World Bank.

Conceptual Framework and Research Method

Definitions

The definition of *excellent* is measured by the school's internal and external efficiency. *Internal efficiency* refers to the relationship between the inputs and outputs and focuses on what occurs within the educational and training processes. Then, what happens to the outputs of the training process in relation to economic and social requirement is defined as *external efficiency*, which is also referred to as *relevance* of the program (Johanson and Adams, 2004). Accordingly, excellent TVET institutions produce the best training outcomes by retaining high internal efficiency.

Premised Four Factors Contributing to School Outcomes

Based on a review of the literature, this study premises that a school becomes excellent when it (1) conserves adequate resources; (2) delivers relevant programs; (3) develops an effective management system; and (4) establishes linkages with enterprise in the three previously discussed areas. Additionally, there are external factors impacting the success of schools, called “ecosystem factors” (Altbach and Salmi, 2011).

Basic Assumption

Case studies were conducted to verify that:

- (1) Graduates of excellent TVET schools have high levels of enterprise recognition, employment rates and employment quality.
- (2) Excellent TVET schools have a strong ability to serve the community.
- (3) Excellent TVET schools have high-quality teachers, better teaching conditions, courses that meet the needs of enterprises, effective management, and strong school-enterprise cooperation.

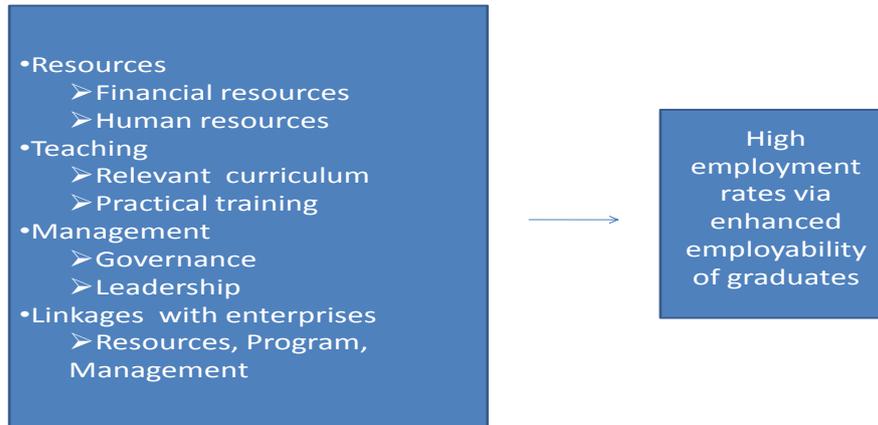
This study concludes that if the above assumptions are verified, then further improving teacher quality, teaching conditions, curriculum, school management and school-enterprise cooperation will lead to enhanced school quality.

Research Questions

By conducting an in-depth analysis, this study seeks to find (1) whether or not the above premise factors impact school outcomes; and if so, then, (2) which of these factors is the determining factor that contributes most to the enhancement of school performance and in what context (various settings and time periods within respective countries); and (3) how this factor can be strengthened based on suggestions from teachers/instructors and school administrators.

Conceptual Framework

Diagram 1 - The Theoretical Framework



Source: author's construction

This study reversely examines the relationship between outcomes and premise factors by selecting a high-performance school (purposely selecting the sampling procedure) and the impact of the premise factors on graduate employment rates. The logic is that if this high-performance school demonstrates a showing of all these factors, then we can conclude that these premise factors are likely to raise employment rates.

Case Study Selection

Three factors were used to select case studies for this study. First, as we are reversely testing the factors that are assumed to be contributing to a school's success, we selected excellent schools with exemplary outcomes. Second, we selected schools at both the secondary and post-secondary levels within the same sector. In this way, we can more easily compare how different levels of skilled graduates are absorbed into the lab or market within the same sector, thereby investigating whether "different levels of skills" is one of the ecosystem factors positively impacting school excellence. Also, this analysis may provide some suggestions on how to attract more students to vocational high schools, especially in countries where students' vocational track preferences are low. Third, we selected schools that provide skills training for sectors that may best represent the select country's economy. In this way, it is hoped that lessons learned from the case study can be tailored to meet the specific needs of a country that may be considering introduction of TVET training for the same sector.

In order to conduct the study, a questionnaire and interviews were carried out in each of the case study institutions.

Questionnaire Design

A total of five questionnaires were designed for the study: 1) a school, 2) its departments, 3) teachers, 4) students, and 5) enterprises. The first set of questionnaires for a school and its

departments cover its basic status, educational output, and other related information including its funding and expenditures; the questionnaires for the teachers and students survey their perspectives on the school facility and equipment, teacher quality, curriculum, school management, school-enterprise cooperation, etc.; and the final questionnaire for enterprises involves their evaluation on the quality of school graduates and cooperation with schools.

Interview and Field Research

Interviews and field research were conducted to understand the elements that affect school quality; summarize the successful experience of school operation; discover problems encountered in the operation process; understand the opinions of teachers, students and enterprises in regards to the schools; and provide suggestions for the improvement of education quality and operational efficiency in each case study institution. Interviews with the school leaders were also conducted to understand the school operation. The team visited the TVET schools to conduct the interviews and held seminars for teachers, students, and the enterprises.

Case Study 1

China's Agricultural TVET Schools²

Background

China's Education System

The Chinese education system consists of five parts, namely, preschool, primary, secondary, higher and continuing education. Secondary education consists of two stages: middle school and high school. Their education periods are 3 years respectively, of which middle school is divided into ordinary middle school and vocational middle school. High school is also divided into ordinary high school and secondary vocational school (including vocational high school, technical school and specialized secondary school). Higher education includes technical education, undergraduate education and graduate education. Technical education is for 2-3 years, while undergraduate education is for 4 years. Continuing education includes literacy education, adult primary/secondary/higher education, adult vocational education, community education and so on.

Expansion of Chinese Education and Industrialization

In China, the expansion of education is closely related to its industrialization, economic growth and labour market demands. Economic policy plays an especially important guiding role in the formation of education policy.

In the 1990s, China's economy changed from a planned economy to a market economy. The state has vigorously popularized compulsory education, while continuing to develop both vocational education and higher education to meet the needs of economic development.

Since 2010, the promotion of national strategy, such as "Made in China 2025," has provided a new direction for the Chinese economy to industrialization, urbanization, informatization and self-dependent innovation. The long-term and rapid development of the Chinese economy has promoted stable and high-quality education at all stages.

After expanding higher education enrolment since 1999, the gross higher education enrolment rate increased from 10.5% in 1999 to 37.5% in 2014. With the challenge of new technology development, China will need not only industrial restructuring, but also to train the human capital needed for a new round of growth.

² By Han Xu, September 2016

Industry Development and Employment

Since its economic reform, China has gradually expanded the proportion of the secondary (manufacturing) and tertiary (service) industries. Between 1995 and 2014, the share of the primary industry's contribution to GDP was consistently below 10%. On the other hand, the contribution rate of the tertiary industry to GDP showed steady growth, and has risen from 28.5% in 1995 to 47.9% in 2014. The change of the economic structure had a great influence on China's job market. The number of employees in the primary industry (collection of natural resources, i.e. farming, fishing) has been decreasing every year, while the number in the secondary and tertiary industries showed an increasing trend. From the long-term trend, the changing industrial structure has directly influenced labour demand, and is also closely linked to the employment issues of the agriculture sector.

Agriculture Industry in China

China's agriculture industry is experiencing a rapid change in structure, as the proportion of planting has been shrinking, but that of stock farming, fishery and forestry have been continuously increasing. The emergence of "company + farmer," "cooperative + farmer" and other organizational forms have diversified the sector's management model. In addition, advancements in agricultural science and technology have been continued, mainly reflected in the development of biotechnology, mechanization, pest control, and livestock breeding. Although the contribution rate of Chinese scientific and technological development to the agriculture sector has increased from 27% in the late 1970s to 43% in 2016, compared to the advanced economies' average of above 60% there is still a gap in its contribution.

Agricultural Employment in China

Over the last 30 years, the agricultural labour force has decreased by 200 million as they have left the land to work in cities and towns. The remaining farmers, mostly working in traditional farming, are unfamiliar with the new agricultural technology and knowledge. However, development of agricultural technology, agricultural product brands, and rural land development have promoted training for all kinds of skills to meet the needs of modern agricultural development. It is estimated that by 2020 China will need 18 million agricultural talents in the areas of (1) family farm management and chain business management, (2) agricultural technology research and food safety management, (3) international trade and marketing, and (4) rural cooperatives management and enterprise management.

Agricultural and Vocational Education in China

As an important component of the education system, agricultural vocational education aims to train technical personnel, managers and skilled agricultural workers. Agricultural vocational education in China consists of secondary vocational education, higher vocational education and various formats of adult vocational education and training.

Higher agricultural vocational education is mainly implemented by agricultural vocational colleges and some local agricultural universities. In recent years, the scale of agricultural vocational education at the college level is relatively stable, but its overall size is small.

Secondary agricultural vocational education is mainly implemented by secondary agricultural vocational schools and county-level vocational education centres. In recent years, the overall scale of secondary vocational education has been shrinking.

Adult agricultural vocational education includes village-level classes to teach agricultural knowledge, production techniques and operational skills. The Central Agricultural Broadcasting School under the Ministry of Agriculture also provides training for farmers. Overall, the scale of adult agricultural vocational education has been decreasing every year.

Case Study Analysis

Objective

The case study of three outstanding Chinese agricultural TVET schools will (1) clarify the connotation and standard of excellent TVET schools; (2) analyse the output of outstanding TVET schools such as the employment rate of their graduates and their ability to serve the community; (3) examine the current status of the outstanding TVET schools from the aspects of teacher, teaching facility, curriculum, school management and school-enterprise cooperation, and summarize their experience as well as the areas that need to be improved; and (4) based on the research conclusions, offer suggestions to promote development of agricultural TVET schools.

The research can provide an empirical basis for policy makers to formulate vocational education policy and guidance for a school to reform and develop their education system.

Case Selection

The basis of case selection is (1) to choose TVET schools in the major agricultural provinces that contribute to the development of the regional economy; (2) due to the different economic development and environment of Chinese regions, select schools across the different regions; and (3) select schools that are recognized as model vocational schools that have the strongest influence in the industry.

In accordance with the above criteria, we have selected Xinjiang Agricultural Vocational Technical College from the major agricultural province of Western China, Nan Gong Vocational and Technical Education Centre from Eastern China, and Heilongjiang Nongken Vocational College from the Northeastern China. Both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre are the model schools for the “National Vocational Education Reform and Development”, while Heilongjiang Nongken Vocational College is the leading school of “Heilongjiang Vocational Education Reform and Development.”

About the Schools

Xinjiang Agricultural Vocational Technical College

Xinjiang Agricultural Vocational Technical College is a full-time higher education institute for vocational education. Founded in 1958, it is under the leadership of the Agricultural Department of the Xinjiang Uygur Autonomous Region. In December 2006, it was selected as one of the key institutions for the “Construction Plan of National Demonstrative Higher Vocational Schools” by the Ministry of Education and the Ministry of Finance.

The school has 13 branch institutes, and 60 majors which mainly focus on the agricultural sector but cover the areas of humanities, economy, trade, management, engineering and Information Technology (IT). It has more than 12,000 full-time students and more than 800 staff members. The school also carries out joint education with countries like Malaysia and Kyrgyzstan.

The College of Animal Science, College of Biotechnology, and College of Horticultural Science are the main agricultural institutes of Xinjiang Agricultural Vocational Technical College. In this study, the three institutes were selected as the research targets, and both questionnaires and field research were conducted.

Nan Gong Vocational and Technical Education Centre

Nan Gong Vocational and Technical Education Centre is one of the first national model secondary vocational schools for Vocational Education Reform and Development. It provides programs of academic education, short-term training, skill appraisal and technology promotion. It has 20 majors in the areas of agriculture and forestry, processing and manufacturing, etc. The school has 380 teachers, 4,200 students for academic education and more than 6,000 students for short-term training.

The school has 2 majors related to agriculture: (1) modern agriculture and (2) animal husbandry and veterinary medicine, recruiting 30 to 40 students for each major every year. The school has also been active in serving farmers and the rural community. It has contributed to the development of the local economy by making use of the school’s educational resources to train the local workforce for farming.

Heilongjiang Nongken Vocational College

Heilongjiang Nongken Vocational College is a full-time public vocational college with a history of more than 50 years. It is one of the model vocational schools of the Construction Plan of Vocational Schools in Heilongjiang and also the Chair of the Teaching Committee for Food Majors in Heilongjiang. The school provides excellent equipment and facilities for training. There are 220 training rooms in the school and 224 training centres outside the school, and they have teaching and research equipment worth more than RMB 58 million.

The school has six branch institutes encompassing the areas of food engineering, pharmaceutical engineering, nursing, etc. It also has the majors of green food production, architectural engineering, and computer network technology, among others.

The employment rate of school graduates is more than 98%, with an employer satisfaction rate of 98%. The school also provides joint training with foreign schools including those in South Korea, Singapore and Thailand. The school conducts an exchange program for teachers and students, and it shares advanced educational resources with those schools.

The food engineering major of the school employs a "2+1" model of training, under which the students learn on campus for 2 years, and train through an internship for 1 year. Graduates are mainly employed in technical management positions of medium and large-sized food enterprises such as Yili, Wandashan Dairy and Mengniu Dairy.

The Surveys

Teachers

In terms of gender, female teachers are in the majority for both Nan Gong Vocational and Technical Education Centre and Heilongjiang Nongken Vocational College, whereas Xinjiang Agricultural Vocational Technical College has a similar ratio of both male and female teachers. All three schools mainly have young and middle-aged teachers, and most of the teachers have both an undergraduate and master's degree with significant work experience in a company.

Students

Both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre have similar proportions of male to female students, whereas Heilongjiang Nongken Vocational College has a significantly higher number of female students (83.27%). In addition, all three schools have a balanced distribution of students in each grade.

Enterprises

Private enterprise accounts for the majority of enterprises in all three schools. With regards to scale, medium-sized enterprises account for more than half of enterprises in both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre, followed by the small-sized enterprise. For Heilongjiang Nongken Vocational College, 61.11% of their cooperating enterprises are medium-sized and 27.78% are large enterprises.

School Outputs

Social Recognition of Graduates

Social recognition of graduates is an important criterion for an excellent vocational school. The main indicators of graduates' recognition are a high employment rate, excellent quality of employment and recognition by enterprises.

In terms of employment rate, the overall employment rate of agriculture majors in all three schools from 2012 to 2015 was above 90%. The average starting salary, which is an indicator of the quality of employment, increased from 2010 to 2015 at Xinjiang Agricultural Vocational Technical College. For the evaluation of the quality of graduates, enterprises indicated that they were “relatively satisfied” with the graduates of both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre.³ Especially in the category of graduates’ “responsibility” and “compliance with industry and enterprise standards,” both schools received the highest evaluation. For Heilongjiang Nongken Vocational College, the enterprises regarded the quality of graduates as “very strong⁴” compared to graduates of other vocational schools, indicating high recognition of the school by the enterprises.

The Ability of a School to Benefit Enterprises

The ability of a school to benefit enterprises is mainly reflected in the training of high-quality graduates for enterprises, providing training for employees in enterprises, helping enterprises to solve technical problems and supporting technical research of enterprises.

As evidenced in both the surveys and interviews, the teachers in Xinjiang Agricultural Vocational Technical College and Heilongjiang Nongken Vocational College believe that the schools have strong abilities in “training high-quality graduates for enterprises” and “providing training for employees in enterprises.” However, they find that the schools have limited ability in both “helping enterprises to solve technical problems” and “supporting technical research of enterprises.” On the other hand, the teachers in Nan Gong Vocational and Technical Education Centre believe that in addition to the training of high-quality personnel, the school can solve the technical problems encountered by the enterprises.

The Ability of a School to Benefit Community

The ability of a school to benefit community is another indicator to determine an outstanding vocational school.

Xinjiang Agricultural Vocational Technical College regards serving the local community, solving problems for local government, and promoting regional economic development as

³ The scale level of this questionnaire includes: 1. Very dissatisfied, 2. Not very satisfied, 3. General, 4. Relatively satisfied, 5. Very Satisfied.

⁴ The scale level of this questionnaire includes: 1. Very weak, 2. Relatively weak, 3. Similar, 4. Relatively strong, 5. Very strong.

important school tasks. By dispatching management teams and teachers, the school manages several county-level vocational schools. In addition, the students and teachers in the agriculture major help farmers during the harvest season, and those in the veterinary major often provide guidance in epidemic prevention among farm animals. The Nan Gong Vocational and Technical Education Centre also supports the process of fertilizer selection, sales and food processing for local farmers. In addition, Heilongjiang Nongken Vocational College has participated in designing and training for the “Construction Plan of the Pilot Area for the Agricultural Vocational Education Reform.”

School Influence

The influence of the school is mainly reflected in its impact on vocational education, industry and students.

All three schools have been widely recognized by industry since they have been selected as model schools for national vocational education. In the survey of Xinjiang Agricultural Vocational Technical College, we found that the school has a strong influence in the local agricultural industry. The majority of managers from the industry are graduates of the school, and the school graduates are in high demand from the labour market. In addition, a majority of the teachers in both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre showed their satisfaction with the ability of schools to attract high-quality students. However, the teachers in Heilongjiang Nongken Vocational College regarded the influence of the school in recruiting outstanding students as average.

Factor 1: Adequate Resources

Financial Resources

Regarding income from both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre from 2012 to 2015, public finance from the provincial governments has grown due to their increased investment in vocational education. However, tuition income has steadily declined resulting from a reduction in the total number of students and tuition exemption for some students.

For Heilongjiang Nongken Vocational College, the teachers believe that the school provides sufficient financial support to students, and it plays an important role in attracting high-quality students who have financial difficulties. However, from the survey we found that the students were not satisfied with their financial support, and it needs to be more centralized and increased.

For school expenditures, both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre mainly disburse on staff wages and benefits. On the other hand, we found that the expense to improve school equipment and teacher training is insufficient. The interview from Xinjiang Agricultural Vocational Technical College showed that the school's overall operation needs more funding, and the current funding level can only maintain its basic operation.

Facilities and Equipment

From the survey, the Xinjiang Agricultural Vocational Technical College teachers' evaluation on the school facility and equipment was not high. Besides the evaluation of the school meals averaging "relatively satisfied," the evaluation of other items was in between "average" and "relatively satisfied" and more towards "average." The teachers believe that the condition of student life and learning needs more improvement. The students also agree that the school should improve their housing, classroom and entertainment facility.

On the other hand, for both Nan Gong Vocational and Technical Education Centre and Heilongjiang Nongken Vocational College, the teachers provided the highest evaluation on "the training facility of the school." The students also agree with the teachers' opinion, but they think school housing still needs more improvement.

Teacher Quality

From the survey of students on the "evaluation of teacher quality," students in all three schools had a high evaluation of their teachers' quality. There was little difference in scores between the criteria of quality, and most of them are close to the "satisfied" level. The criteria for a teacher's quality include: "teacher's professional knowledge," "the relationship between teachers and students," "teaching ability," and "cooperation between teachers and other teachers."

Teacher Training

According to the survey on teachers' on-the-job training, most of the teachers responded that they had received training, and they are attending training for more than 20 hours every year. However, more than half of the teachers did not have training from the company that has signed the cooperation agreement with the school, and this makes it difficult for teachers to introduce the company culture to the students and provide targeted guidance for employment.

Criteria for Recruiting Teachers

Most teachers believe that teachers in vocational schools should have specific industry experience in addition to teaching experience, emphasizing the difference between vocational education and general education. With specific industry experience, teachers can better guide students toward employment and help them adapt to the work environment.

Factor 2: Relevant Program

Curriculum

Most teachers in all three schools regard the school curriculum as competitive, and students are also satisfied with their programs. However, despite their high evaluation, we found that students still need to receive additional training outside the school, and there is a gap between curricula and enterprises' needs.

Practical Course and Skill Development

A majority of the students believe that the schools provide sufficient training to prepare for a job. More than half of the students receive less than 10 hours of practical training every week, and one-third of students receive 11-15 hours of training. We also found that there is a significant difference in training hours among the grades.

Internship

A majority of students in both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre responded as having participated in an internship program before, while only 39.44% of Heilongjiang Nongken Vocational College students participated in the program. Their main reasons of not attending the internship were because it is difficult to find an enterprise and time. From the interviews with students, we found that the schools do not offer an internship opportunity for first-year students.

In regard to the size of enterprises for student internship, more than one-third of the students in both Xinjiang Agricultural Vocational Technical College and Heilongjiang Nongken Vocational College have worked in enterprises with 50-100 employees. On the other hand, 77.94% of students in Nan Gong Vocational and Technical Education Centre have worked in enterprises with less than 50 employees. Among the students, more than 75% of students in both Xinjiang Agricultural Vocational Technical College and Heilongjiang Nongken Vocational College received a salary for the internship, at the corresponding wage level of the labour market. However, 67.65% of students in Nan Gong Vocational and Technical Education Centre were not able to receive a salary, reflecting the lack of a student internship remuneration system in the school.

Despite more than half of the students expressing their satisfaction with the correlation between internships and school learning, there is still a gap that needs to be resolved. This gap arises from the school curriculum failing to reflect the actual needs of enterprises, while enterprises therefore do not provide positions that adequately reflect student majors.

Regarding student satisfaction with the overall internship, students had high satisfaction on “training directors of an enterprise,” “level of responsibility and work,” and “the working environment.” Students were mostly satisfied with all aspects of the internship program, believed that the schools were looking for internships that were well-suited to individual students, and that they are partnering closely with the enterprises. However, since the students’ evaluation on “remuneration and benefit” was relatively low, the schools need to further discuss with the enterprises to improve student remuneration and benefits during the internship.

Factor 3: Effective Management System

Teachers in both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre provided a high evaluation of school management. The criteria that received the highest scores are “school leaders can prepare for the future and continue to innovate” and “school leaders have clear principles of management.” On the other hand, the teachers of Heilongjiang Nongken Vocational College

believe that school leaders need to encourage more cooperation among teachers and appreciate teachers' contribution to the school.

Factor 4: School Industry Linkages

Partnership with Enterprises

Xinjiang Agricultural Vocational Technical College partners with various types of enterprises, and its main partners are small and medium-sized private companies. In regard to the job profile of graduates accepted by these companies, the graduates who are working in the technical guidance position of a production line account for the most (43.68%). The survey showed that most of the school graduates are favoured by the enterprises in employment decisions.

The teachers in all three schools believe that factors that hinder the partnership between school and enterprise are "a school wants to cooperate with an enterprise, but it lacks the ability" and "an enterprise is not interested in the cooperation." They believe that a school loses its appeal in cooperation when it cannot provide a benefit to an enterprise.

Enterprise Participation in Student Training

The main way in which an enterprise participates in student training is to provide an internship program. Information from both Xinjiang Agricultural Vocational Technical College and Nan Gong Vocational and Technical Education Centre demonstrated that the participation of an enterprise in curriculum development is lacking. However, if an enterprise does not directly participate in curriculum development, the school curriculum cannot reflect the actual needs of enterprises. The interview also revealed that most enterprises have neither the resources nor ability to undertake curriculum development, and they lack enthusiasm for participation, which may have resulted from the compensation provided by the school.

According to the survey of enterprises, 89.36% of enterprises regarded the internship students as their apprentices, and helped them to participate in production under the guidance of directors. However, we also found that there are many situations where students are only used as simple manual workers after undemanding training.

Enterprise Evaluation of School-Enterprise Cooperation

According to the survey, the enterprises' evaluation on all aspects of school-enterprise cooperation was very high. The criteria of the evaluation included "communication and coordination between the school and enterprise," "cooperative education conducted by both school and enterprise" and "the school provides staff training for the enterprise." Overall, the enterprises were satisfied with their cooperation with all three schools.

School's Career Development System

From the survey, the teachers in both Xinjiang Agricultural Vocational Technical College and Heilongjiang Nongken Vocational College evaluated the school's career support system

as average, whereas the teachers in Nan Gong Vocational and Technical Education Centre evaluated the system as an important tool for a student's career planning. For the students, more than half of them were satisfied with the career counselling service offered by the school, and more than 90% of students think career counselling contributes to their life planning.

With respect to continuing education, more than 60% of students want to pursue a higher degree. The majority of teachers in all three schools believe that the academic courses of schools can support their students to further their studies.

The Impact of Government Policy

From the survey question on "how much does the government's vocational education policy affect the school governance and policy?" the teachers believe that the government's policy affects the school governance to a certain extent. Most of them think that the national leaders have consistent vocational education policy and they think the government has an effective school-enterprise cooperation policy, quality assurance framework and financial mechanism, which promote improvement of school quality.

Conclusion

Lessons Learned

From the case study of the three vocational schools, we have learned that the excellent agricultural vocational schools persist in serving the rural community, strengthening school-enterprise cooperation, and innovating the talent training model.

Serving the Rural Community

One of the common traits of the three schools is service to the rural community and farmers. Nan Gong Vocational and Technical Education Centre has been making full use of school resources to support the 12 agricultural model villages including Wangtun, Xiezhai and Xiaochang. Xinjiang Agricultural Vocational Technical College also worked with Ulan Wusu town to promote the development of local economy. The school has dispatched teachers to train farmers in cultivation, pest control and preservation. The training has promoted the popularization of new agricultural technology and production methods, and optimized planting approaches throughout the entire town where the school is located. In addition, Heilongjiang Nongken Vocational College has actively participated in construction of the pilot areas for the Agricultural Vocational Education Reform. Since 2012, it has supported the construction and management of pilot areas including Nehe City, Wudalianchi City and Fuyu County.

Strengthening School-Enterprise Cooperation

School-enterprise cooperation is one of the key factors that affect the quality of talent training. Nan Gong Vocational and Technical Education Centre and partner enterprises have jointly built 9 farms, 2 training centres, 3 research laboratories on campus and 10 training

centres outside the school. Xinjiang Agricultural Vocational Technical College and partner enterprises have been cooperated on various fronts. For example, they have built a training centre for both seed production and management majors, and developed eight training courses reflecting seed production companies' work. In addition, Heilongjiang Nongken Vocational College established a province level school-enterprise cooperation group for food majors. The group provided consultation and research and development (R&D) to the companies. For example, it offered food safety and quality system training to the companies including Mengniu, Yili, Wandashan. It has also conducted the R&D on the preservation of mashed potato for a company in Qiqihar.

Innovating the Talent Training Model

Innovating the talent training model to improve the quality of training is another common trait of excellent agricultural vocational schools. Nan Gong Vocational and Technical Education Centre used the rotation training model to help students to find employment and positions suited for them. For the training of the animal husbandry major for example, the school has divided three teaching districts in Nan Gong according to their specialized areas of farming, and helped students to select one of them for their career development. The students can experience training from all three districts, with different positions offered by an enterprise in each district. The training model has provided the students an opportunity to experience the different areas of farming based on the characteristics of regional agricultural economies.

Xinjiang Agricultural Vocational Technical College has also implemented the various forms of work-integrated learning to meet the needs of high-quality personnel training. For Heilongjiang Nongken Vocational College, its training focuses on the student's sense of cooperation, sharing, and quality assurance. In addition, the teachers designed the education content and methods to stimulate the student's interest in self-learning.

Continuing Challenges

Although all three schools have accumulated successful experience in their operations, there are still areas that need to be improved, mainly reflected in:

Decline in Agriculture Related Majors

Nowadays, the students studying in agriculture related majors are decreasing every year, causing shrinkage of the size of the majors. So the schools began to expand the majors related to the secondary and tertiary industries. This phenomenon is more evident in the secondary vocational schools. One of the main reasons is that due to the low social recognition of the agricultural profession, most parents are not willing to let their children study in the agriculture related majors. In addition, the level of economic development in rural areas is comparatively low, so there is no attraction for graduates to work at the rural area. From the field research of Nan Gong Vocational and Technical Education Centre, we found that most graduates want to work in a big city in Hebei, and are reluctant to stay in Nan Gong for local employment.

Limitation in School-Enterprise Cooperation

The surveys showed that most enterprises working with the schools are small enterprises, and their main reason for cooperation is to solve their labour shortage problems. At Nan Gong Vocational and Technical Education it was found that because of the enterprises' size and low level of technical capacity, it is difficult for the students to learn new technology from them, and the enterprises can only offer lower quality jobs. The students in Xinjiang Agricultural Vocational Technical College also expressed that since their internship program was not administered with a clear plan and content, they were mainly used as a simple manual workforce. For Heilongjiang Nongken Vocational College, school-enterprise cooperation has been heavily reliant upon personal relationships, preventing the establishment of a formal system of cooperation.

Shortage in School Resources

Although the three schools are the national model vocational schools, their resources still can not fully meet the teaching requirements. First of all, their training facilities need to be improved and the schools must invest in the equipment of the newly opened majors. For example, if there was no assistance from enterprises, "the horse industry major" of Xinjiang Agricultural Vocational Technical College would have never met the needs of high-quality training. Secondly, the schools need more IT resources to provide on-line courses for students. Thirdly, student living conditions require improvement. We have found that Xinjiang Agricultural Vocational Technical College students have poor accommodations, and the school should meet the students' demand for better living conditions. Lastly, the teaching capability of teachers needs to be enhanced. A large number of teachers do not have work experience in an enterprise, and due to their heavy workload, they do not have time to participate in training to improve their practical teaching. So the schools need to provide the incentive and support for teachers to participate in practical training.

The Frequent Reform of Curriculum in Vocational Education

With the frequent reform of curricula, many educational plans have to be changed before their full implementation. Frequent reform also makes it difficult for teachers to understand and apply them in a short period of time.

Suggestions on Promoting Development of Agricultural Vocational Education

Vocational education is closely linked to the development of regional economies in China. To support the country's economic development goals, the government must continue to pursue agricultural modernization, which in turn will promote further development of agricultural vocational education. In order to do so, the structure of agricultural industry must be adjusted to promote green and creative agricultural production. Second, the processing industry of local agricultural products should be further developed to increase its added value. Third, the agricultural cooperative model to support the farmers throughout the production process could be better developed. Lastly, the online market of agricultural products must be further developed to promote their production, sales, branding and other related activities.

Enhance the Attraction of Agriculture Related Majors

China needs to raise awareness of the developing agriculture sector. Currently, the development of the agriculture industry is far beyond the traditional planting, and this new development requires a large number of excellent skilled workers. Therefore, efforts are needed to publicize its development and technology through media to raise awareness and attract highly skilled professionals. The agricultural vocational schools also need to strengthen their publicity activities to attract more students and attention. Through the media and regular visits to high schools, they can provide potential students with more information about the school and encourage them to apply.

Improve the Ability of a Vocational School to Serve the Regional Economy

In order to train high-quality professionals for the development of modern agriculture and the regional economy, a school needs to adjust its majors to incorporate content related to new agricultural trends and technology. In addition, it needs to further strengthen its infrastructure, teaching staff and school-enterprise cooperation to improve the quality of education and training. In this way, a school can make full use of its resources to contribute to regional economic development.

Leverage Government Policy

The government can reduce or exempt the tuition of students from agriculture related majors to attract more high-quality students. It also needs to increase public finance to improve learning conditions within agricultural vocational schools and between the schools and enterprises. The increase in teacher welfare and training will also do much to further development of agricultural vocational education.

Case Study 2

Korea's Busan Meister Technical High School

Background

Korea's Busan Meister Technical High School (BMT) was selected because it meets all three study criteria. The study collected data from multiple sources (archived information, quantitative measures, a survey, and interviews) to increase validity.

The Survey

The survey was conducted with students, teachers, vice principals, and the principal. 555 2nd and 3rd grade students out of a total of 600 responded to the survey. 1st grade students were excluded, as they are assumed to have a lack of learning experiences with BMT. 107 teachers (including the principal, two vice principals and 104 teachers) responded to the survey out of the total number of 113 teachers. The survey is designed to address whether or not schools retain each factor (resources, teaching, management, and linkage with industry) and these factors' impact on school outcomes.

The Interview

In order to conduct an in-depth analysis, interviews were conducted with 10 students, 10 specialty teachers, the principal, and one vice principal. Interview questions were structured to investigate the association between the premise factors and the factor most effective in enhancing school outcomes and how this identified factor can be improved.

About BMT

History

BMT was founded in 1967 by the government to supply skilled workers to Korea's newly established industry, and as of 2015 the school has produced 28,415 graduates in the field of mechanical engineering. The school became a Meister High School (MHS) in 2009. This same year, it reorganized the program to cover Precision Machine, Mold Design, Shipbuilding and Machine, and Robot Tech classes. The program changes and a series of reforms within the school system were undertaken to meet new industry demands for the 21st century global economy.

Educational Goals

BMT aims to help students become future industry leaders through self-development. The educational goal is to produce Young Meisters who are self-motivated and have problem-

solving skills and warm hearts. More specifically, the school focuses on developing basic occupational competencies and problem-solving skills; combining academic knowledge with industry-specific technical skills; providing students with an excellent learning environment; and ensuring teacher competency.

Case Study Analysis

Outcomes

BMT has showed very high graduate employment rates particularly after being transformed into a Meister High School. Prior to becoming a MHS in 2009, its graduate employment rate was between 45% and 55%. Upon reforming its program and transforming into a MHS, BMT's employment rate increased to 83% in 2010. Since 2013, when the school first began producing MHS graduates, the graduate employment rate has consistently been above 90%.

In 2014, public enterprises and large companies hired approximately 40% of BMT's graduates, while about 50% were hired by SMEs. By major, Precision Machine shows a very high employment rate, while Shipbuilding and Machine shows the lowest employment rates. Considering its comparatively larger number of students, Robot Tech also shows a high employment rate, particularly in the public enterprises and larger companies most pursued by BMT graduates. According to a survey conducted by BMT, the majority of students (70%) responded that their plan after graduation was either employment with large companies (35.6%) or public enterprises (34.8%); 21.5% responded that they were planning to work at SMEs (Educational Planning, 2015, BMT).

BMT teachers believe their students are highly competent. During the teacher survey, 96% responded that their students are highly competent and 97% believe that BMT is attractive to highly competent students. During the interview, teachers mentioned a “virtuous circle,” indicating that because the school achieves successful results, graduates have a high chance of being employed, which makes the school very attractive to prospective students who are already competent and can easily obtain the skills taught by BMT. As a result, the school produces successful outcomes again and again.

Findings

In this paper, ‘excellent TVET’ institution’ means that it helps students’ transition smoothly into the labour market upon graduation by inputting adequate resources. BMT teachers agree, stating that ‘excellent school’ means that it produces a high employment rate and, in order to do so, the school requires competent teachers, demand-driven programs, and well-established school-industry linkages. The teachers pointed out that the skills currently in-demand by industry include basic technical skills along with socioemotional (SE) skills such as adaptation, diligence, consideration for others, problem solving and work ethic.

BMT's teachers further described an excellent school as one having a “virtuous circle.” If the school inputs key resources and uses them efficiently, then more students become employable, which in turn results in a higher graduate employment rate. This outcome in turn increases the school's brand power, which attracts even better teachers and more

competent students. Also, when the school produces high employment rates, it receives more financial support from the government, which enables the school to acquire and retain expensive equipment and practical training facilities. With the high social recognition of being a top performing school, more companies are interested in hiring BMT graduates. This is BMT's virtuous circle.

BMT's students agree with its teachers. During the interview, students stated that the factors contributing to BMT graduates' high employment rate are good teachers and facilities, and the school's well-established school-industry cooperation. In addition, some students highlighted the school's reputation, and alumni support, while others mentioned its strong emphasis on employment and provision of various employment service programs.

All students stated that they choose BMT because they believe it will help them secure a job upon graduation. Currently, they are satisfied with their choice and with the school's facilities, equipment and teachers, who they view as competent in their technical and teaching skills and actively able and committed to helping them secure a job. Given Korea's high youth unemployment rate, BMT's success is all the more remarkable.

Factor 1: Adequate Resources

Financial Resources

Budget

BMT is overseen by three government agencies: the Ministry of Education, Busan government's local education office, and the Small and Medium Business Administration (SMBA). SMBA is the main agency that provides annual funding to BMT, and it also funds two other Meister High Schools for the purpose of producing and supplying adequate skilled workers to SMEs. According to 2015 data, the government (SMBT and the provincial office) provides the highest percentage (about 60%) of BMT's total revenue, followed by parental support. Regarding expenditures, the school spends the most on student welfare (i.e. dormitories and food), followed by administration. More than 20% of the total budget is allocated to curriculum development. BMT spends 16% of its total budget on teachers' wages. Teacher and student survey and interview results demonstrate that the school retains adequate financial resources with 85% of surveyed students responding that at least some portion of course fees, residential costs, and academic materials are covered by the school.

Facilities and Equipment

During the teacher survey, 85% responded that school building conditions are excellent or good, 84% believe equipment maintenance is excellent or good, and 83% agree that retention of full or updated equipment is excellent or good. Overall, the majority of teachers are satisfied with school facilities, equipment and their maintenance. The student survey showed majority satisfaction regarding school's facilities and equipment. Sixty-seven percent responded that they are satisfied with classroom conditions, 61% are satisfied with computer labs and access, and 72% are satisfied with practical training resources. All ten of the

interviewed students agreed that BMT retains adequate training facilities and equipment, providing each student with practice space and materials.

Human Resources

Number of Teachers and Staff

As one of largest Meister High Schools, BMT also retains a large number of teachers and staff, including one principal, two vice-principals and 113 teachers.

Teacher Characteristics

The majority of BMT teachers are in their 50s, while there is a shortage of teachers in the 40s age-range. This shortage prevails throughout Korean TVET schools, because during the 1990s government policy on TVET teachers limited their numbers. The average years of teaching experience is high, with nearly half of BMT teachers possessing over 20 years. The average educational level of the teachers is an undergraduate degree, and roughly one third have also obtained a master's degree in their areas of specialty.

In-service Training

BMT requires its teachers to receive 90 hours of in-service training per year. According to their 2015 Educational Planning, among 65 specialty teachers, 4 from Precision Machining, 8 from Mold Design, 17 from Shipbuilding and Machining, and 15 from Robot Tech, received in-service training in their respective areas. Our teacher survey results show that 96% of BMT's teachers received in-service training, and among them 59% had received more than 61 hours by April of 2015. The majority (61%) had received seminar/workshop training.

During the survey teachers were asked to assess their own competency. Ninety-eight percent regard themselves as a competent teacher who possesses the required technical and teaching skills. The same proportion of BMT's teachers believes that the school has adequate teacher recruitment standards. During the in-depth interview, all teachers indicated that the most important element of being a competent TVET teacher is technical skill. However, newly hired teachers often lack technical skills due to a lack of practical training during tertiary teacher training programs. According to the Principal, BMT offers 3-6 months of training to newly hired teachers, hiring substitute teachers during their absence, in order to overcome this issue. The school also appoints industry mentors for teachers to help them improve their technical skills.

According to the student survey, 75% of students agree that their teachers are competent. Interviewed students further stated that BMT's teachers are competent in both technical knowledge and teaching. Students said the older teachers have more teaching and technical skills than younger teachers, and that older teachers are able to teach the latest skills. Students also mentioned that teachers support them in acquiring certificates by working with them even after class, on weekends and during vacations. Students further report that their teachers actively find prospective companies for them, continually providing information on employment with these companies.

Career Development Supporting Programs

BMT offers various programs to help its students build their career plans. First, “Semester for Promotion of Learning Motivation” is a new initiative developed by the current Principal, Dr. Lee. The program is offered to freshmen during the first month of the high school year and aims to improve learning motivation to help them develop career plans. The program also seeks to enhance students’ sense of community, self-reflection, self-esteem, self-control, commitment to and respect for others. During this month, students participate in various group activities and attend special lectures conducted by prominent graduates.. They also visit large companies and SMEs. Overall, the teachers (59.5%), parents (63.5%), and students (63%) are satisfied with this program (The Educational Planning of 2015, BMT). During our interview, students said that “My future company visit” during the Motivation program was key in helping them understand how a manufacturing plant operates and the workings of a real job. Another program, “Weekly Special Lectures of Personalities,” invites prominent alumni (such as corporate CEO) to foster student motivation for future achievement and job acquisition. Lectures are aimed at increasing student self-confidence, helping them developing their future career plans and cultivate a sense of caring for others. Overall, the teachers (69.7%), parents (57.3%), and students (51.9%) are satisfied with this program (The Educational Planning of 2015, BMT).

The fact that BMT has instituted an excellent support system to enhance student employment is supported by evidence collected by our study. During the teacher survey, 38% rated BMT’s support system as excellent, particularly in the area of career services. During the interview, they agreed that the school has successfully motivated student learning, helping them develop career plans. According to the Principal, BMT’s support system directly and positively influences the graduate employment rate. As of April, 90 students out of 295 (3rd grade) had secured employment and in order to make this happen, the school has provided various other programs, besides the two aforementioned, such as Employment Camp, Job Fair, and Company Field visits.

BMT’s students also said that the school’s support system has been very helpful. During the survey, 63% reported receiving career counseling, and among them, 89% responded that the counseling has helped them navigate their career plans. In particular, homeroom teachers guide them in finding their specific interest, occupation and companies. Then, the school provides information on the company and employment opportunities: for example, assisting students in acquiring certifications needed for the specific job and company, improving their interview skills, and supporting them in writing a resume and self-introduction letter.

Factor 2: Relevant Program

As BMT is a specialized high school whose specific purpose is to produce skilled workers within relevant fields, the specialist subjects occupy the most (50%), and are comprised primarily of required credits. BMT’s 1st year program focuses on the National Common Basic Curriculum, while the 2nd and 3rd year programs focus on Optional Subject Curriculum.

Our study findings support the fact that BMT is providing its students with programs that enhance industry-required skills. Ninety-three percent of teachers said BMT offers high

quality programs and 87% believe its curriculum is industry-relevant. Sixty percent of the teachers reported that students need to take additional training to be employed. This is because in Korea's case, the students need to acquire certificates, and additional training serves this purpose. Overall, 95% of surveyed teachers believe that the school provides relevant programs (including practical training) to produce competitive graduates. During the in-depth interview, teachers generally agreed that the school offers its students what industry requires. Furthermore, 90% of teachers believe that BMT's program can also help students advance to higher education.

According to the Principal, currently needed skills include basic technical skills, cognitive skills, and SE skills such as adaptation, consideration for others, diligence, patience, problem-solving skills, and self-determination. In regard to technical skills, teachers believe that the school should impart basic technical skills because these are the job-ready skills needed on production lines and they form the basis for acquiring firm-specific skills. To meet the rapid changes in industry, BMT annually reviews its curriculum and updates supplemental training materials.

Students agree that BMT provides industry relevant programs. During the internal survey, 63.7% of students responded that they are satisfied with their major (The Educational Planning of 2015). In our survey, 72% of students responded "Yes" to the question of whether they believe BMT is preparing them adequately, skill-wise, to find a job and 56% mentioned receiving more than 20 hours of practical training each week at BMT. Nevertheless, 78% of students said that they take additional training outside of BMT's regular program, and among them, more than half are receiving 10-15 hours of additional training per week. Students said that they take additional training aside from school's regular program not because they lack practical training but because they need to prepare for certain certificates. According to students, Korean companies emphasize whether or not an applicant holds needed certifications during the hiring process.

Factor 3: Effective Management System

The teachers all agreed that BMT's management contributes to its positive school outcomes.

Organization of School Management

BMT's management includes one principal, two vice principals, seven centre heads and 25 team leaders. Under the Principal, there are two vice-principals and one head of Administration. Each vice principal is responsible for the three centres, and each head of centre manages their own department. The head of Administration under the Principal manages the school administration centre that consists of five departments, including school-industry cooperation.

Centre-focused Department Management

BMT's unique Centre-focused Department Management aims to improve open communication, unity, and harmony among faculty members by integrating 25 departments

into seven major centres. The seven centres are the Education Planning Research Centre; Meister Centre; Technical Education Centre; Creative Design Centre; Cognitive Education Centre; Student Support Centre and; the School Administration Support Centre. The school holds bi-weekly meetings to discuss and share the centres' issues, including curriculum, budget, and facilities; therefore, during the meetings, the teachers understand the total workflow across the department as well as among the centres. Also, this centre-focused management approach enables BMT to use the budget efficiently as funds are allocated by centre, and departments within the centre share the funds overall.

To assess management perceptions, BMT conducted an internal survey of its teachers. Regarding the question of to what extent teachers' suggestions and demands are reflected in the school's education plan and aim, 36.7% of the teachers responded "some" and 44.3% responded "moderate." In response to the question of to what extent teachers' suggestions and demands are reflected in the school's division of duties and personnel management, 40.5% of teachers responded "some" and 35.4% responded "moderate." On school support for in-service training, 17.7% of the teachers responded "very satisfied" while 46.8% said "satisfied." Another question concerned whether they were satisfied with BMT's suggested 2014 educational goals and 62% responded "satisfied." Lastly, 35.4% of the teachers said they are "satisfied" with the centre-focused management (The Educational Planning of 2015, BMT). Overall, BMT's teachers are satisfied with its management system.

The Bank also conducted a teacher survey to assess their perception of school management, particularly leadership. Ninety-one percent of the teachers believe that BMT's school leaders have consistent school policies and an equal percentage believe that the school leaders execute BMT's guiding principles with clarity. Ninety-two percent believe their school leaders envisage the future and consistently look for new and innovative products, processes, and services. Seventy-four percent of teachers find school leaders encourage collaboration by building trust among faculty members while the same percent indicated that their school leaders encourage self-determination and ongoing competency development among teachers. Eighty-two percent teachers responded that BMT has a vision that is shared among faculty and staff. Seventy-six percent said that school leaders are consistent about their words and deeds and 87.7% of the teachers said, "the school leaders recognize my contribution by showing appreciation." Lastly, 82% of the teachers responded that the school has the capacity to deal with both anticipated and unexpected challenges/risks.

The teachers indicated that the Korean education system confers strong management power to the Principal. For example, Principals can reorganize the school system, manage teachers, and even develop new curricula. This is particularly so in Meister High Schools, which have more freedom to develop their own curricula to meet industry demands. Accordingly, BMT's Principal is able to develop and institute new initiatives and he has a strong vision. Several teachers referred to the school's new initiative programs as one example of the principal's strong leadership.

One teacher pointed out that management impacts graduate employment rates by increasing student motivation and confidence. In particular, student experiences during the new initiative programs, directly influence their motivation for learning and acquiring a job. This view is supported by the students as well. During the interview, students stated that their experiences during "Semester for Promotion of Learning Motivation" helped them find the

purpose of their study and navigate a career plan, which pushed them to work harder during the school year to achieve their employment goals.

Factor 4: School Industry Linkages

To strengthen school-industry linkages, BMT has created various departments, including School Industry Cooperation TF, the School-Industry Cooperation Advisory Committee, Council for Operation Field Practice, and Management of Job Career Development Center. Furthermore, the school organizes several field visits to select companies for the students.

School-Industry Cooperation Advisory Committee

The committee is composed of the school teachers/staff and representatives from enterprises. The chair is selected from industry, and the head of the Meister Centre is designated as an assistant administrator. Within the committee, operation committee members are composed of the vice principal, the head of five centres, and the team leader of the 3rd grade, two staff members from the school-industry cooperation department, and the head of four major departments; while advisory Committee members are composed of representatives from enterprises. The meeting is held annually, and during the meeting, the members discuss specific programs, textbooks, curriculum to meet industrial demands, share employment information, and discuss the possibility of in-company training for both the students and teachers.

Council for Operation Field Practice

The council is composed of the vice principal, the head of five centres, and the team leader of 3rd grade, the head of four major departments. The vice principal is designated as a head and the head of the Meister Centre is designated as an assistant administrator. Their main tasks include selecting companies for practical training; defining procedure for in-company practical training; and assessing practical training.

School Industry Cooperation TF

Its role is to develop a MoU with prospective companies, and their specific activities include finding excellent SMEs, visiting these SMEs, developing a MoU with them, and sending students to these companies for in-company practical training and employment.

Job Career Development Centre

The centre's main responsibilities include building a database on company information in connection with SMEs administration; supporting educational programs offered by the companies; organizing staff's company visits to develop MoU for employment. In addition, the centre provides the students with the latest information on the companies, helping them prepare self-introductions, resumes, and job application letters, and providing personalized career counseling via job interview simulation. According to the internal survey, 65.9% of teachers, 55.9% of parents, and 62% of students are satisfied with their experience with the Job Career Development Centre (The Educational Planning of 2015, BMT).

Field Trip to Select Companies

The school provides students with an opportunity to visit prominent companies to help them understand how products are manufactured in the production lines, to help them develop their career roadmaps, and to promote school-industry linkages. Because the students of 3rd year are taking in-company training during summer, the site visit is designed specifically for 1st and 2nd year students who are still developing their career plans.

According to the teacher survey, 95% reported a belief that BMT has built successful partnerships with companies that enhance school outcomes. Also, in regard to the type of cooperation, 96% of teachers believe that a school should have a formal partnership with companies. However, teachers often face difficulty in finding interested companies. Indeed 67% of those surveyed identified companies' disinterest as the main impediment to MoU development. During the interview, all teachers stated that in particular SMEs are generally not interested in developing school-company cooperation.

To overcome this challenge, BMT teachers have made tremendous efforts by visiting companies in person to discuss possible collaboration and MoU. Once a MoU is developed, then the companies participate in developing training materials and curricula as well as provide scholarships, in-company training for the students and teachers, places for the field visits and employment.

Also, all teachers agreed that their cooperation with the companies is systematic as the MoU defines each party's roles and responsibilities. The role of companies is rather advisory: for example, during the School-Industry Cooperation Advisory Committee meeting, the representatives from the companies provide advice on the direction of the program and curriculum. In regard to developing BMT's own training materials, the teachers of each department work closely with the representatives from four companies according to their relevant fields.

However, most teachers indicated that the companies need to be more active in this cooperation. Although the formal School-Industry Cooperation Advisory Committee is held twice a year, sometimes one third of representatives of the companies fail to attend the meeting. Therefore, the teachers note that school-industry cooperation can have the best outcome only when the companies also actively participate in this cooperation.

Conclusion

This study reversely examined the relationship between outcomes and premise factors by selecting a high-performance school and the impact of the premise factors on school outcomes. The logic is that if this high-performance school demonstrates that it possesses these factors, then these premise factors likely raise employment rates.

The first research question is whether or not the school possesses these factors. The findings strongly support that BMT has 1) adequate resources, 2) relevant programs, 3) excellent management, and 4) well-established school-industry linkages. The second question is whether or not the above premise factors impact school outcomes. The findings suggest that

these factors both directly and indirectly influence BMT graduate employment rates. According to the survey and interview conducted with teachers and students, these factors increase student employability. The third question concerns which of these factors contributes most to the enhancement of school performance, in what context, and how this factor can be strengthened. According to the findings, the primary factor has changed over time due to economic and social conditions.

During the 1970s, because the country shifted from a lighter to heavier manufacturing industry, it required different types of labor force, such as skilled technicians and experts. Accordingly, the government expanded technical and vocational education to meet the demand for skilled workers in the heavier manufacturing industry (Zang, 2009; Kim, 2000; Lee et al, 2012). Given this economic context, BMT was strongly supported by the government. In fact, the government founded BMT in 1967 to meet this shortage of skilled workers with support from the German government as well as IBRD. Then, the government produced practical trainers within a short time period by issuing a practical trainer certificate to those who graduated from BMT. The teachers stated that during this period, both financial and human resources were the most important factors contributing to the school's performance. Although BMT faced a lack of resources, strong government support, along with support from IBRD and other donor countries, and their ability to expedite technical teachers enabled them to overcome the odds.

Since 1985, higher education enrollment (both 2 year technical and vocational college and 4 year university) has rapidly increased due to economic growth and social demands. As a consequence, according to the teachers, all TVET schools had the most difficult time during the 1990s: most students entered academic high school to pursue higher education, while stigma attached to those who studied at TVET schools prevailed. During this time, the teachers generally agreed that management, particularly a strong leadership and vision, was the most important factor contributing to school outcomes. First, BMT management efficiently utilized its resources in the face of a lack of financial support from the government. Second, management focused on establishing school-industry cooperation with strong alumni support. Because of its long history, BMT had a good number of prominent alumni, including CEO of SMEs. Their companies provided scholarships, lectures, and employment to BMT students. Also, under strong leadership direction, the teachers not only taught but also actively worked on establishing the school-industry cooperation. Therefore, the teachers said that during the 1990s when there was low demand for and high stigma attached to TVET schools, BMT's management was the most important factor, and their recommendation was to have a leader with strong vision and leadership.

In 2008, the government made a major policy change in the TVET system. Due to a shortage of technical skilled workers and stigma attached to TVET schools, it decided to establish the Meister High Schools by selecting 39 existing TVET schools whose performance meet the criteria. The purpose of establishing the Meister High School is to produce skilled workers via a curriculum tailored to industry needs in order to reduce skills mismatching. By transforming TVET schools into specialized high schools purposed to produce the best skilled workers, the Meister High Schools would reduce the stigma attached to TVET schools. To achieve this goal, the government first provides the schools with financial resources to substitute their students' tuition, dormitory, and fees, as well as to maintain training facilities and equipment. Second, the schools are given the autonomy to develop customized curricula

to meet the demands of companies in their relevant fields. Third, due to increasing school autonomy, the government encourages the schools to select a Principal with strong management skills via public contest. Lastly, the government encourages Meister from industry to train Meister High School students via school-industry cooperation.

Since becoming a Meister High School BMT has received strong government support, particularly financial resources. BMT has built a strong reputation and high employment rate outcomes. Given that a Meister High School has strong autonomy in the areas of curriculum development and management (including the Principal's), most of BMT's teachers agreed that management, particularly leadership, is a key factor in determining school outcomes. They recommended that schools should have a good leader who has vision, manages resources efficiently, encourages teachers to improve their competencies, develops demand-driven, tailored curricula, and establishes meaningful school-industry cooperation. In Korea's BMT Meister High School, all school inputs are created and utilized under the direction of the Principal's strong leadership.

Case Study 3

Korea's Yeungjin School

Background

Korea's Yeungjin School was selected because it meets all three study criteria and is well-known for producing successful mid-level technicians for the manufacturing sector. The study collected data from multiple sources (archived information, quantitative measures, a survey, and interviews) to increase validity.

The Survey

The survey is designed to directly address whether or not the schools retain each factor (resources, teaching, management, and linkage with industry) and these factors' impact on school outcomes. It was conducted with the students and professors of three majors directly related to the manufacturing sector [School of Mechanical Engineering, School of Electronic and Info-Communication, and School of Electronic Engineering] and the President of Yeungjin. Six hundred ninety-three students out of the total number of 1,400 responded to the survey. Among faculty members, 23 professors of the aforementioned majors responded to the survey.

The Interview

The interview investigates the association between the premise factors and the factor most effective in enhancing school outcomes and how this identified factor can be improved. To conduct an in-depth analysis, we interviewed 10 students, 10 professors, and the President.

About Yeungjin

Educational Purpose, Goals and Strategic Plan

Yeungjin's educational purpose is to cultivate creative and highly proficient professional technicians by strengthening specialized skills via a demand-driven program. Specifically, it aims to, 1) cultivate professional technicians who can be 21st century leaders; 2) educate students to become professional technicians with clear vocational goals; 3) develop and provide a customized education to students; 4) help students prepare for globalization by providing information technology and foreign languages; and 5) help students develop socioemotional (SE) skills (e.g. ethics, diligence and consideration for others). To achieve these goals, Yeungjin has developed the following integrated strategy.

Table 1: Strategy

Establishment of a Top-Class Education System

<i>Admissions Competitiveness</i>	Increase the quality of applicants by strengthening the admission process
<i>Diversification of Academic Programs</i>	Improve education quality by further developing instructors' program competencies
<i>Customized Education</i>	Cultivate highly skilled workers to meet industrial demands by strengthening customized education
<i>Industry-College Cooperation</i>	Increase graduate employment rates and the quality of job placement by strengthening school-industry cooperation
Innovation of Administrative and Financial Structure	
<i>Management System</i>	Cope with rapid changes in educational circumstances by reforming the management system
<i>Administration</i>	Provide student-focused administrative services by retaining competent employees
<i>Diversification of Resources</i>	Lower dependence on tuition and fees by finding other resources
Construction of Future-oriented Educational Infrastructure	
<i>Industry-College Centered Techno Valley</i>	Play a vital role in local economic growth by facilitating an industry-college cooperation
<i>Education-Centered LLL Hub</i>	Become a Life Long Learning hub by providing training services to SMEs for their employees
To Foster International Competitiveness	
<i>Internationally-associated Customized Education</i>	Meet demands from overseas Korean companies by expanding customized education
<i>Support System for International Students</i>	Institute a system that supports international students by providing Korean language, student life, study guides, career counseling, etc.
<i>Global Education Programs</i>	Cultivate global leaders by developing programs that aim to improve international work skills
<i>Global Education Support System</i>	Create an educational environment that caters to international students by meeting international tertiary education standards

<http://www.yjc.ac.kr/CmsHome/MainDefault.jsp>

Employment Rate

The College Sustainability Index⁵ evaluates performance in five areas: education, research, job placement, management, and convenience / fairness/ communication among 132 Korean colleges nationwide. In 2012, Yeungjin received the highest score (777.3 points) among 132 colleges, ranking first in job placement, second in management, and third in education. According to the Ministry of Education's (MoE) "Job Placement Statistics of Higher Education Institution Graduates 2012," Yeungjin ranked at the top in job placement among

⁵ The Index is jointly developed by the Kyunghyang Newspaper Economic Research Institute for Sustainable Society (ERISS), World with No Worries on Private Education, Samjong KPMG, LLC, Hyundai Research and Young Entrepreneurs for Sustainable Society.

colleges retaining more than two thousand graduates with 79.3% of its graduates employed. In 2011 the MoE, whose aim is to cultivate Korea's best technology masters in colleges, nominated Yeungjin as one of seven World Class Colleges (WCCs). This is a meaningful award as a WCC is a comprehensive evaluation that assesses college infrastructure, educational performance, financial integrity and the satisfaction rate of industries with education. As the graduate employment rate is an outcome indicator in this study, Yeungjin is assumed to be an excellent school. Next, we will reversely examine whether or not the school possesses all of the premise factors before determining whether or not these premise factors are likely to impact employment rates, and in what direction.

Case Study Analysis

Factor 1: Adequate Resources

To determine whether or not Yeungjin has adequate financial and human resources to enhance student employability, we conducted a survey and interview with teachers and students.

The Teachers' Perception

During the survey, teachers were asked to assess three areas, a) the school's financial resources and facilities; b) teachers' recruitment standards and in-service training; and c) the support system for employment. Results show that Yeungjin retains adequate financial and human resources. All surveyed teachers believe the school provides adequate financial support to students, and 96% responded that providing financial support plays a primary role in attracting talented students. Regarding school facilities, 65% of teachers answered "excellent," while 57% answered "excellent" for equipment maintenance, and 56% answered "excellent" for retaining full and updated equipment.

In the area of human resources, teachers were asked about teacher recruitment and in-service training. For teacher recruitment, teachers were asked to identify which is most important, 1) minimum academic qualifications; 2) minimum years of industry or work experience; 3) minimum years of teaching experience; or 4) other. Thirty-five percent responded that "minimum years of industry or work experience" is the most important criteria. Ninety-one percent responded that Yeungjin's recruitment standards for teachers/instructors are adequate enough to provide students with state-of-the-art skills. All of the teachers believe themselves to be competent teachers with the required skill set for teaching. Ninety-one percent of Yeungjin teachers had completed in-service training as of April 2015 and the majority (67%) had taken a formal type of in-service training, such as mentoring or leadership coaching.

Teachers were also asked to assess Yeungjin's support system for student employment. Ninety-one percent answered that the school has a support system to assist students with their career plans and provides various employment services, such as a job service center. In addition, all teachers said that they have guided their students in developing career plans.

Regarding facilities and equipment, teachers pointed out the benefits of participating in government projects that support SMEs. The school has been nominated as a learning and skill hub in the region for several government projects that support SMEs in boosting the

local economy. Through this SME consortium, Yeungjin provides SMEs access to its facilities and faculty in exchange for the SME's providing expensive machines and equipment. The teachers said that through this process, the school was able to upgrade its training facilities and secure the best equipment in the region.

Regarding human resources three key themes emerge from the study, 1) teachers with industry experience are recruited, 2) advisors work closely with students, and 3) a virtuous circle is maintained. First, teachers pointed out that Yeungjin recruits teachers from industry, particularly those who hold middle or high level positions at large companies, via public contest. The goal is to secure faculty members who are able to develop demand-driven programs as well as strengthen school-industry cooperation. Selected instructors are able to develop relevant curriculum and training materials, as they know the types of skills and knowledge demanded by the current labor market. Additionally, they respond to market changes by continually updating training materials and, if necessary, changing out entire courses. All teachers agreed that hiring instructors from industry has a direct impact on increasing the graduate employment rate. Based on their industry experience, instructors are able to inform students of the types of certificates and courses needed to attain employment in their chosen industry and, ideally, at their dream company. Teachers are further able to help students gain employment by leveraging their own networks.

Second, in Yeungjin, there is an advisor for each class who is responsible for approximately 30 students. Via one-on-one meetings, each advisor works closely with their respective student on developing their career plans, providing company employment information and job opportunities. Advisors teach job ethics classes to help students prepare for work, provide career counseling, and support students in developing their academic skills.

Third, teachers pointed out that the school is in a virtuous circle, similar to that described by the teachers of Busan Meister High School. Because the school retains adequate resources, excellent facilities and faculty members, it produces high graduate employment rates, particularly with high quality jobs. Then, based on good assessment results, the school receives more financial support from the MoE and is able to participate in the government-supported SME consortium. This in turn helps the school retain excellent facilities and strengthens school-industry cooperation. Then, the school is able to secure competent students and teachers and, in this manner, continually produces the best outcomes.

The Students' Perception

During the survey, the students were also asked their perception of the school's resources. Eighty-three percent reported receiving at least some level of financial support to cover course fees, residential costs, academic materials, etc. Sixty-seven percent are satisfied with classroom conditions. Regarding teacher competence, 71% said they are satisfied. Regarding career support system, 63% had received career counseling, and among these, 92% said that the counseling helped them navigate their career plans in order to secure a job. In general, 66% of the students are satisfied with school life.

In addition to interviewing teachers and staff, we conducted an in-depth interview with ten students. Those interviewed agreed that enough machines and equipment are available to them for their practical training. They are impressed with Yeungjin's training facilities,

because some of the expensive machines they have access to are not available in other universities and they notice no shortage of machines or equipment.

All interviewed students agreed that their teachers are competent. According to the students, based on their work experience with large companies, their teachers are able to design demand-driven, customized programs, teach the most relevant skills, and develop useful training materials. Interviewed students mentioned that based on their experience, the teachers continually give students tips for employment preparation, guide students in developing career plans, and provide company-specific information. The students said their teachers directly assist in connecting students with companies within their respective networks. Furthermore, interviewed students said Yeungjin's teachers continually update knowledge and skills in their fields while maintaining relationships with companies. Teachers are able to freely develop and update training materials for the classes they teach. One student mentioned that some employed graduates still use school training materials to do their current job.

Students said that the one-on-one meetings with an advisor are very helpful in solidifying their career plans because advisors provide them with company specific information and inform them of certificates necessary for applying to a particular company.

Interviewed students agreed that most teachers not only teach but also emphasize individual student job placements. They continually provide tips for job preparation during classes and directly help students obtain jobs by matching company requests with students' skills to identify ideal candidates. By utilizing their own network, teachers find places for in-company training and even jobs for students. Most importantly, students said that their teachers care about them, for example, supporting late learners by using personal time after class and on weekends to help them catch up. All interviewed students agreed that their teachers are available anytime they need help outside of class and many provide special weekend lectures and lectures during vacation.

Factor 2: Relevant Program

Program Structure

Yeungjinn has three departments:

The School of Mechanical Engineering

This department includes three sub-majors:

1. *CAD/Mechanical Design Course* provides knowledge and skills for CAD needed to design machines like semiconductor equipment, automobiles, and ships.
2. *Mold/Tooling Course* provides knowledge of Mold and Tooling and skills for Mold/CAM by using 3D CAD. The students also obtain skills for CAM engineering, precision machining, precision measurement, machining technology, mechanical drawing, and mold and die structure.

3. *Robot and Automation System Course* provides knowledge and skills for controlling advanced hybrid systems: Mechatronics is the combination of mechanical and electronic engineering, especially offered to students with practical knowledge and skills relating to Automation, Robotics, and CAM technologies.

The department operates seven customized classes based on an agreement with companies, including LG Display Class, Refrigeration and Air-conditioning Class, Japanese Automobile Design Class, and Shipbuilding and Ship Engineering Class, etc.

School of Electronic and Info-Communication

The department includes three sub-majors:

1. *Electronic Information Course* provides students with theoretical and practical knowledge on electronic technology, control systems using computers, microprocessor applications, semiconductor technology, embedded systems, display technology, and electronic equipment and applications.
2. *Solar Semiconductor Course* fosters professionals in the field of solar cell and semiconductor manufacturing technology such as semiconductor processing, solar cell processing, LED application, optical components application, green energy, etc.
3. *Info-Communication Course* provides students with theoretical and practical knowledge on mobile communication systems, high-speed info-communication systems, embedded systems, info-communication equipment, mobile communication equipment, and mobile internet.

Graduates of this major can obtain certificates in the areas of Radio station equipment, Electronics industry, Radio electronic industry, Information and Communication, Information processing, Electronic circuit design, Semiconductor Design, Digital control, etc. Affiliate companies include Samsung Electronics, Samsung Display, LG Display, LG Chem, Ltd. SK Telecom, Korea Telecom, POSCO, etc.

School of Electrical Engineering

The department includes two sub-majors:

1. *Renewable Energy Course* cultivates professionals in the field of the new and renewable energy industry concerning low carbon and green growth as well as development of alternative energy sources. Course topics cover solar cell process, PV system, power conversion technology, etc.
2. *Digital Electricity Course* provides practical and theoretical knowledge in the field of electrical technology. Course topics include automation facilities, electrical facility design, operation and maintenance through computerized technology.

Graduates of this major can obtain certificates in Electronic Power, Electrical Machine, Industrial Safety Management, Industrial Instrumentation, Railway Signaling, Power Engineer, Electrical Engineer, etc. Affiliate companies include Samsung Electronics, Samsung Electro-mechanics Co., Ltd, Samsung LED, Samsung Display, LG Electronics, LG Display, LG Chem, Ltd., SK Hynix, POSCO, Hyundai Heavy Industries Co., Ltd, and Korea Electric Power Corporation.

The Teachers' Perception

The teacher survey investigated three areas: a) program relevance, b) students competencies, and c) articulation between the two. In regard to the relevance of the program, 61% of the teachers strongly agree that the school curriculum (both academic and practical) reflects current industry demands. Also 57% of the teachers strongly agree that the school offers high quality programs. However, 57% of the teachers responded that their students need to take additional outside training in order to secure employment.

Eighty-three percent of teachers believe their students are competent and 52% strongly agree with the fact that the school is attracting highly competent students. Overall, 87% of the teachers believe that the school provides relevant teaching programs (including practical training) to produce competitive school outcomes. Eighty-three percent of teachers believe that the school offers academic programs to students who want to continue their education/pursue an advanced degree, and all teachers think that Yeungjin's program helps students advance to higher education.

The interview followed, and three program-related themes emerged, the importance of 1) developing a demand-driven program, 2) having a flexible curriculum, and 3) balancing theory and practical training. First, the teachers agreed that Yeungjin's programs meet industrial needs by pointing out its demand-driven programs. Each year, teachers and representatives from companies of each sub-major design curricula together via an annual committee meeting, updating the curriculum based on company needs. Teachers mentioned Yeungjin's customized classes. Each department has several customized classes created upon request from a specific company⁶. Accordingly, students obtain more specific skills than transferable skills, enabling them to immediately work for specific companies upon graduation. A second, related advantage

The strength of Yeungjin's program lies in its flexibility; teachers continually review and update programs in response to rapid industry changes. Even customized classes can be closed if there is low demand, and new customized classes are created if there is high demand. Teachers also mentioned that feedback from alumni who are currently working at prospective companies is useful for updating the program.

Third, teachers pointed out the importance of balancing theory and practical training. Ideally, training schools might provide theory and basic knowledge of each field as well as the SE skills needed to succeed in the world of work. At the same time, the school needs to provide

⁶ The School of Mechanical Engineering has seven customized classes, the School of Electronic and Info-Communication has 13 customized classes, and the School of Electron Engineering has 11 customized classes.

enough practical training to help students prepare for future, hands-on jobs. One teacher shared his own experience upon graduation from a top ranking university saying, “I had difficulty working at Samsung right after joining the company, because I mainly studied theory and did not have much practice while studying at school.” Therefore, he believes that Yeungjin should emphasize practical, hands-on training, in addition to theory. In general, teachers agreed that provision of relevant knowledge and skills directly increases graduate employment rates because the knowledge and skills obtained in school are also tested during the hiring process. In Korea, the hiring process includes a Document Screening Process, Aptitude Test, and Interview, and during the interview, companies test applicant knowledge in their chosen field.

The Students’ Perception

According to the survey, only 9% of students pursue further education, while 91% want to be employed upon graduation. Among those who are looking for a job, 60% expect to obtain a mid-level skilled position and 71% expect to receive more than USD 20,000 in annual income. Fifty-nine percent of students hold certifications. Fifty-four percent of surveyed Yeungjin students said they are satisfied with the program. About half said that they receive more than 10 hours of practical training per week, while the other half indicated that they take less than 10 hours. Thirty-eight percent receive additional out-of-school training, and 46% are planning to receive additional training from another institute after graduation. Nevertheless, 69% believe that Yeungjin is adequately preparing them to find a job upon graduation.

All ten of the interviewed students agreed that the curriculum is designed well enough to help them acquire a range of information from basic knowledge and theory to specialized knowledge and hands-on skills. During the first year, all students study common subjects, then they are divided into sub-majors based on their interests and levels of competence. During the 2nd year, the students obtain in-depth knowledge and skills in their relevant fields. The students reported that they are satisfied with this balance of theory and practical training. Like the teachers, they said that the program should include theory, because the college is not a training institute whose program is mainly designed to help trainees obtain certificates. The students also believe that their practical training is adequate preparation for employment opportunities. However, considering the importance of possessing particular certificates for certain job applications, aside from the regular courses, they feel it is necessary to take additional courses to obtain these certificates. Finally, students reported improved creativity after taking the Capstone course. During the class, the students organize into groups, select a topic, develop an idea based on open debates and discussions, present their ideas, produce a product, conduct a survey for market value, and present their final product during graduation. The teachers support them in finding necessary materials and share sound advice. According to them, during the Capstone process, their ideas are developed, and most importantly, their self-confidence increases.

Factor 3: Effective Management System

Yeungjin’s uniqueness in terms of school organization is its emphasis on the school-industry linkage by instituting a separate “Industry-College Cooperation Corp” division. Four

departments comprise this division, a) Industry-College HRD Center, b) Office of Industry-College Convergence, c) Daegu Techno-Park Yeungjin Branch Office and, d) the Business Support Center.

Teachers' Perception

During the survey, the teachers assessed Yeungjin's leadership and the management system. Fifty-six percent strongly agreed that the school leaders execute the school's guiding principles with clarity, and 48% said that the school has shared its vision with its faculty members. Furthermore, 57% of teachers strongly agree that their school leaders are consistent with their words and actions. Regarding leadership's consideration for employees, 52% of the teachers responded that their school leaders encourage collaboration by building trust among faculty members; 52% strongly agreed that their leaders encourage self-determination and teacher competency development while the same percent agreed that their school leaders recognize their contribution by showing appreciation. Sixty-one percent of the teachers strongly agreed that leaders envisage the future and consistently look for new and innovative products/processes and 65% responded that the school has the capacity to deal with both anticipated and unexpected challenges/risks. Regarding relationships with the leaders as well as with other teachers, 48% said their relationship with the President of Yeungjin is excellent, and 39% said their relationship with other teachers is excellent.

Interviewed teachers pointed out management's contribution to Yeungjin's high graduate employment rate. According to them, under strong leadership, Yeungjin's management system coordinates the efforts of all faculty members to accomplish the school's single objective of increasing the graduate employment rate by utilizing financial and human resources efficiently and effectively. First, the teachers all agree that leadership is key to not only the school's outcomes but also the school's survival. According to them, 2-year colleges were founded based on the country's economic needs during the mid-1970s. Until the early 1970s, Korea did not have 2-year TVET colleges, because the government emphasized expanding TVET high schools and 4-year universities to supply urgently needed skilled workers to fast growing industries; however, as industry became more complicated, companies also began requiring mid-level skilled workers to fill the gap between low and high skilled workers. Due to resource constraints, the government encouraged the private sector to establish 2-year colleges to produce these mid-level technicians by providing more relaxed regulations to school openings. Yeungjin was one such 2-year school established during this period.

Since the mid-1980s however, 2-year colleges have faced the major issue of declining demand. The factors contributing to low student demand for 2-year college include shifts in the economic structure demanding more higher skilled workers, the change in the government's higher education policy allowing 4-year universities to accept more students, establishment of in-house universities at large companies that provide specific skills, and increasing social demands for a 4-year diploma. As a result, the training market became more competitive, and 2-year colleges lost competitiveness against 4-year and in-house universities. Like other 2-year colleges, Yeungjin has faced the challenge of maintaining adequate numbers of students. According to the teachers interviewed, the main contributing factor to school survival during this time has been strong leadership and management: the

President supports teachers and has helped them feel a sense of ownership of and belonging to the school.

Under this strong leadership, Yeungjin has reformed its entire school system. First, it changed the management system to coordinate the efforts of all faculty members to accomplish the school's single objectives of maintaining adequate student number by utilizing financial and human resources efficiently and effectively. Next, teacher recruitment policy was changed in order to replace academic based teachers with industry-experienced teachers. Via public contest, the school started recruiting new teachers who held middle to high positions at large companies. Next, with this manpower, the school reformed the curriculum from supply to demand-driven. In order to develop a demand-driven curriculum, teachers conducted a series of surveys and interviews with specialists of companies in each major and created competency-based programs based on their responses. Finally, management knew that providing a demand-driven program was key to success in the training market as most schools then provided supply-driven courses and failed to meet industrial demands. Accordingly, the school strengthened school-industry cooperation by utilizing teachers' networks and participating in government projects that support SMEs. For the latter, the participation in government projects that support SMEs in the region will not only enable the school to secure the best facilities but also strengthen school-industry cooperation to secure in-company training places and employment for the students.

Even after entering this "new normal" stage, Yeungjin's leaders continually prepare for the next challenge, for example Yeungjin was the first college to advertise itself in 1995. In addition, it began accepting younger students to offset the impacts of Korea's aging population.

Teachers agree that strong teacher commitment is another key to success; in other words, teachers share their visions and communicate with each other as well as with their leaders. By doing so, teachers feel a strong sense of ownership and belonging. The teachers said that during difficult times, strong leadership support enabled them to develop ideas to reform the program, increase their sense of ownership, and make tremendous efforts towards mutually achieving school goals. For example, they visited high schools to attract students, developed the customized program and training materials, and created MoUs with companies.

Third, regarding resource management, the teachers agreed that the school utilizes its financial and human resources efficiently. In terms of human resources, the teachers pointed out the school's performance-based payment and incentives. The teachers' work on developing a specific customized course, strengthening school-industry cooperation by establishing MoUs, and conducting administrative work is reflected in the teacher's assessment that is linked with immediate rewards. In fact, the most important element of the teacher assessment is their students' employment. Incentives have also played a role; according to teachers, the school changed its teacher wage policy from seniority to performance-based payment. Teachers agree that these measures encourage teachers to produce better outcomes.

Factor 4: School Industry Linkages

Customized Education

Yeungjin has successfully built a customized education system via strengthening school-industry cooperation. Customized education means that the school receives requests from select companies to supply a certain number of skilled workers and then develops courses and curricula to meet their requests. Then, the students are expected to be hired by these companies upon graduation since they have acquired company-specific skills in addition to transferable, basic technical skills. Currently, Yeungjin is requested by 285 companies - large and SMEs, domestic and overseas - to supply 4,493 technicians.

By participating in several government projects, Yeungjin has strengthened industry cooperation. The first example is the industry-college convergence zone development project, Quality of Working Life (QWL), which is managed by the Ministry of Knowledge Economy. Both the MKE and private sector fund the project with a total of USD 450 million. The purpose of QWL is to produce skilled workers by strengthening school-industry cooperation that connects education, R&D, and employment. The project required a college campus with adequate training facilities, and Yeungjin met this criteria. The projected number of skilled workers that Yeungjin will train for the next five years will be 3,000 and the school plans to bring in 200 SME-sized enterprise research institutes. By participating in this project, Yeungjin expects to strengthen its relationships with the SMEs, as well as contribute to local economic growth by supplying adequately skilled workers to the SMEs.

Teachers' Perception

All surveyed teachers believe that a school should build a formal partnership with companies and that Yeungjin has built a successful partnership with companies, enhancing school outcomes (e.g. graduate employment rate). The companies provide resources (e.g.) scholarships, in-company training for students, instructors and special lectures. As a hub of the SMEs consortium in the region funded by the government, Yeungjin provides SMEs with facilities and human resources. For example, Yeungjin teachers provide technical assistance to the SMEs. At the same time, teachers obtain information on employment, industrial demand, and company-specific information from these companies.

For the program, the teachers of each major and representatives from ten relevant companies hold a meeting twice a year to develop curriculum and training materials together. During that meeting, the school receives the companies' demanded skills in the relevant fields. Particularly, for the customized classes that are created based upon the company's request, the teachers and the representatives from that specific company develop curricula together, and 60% of the program is required by the company.

Conclusion

This paper reversely examined the relationship between outcomes and premise factors by selecting a high-performance school (the high graduate employment rate) and the impact of the premise factors on school outcomes. The logic is that if this high-performance school

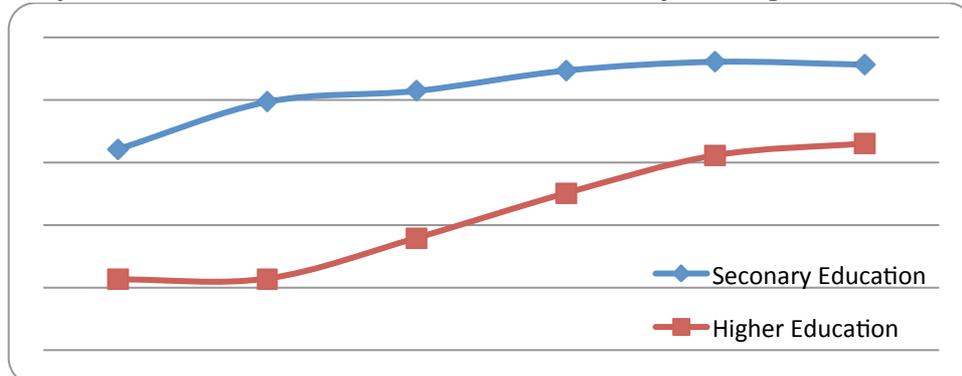
demonstrates that it possesses these factors and that they have close relationships with the outcomes, then we can conclude that these premise factors are likely to raise employment rates.

The first research question is whether or not the school possesses these factors. The findings strongly support that Yeungjin has adequate resources, relevant programs, excellent management, and well-established school-industry linkages. The second question is whether or not the above premise factors impact school outcomes. Findings suggest that these factors both directly and indirectly influence Yeungjin’s graduate employment rate. According to the survey and interview these four factors all increase student employability, making graduates more likely to land a job. The third question is which of these factors is the determining factor that contributes most to enhancement of school performance, in what context, and how can this factor be strengthened.

In Korea’s case, industrialization, education, economic growth, and the labor market are closely related. Economic policy continues to guide educational policy based on the assumption that education, although not sufficient, is a necessary factor contributing to the country’s economic growth by providing adequately skilled workers to industry. During the 1970s, because the country shifted from a lighter to a heavier manufacturing industry, it required a different type of labor force, including skilled technicians and experts. Accordingly, the government expanded technical and vocational education to meet demand for skilled workers in the heavier manufacturing industry (Zang, 2009; Kim, 2000; Lee et al, 2012). During this decade vocational schools grew by 24.5%.

Since the late 1970s, Korea’s strategic industry has shifted to more skill-intensive industries, such as the electronic and car industries. To meet this demand, higher education (both 2-year college and 4-year university) was greatly expanded to train skilled workers for this new type of industry (Zang, 2009; Kim, 2000). The expansion of secondary and higher education is illustrated in Graph 1 (Lee, 2011; Lee, 1993; Kim, 2000). Then, between 1985 and 2007, there was sudden and rapid expansion of 4-year universities. This is because as technological development changed the industrial structure, demand for highly skilled workers (e.g. managers and experts) who had completed higher education increased (Lee, 1993).

Graph 1 Gross School Enrolment Ratio: Secondary and Higher Education



Zang, p. 113, 2009; KEDI

In addition to the economic change, expansion of 4-year universities was also influenced by a strong demand for higher education from the new middle class who had accumulated their

wealth during industrialization (Lee, 2011). A 1991 survey conducted by KEDI showed that 41.7% of parents believed that people who do not attend university “are not respected in our society.” Twenty-one percent of parents thought that “these people have limited options in choosing their occupation” while 12.5% believed that “these people are paid less than higher education graduates” (Kim, 2000).

However, most teachers in Yeungjin agreed that regardless of these economic and social changes throughout time, the most important factor contributing to the school’s success is well-established management and leadership, because it directs all resources, including human resources, towards achieving the goal of enhancing school performance. Some teachers pointed out a leader who supports the teachers, while others pointed out the teachers’ ownership as being the most important factor for success. Both indicate that well-established management is based on everyone working together to achieve a shared vision. When Yeungjin faced outside challenges, the President and faculty members united to overcome them. The leader strongly supported the teachers’ suggestions on transforming the program from supply-driven to demand-driven, and the teachers made efforts to establish school-industry connections.

Under circumstances of rapid labor market shifts, the management system emerges as the most important factor not only contributing to high graduate employment rates but also impacting the more fundamental issue of Yeungjin’s survival in the training market. The school’s flexible management system enables it to reform its system in response to changes, including reorganizing structure, altering curriculum, changing teacher recruitment and payment policies, and strengthening school-industry cooperation. Also, an efficient management system enables the school to optimize resource use. Teachers recommended that leadership is central to a well-established management system. Under leadership that provides an overall direction, management utilizes all resources efficiently to achieve goals and support faculty members in working at their maximum level with a strong sense of ownership. Accordingly, management emerges as the key factor in increasing Yeungjin’s internal and external efficiencies and therefore producing the best outcomes, including high graduate employment rates.

Lessons Learned

The aim of this study is to provide policy makers with empirical evidence that might be used to develop new policies to direct schools toward more market-responsive and demand-driven approaches to TVET training. In it, we have summarized the successful experience of a) three Chinese agricultural TVET schools (one secondary vocational school and two tertiary vocational schools), b) Korea’s Busan Meister Technical High School, and c) Korea’s Yeungjin School. The case study schools were selected because they met three research criteria: 1) exemplary outcomes, including high graduate employment rates; 2) TVET offerings at both the secondary and post-secondary levels within the same sector; and 3) skills training provision for sectors that may best represent the country’s economy. In collecting information via surveys and interviews, we have made an effort to analyze the challenges faced and solutions found by these TVET leaders.

Lessons learned from these three case studies include:

- **Teachers make all the difference.** In all three case studies, students ranked their teachers highly in terms of technical and experiential knowledge in the industry and believed them to be good at delivering curriculum content. Furthermore, teacher's industry connections were key in establishing MOUs to support student apprenticeships, one of the most direct routes to employment upon graduation.
- **Strong school-industry linkages are paramount to student success.** While teachers in all three case studies mentioned the challenge of engaging industry to support TVET, particularly as enterprise size increased, school-industry relationships were viewed by all as absolutely critical for student success and employment opportunities upon graduation. Students in all three case studies cite the importance of spending time working within an industry and at a specific enterprise in landing their first successful job. TVET is hands-on and practical experience is one of the best ways for students to get it.
- **Programs must be relevant to current labor market needs.** TVET is often viewed in both China and Korea as a less glamorous route to success than tertiary education. Strong connection between current labor market needs and TVET curricula is therefore necessary in order for TVET schools to survive. Indeed, industry input into curriculum creation at Busan Meister played a key role in the school's reorganization, which led to higher student employment rates. In turn, higher employment rates raised the perception of BM among potential students and industry, creating a virtuous circle that teachers view as central to its ability to attract the best students and remain competitive within Korea's competitive TVET sector.
- **Supportive, involved management is key.** Yeungjin's flexible management system enables it to respond to changes – for example restructuring, adapting curriculum, changing teacher recruitment and payment policies, and strengthening school-industry cooperation, as needed.
- **Resources matter.** Having the tools to teach the trade(s) is obviously important. When resources are lacking, students bear the cost. Indeed, one of the limiting factors for China's agricultural training institutes is lack of sufficient student housing. Beyond simply having resources however, how management employs them matters a great deal. For example, according to Yeungjin's teachers, under leadership that provides an overall direction, management is able to efficiently utilize all resources to achieve goals and to support faculty to work with high levels of efficiency, effectiveness and ownership.
- **Success is a combination of all of the above factors.** Busan Meister's teachers noted efficient resource use as the beginning of their "virtuous circle." According to them, efficient resource use results in more students become employable, which in turn leads to increased graduate employment rates. This success in turn increases the school's brand power, which attracts more competent students and better teachers. Also, when the school produces high employment rates, it receives more financial support from the

Korean government, which enables it to acquire and retain even better resources (expensive equipment and practical training facilities). Finally, with the social recognition of being a high performer attached to the school, more companies are interested in hiring Busan Meister graduates.

The biggest takeaway from this study is perhaps that it is not any one factor, but rather a combination of factors that keeps TVET institutions connected to industry and providing high quality workforce development training. The lessons from the case studies, in combination with context-specific approaches, may be used to improve vocational education in other countries across the EAP region and around the globe.