1. INTRODUCTION

In 2006, in order to secure sustainable economic growth and competitiveness in Korea, ‘Ten growth-engine industries for next generation’ were selected. The central government, in joint effort with academic-industry cooperation, have discovered growth-engine industries that would lead the national economy for next decade, and have established policies and implementation strategies that would further develop the selected industries. The central government recognized the urgent need for securement of source technologies in high-tech industry, which has high intensity of R&D, and planned to simultaneously resolve the issue and foster sustainable economic growth.

In consideration of limited resources and a trend of integration of global economy, with awareness in impossibility and inefficiency of development of every industry, a strategy that focuses on discovery of industries, which are capable of producing persistent added-value and securing comparative advantage, in basis of industrial structure in Korea, was pushed forward. In addition, fields of strategic industry were selected in each region, and industrial-specialized policies, which would establish development strategy for each region and create balance with local-related industries, were developed.

For development of growth-engine industries and specialization of regional industries, Technopark promoted the enhancement of structure of regional industry and the development of higher added-value through research development, vitalization of startup business incubator, and reinforcement of enterprise support service. Technopark served as an essential role for reinforcing industry development and competitiveness for specialized fields in each region. As a physical infrastructure, Technopark, in addition to establishment of the complex and supporting the innovation infra, served as the engine for regional innovation system through providing support for regional enterprises and innovative technology of institutions.

For reinforcement of competitiveness and development of specialized fields of four major strategic industries (i.e. next-generation semiconductor, next-generation batteries, electrical & electronic fusion components, and biopharmaceutical), Chungbuk Technopark served as the hub for regional industry development and innovation by continuously promoting eight major support businesses (i.e. startup incubation, research development, equipment usage, education training, information utilization, pilot production, enterprise support, and marketing assistance). Recently, Chungbuk Technopark chose the solar energy industry as the strategic
industry for future, and expanded its support to include enhancement of research development capabilities, reinforcement of academia-industry cooperation, activation of startups, and establishment of excellent enterprises.

The study examines the innovative activities and achievements of Chungbuk Technopark for improving regional industry development and innovation capabilities. Furthermore, it analyzes the characteristics of Chungbuk Technopark as the regional innovation platform and the regional innovation hub by reviewing its activities and strategies of development of solar energy industry as the strategic industry for future.

2. CHARACTERISTICS AND CURRENT STATUS OF TECHNOPARK IN KOREA

In 1997, the Ministry of Telecommunication (currently, Department of Trade and Industry) had promoted development of Technopark, and have stated, “the physical and operational infrastructure, which are required to stimulate technology startups and new technology product development of SMEs, are built in neighboring regions of main institutes of technology development, e.g. universities with functionally and operational capabilities.” Since 2000, Technopark is defined as “the complex of facilities for research development, high-technology enterprise incubator, assistance service, and industrial production, in the form of academia-industry cooperation for improving regional and national level of technology competitiveness” (Ministry of Commerce, Industry, and Energy 2003).

For the purpose of establishment of branching sites of the regional innovation system, a total of 18 Technoparks—16 government initiated and 2 private company initiated (Gyounggi-Daejin TP and Seoul TP)—have been established in between 1997 and 2010. In regards to 16 government-initiated Technoparks, it began as establishment of 6 pilot Technoparks (Songdo, Gyounggi, Chungnam, Jeonnam, Daegu, Gyeongbuk Technoparks) in 1997, and followed by establishment of 10 Technoparks. The corporation foundation, in the form of tertiary sectors, with involvement of local government, universities, research institutes, enterprises, and etc., was created to manage the 16 Technoparks. In addition, the Council of Technoparks was established to exchange information and to promote joint projects, and the Network of Technoparks was created for win-win development, which stimulated active participation from each Technopark. Through the establishment of 18 Technoparks, inadequate level of technology and weak infrastructure of technology development were improved. Moreover, by correcting the regional technology innovation system, the Technoparks serve as the platform of academia-industry cooperation for vitalization of regional economy.

The characteristics of Technoparks in Korea are explained below. First of all, Technoparks are the cluster of complexes for resources of technology innovation and enterprise management. In the past, the government, government-affiliated organizations, and local self-governing bodies have provided the support for enterprises directly given to individual enterprises. However, a flaw in the aspect of efficiency was revealed, thus development of more standardized enterprise-supporting system was necessary. Therefore, establishment of the cluster of complexes, e.g. Technoparks, allowed expansion of enterprise-supporting infrastructure, such as various facilities and equipment, labor force, information, technology, and funding. Furthermore, Technoparks allowed every enterprise to access the infrastructure at any time.

Secondly, Technoparks are the hub of network for regional innovation. As mentioned above, although the main tasks include integration of resources for technology innovation and enterprise management, the limits exist in constantly securing the sufficient resources for every enterprise. The network of academia-industry cooperation is established to supplement for the lack of resources. The aforementioned network is necessary for efficient distribution of enterprise-supporting resources among the related organizations, and it is important for provision of more opportunities to greater number of enterprises.

Third characteristic of Technoparks is to build conditions for industrial technology complex based on the high-tech technology. In other words, the establishment of Technoparks was not initiated to simply construct a technology innovation center or organization. The purpose of Technoparks is stretched to include the creation of the physical infrastructure, e.g. land property or complex. The exemplary industrial complexes are Silicon Valley, USA, Cambridge Science Park, Britain, Sophia Antipolis, France, and etc.

Last of all, Technoparks is operated through the integration between a focus on core activities of enterprises and continuity of production and research. In contrary, Daedeok INNOPOLIS is operated with a focus on research, and national and regional industrial complexes are operated with a focus on production. Technoparks establishes the integrated system of production and research; thereby it stimulates the commercialization and commodification of developed technology.
3. PIONEERING AGENCY FOR REGIONAL INNOVATION, CHUNGBUK TECHNOPARK

3.1 CBTP Overview

In 1990’s, the foundation of industry in Chungbuk region was lagging behind compared to other regions in Korea. The critical and imperative tasks of Chungbuk region were to establish regional innovation system by creating network among regional technology innovative agents and to strengthen the foundation for regional industrial growth through fostering of knowledge-based industry and new industry.

Chungbuk Technopark established the regional innovation system in Chungbuk region. It vitalized enterprise fostering, startup acceleration, and academia-industry cooperation through fostering of strategic industry. Through its achievements, Chungbuk Technopark was founded in 2003 to contribute in activation and growth of regional economy. With the goals to foster the regional knowledge-based high-tech industry by formulating academia-industry cooperation, advancing technology in regional strategic industry fields, and stimulating startup of technology-intensive enterprises, Chungbuk Technopark became the regional innovation system that makes connections among research development system, enterprise supporting system, industrial production system, and technology supporting system. In addition, it serves as the hub of regional innovation through establishment of the regional innovation network by concentrating innovation capabilities within the region.

Chungbuk Technopark, as the enterprise-supporting system, operates the management programs in 8 areas (Startup business incubator, Research development, Equipment usage, Education training, Information utilization, Pilot production, Enterprise support, Marketing assistance) for stimulating startup of high technology, fostering small but strong enterprises, and developing regional strategic industry.

- Startup business incubator: To achieve a role as the hub for development of strategic industry in Chungbuk re-
region, Post-BI center was established and the foundation for startup incubator was strengthened. Startup business incubator program attempts to provide individualized enterprise-supporting service customized for different growth phases of enterprises, and to support for development and establishment of startup of strategic industries (i.e. next-generation semiconductor, next-generation batteries, electrical & electronic fusion components, and biopharmaceutical).

- **Research development:** To strengthen the research development capabilities of the region, the cooperation system was reinforced among innovative agents, regional SMEs, and research institutes within Chungbuk Technopark. Additionally, main goals are to provide support for R&D discovery, to stimulate high-technology based startups by creating connection with commercialization, and to foster technology innovation enterprises.

- **Equipment usage:** Increases efficiency in usage of the existing equipment through activation of the joint equipment network of Chungbuk region, and develops regional technology innovation conditions through a boost in utilization of high-tech expensive equipment.

- **Education and training:** For promotion of the 4 major strategic industries, develops education programs and supports in human resource training customized for fieldwork.

- **Information utilization:** Serves as the hub of regional information and provides necessary information to enterprises, which are achieved through the establishment of information service center and system for collection of information for development of regional strategic industries and effective exchange and utilization of information.

- **Pilot production:** Supports in production of prototypes of research development projects of enterprises within Chungbuk Technopark, and supports in production of prototypes of SMEs within the region.

- **Enterprise support:** To provide personalized enterprise support, it strengthens the competitiveness of enterprises by establishment of the One-stop enterprise support system. The One-stop enterprise support system is estab-
lished through diagnosis of difficulties of enterprises and formation of network with interagency organization.

- Marketing assistance: To increase the competitiveness of products made by SMEs, it provides support for product design and advertisement production. Additional support includes assistance in pioneering new market at both national and international level, such as marketing consultation, entry at home-shopping exhibition, export counseling, trade counseling, and entry at global exhibition.

3.2 Role of Chungbuk TP for Regional Industry Development and Industrial Acceleration

Founded in 2003, Chungbuk Technopark has been contributing to expand economic growth for Korea and Chungbuk region through regional industry fostering, employment creation, technology advancement for SMEs, and new growth-engine industry discovery. The roles and mid- and long-term visions of Chungbuk Technopark are to create industrial structure for cyclical profit production with equal value on ‘employment and economy’.

In order to achieve the aforementioned roles and functions, it has been engaged in various tasks and innovative activities. The overall look on the various tasks and activities can be summarized in the following.

In the perspective of organizing regional strategic industry, the foundation has established detailed plans to fulfill policies of Chungbuk for establishment of strategy for regional industries, organization of policies, and establishment of NIS. In addition, it has worked to establish practical and realistic industrial policies for Chungbuk region.

Specifically, strengthening of innovation capabilities for regional industry fostering, construction of RIRM (Regional Industry Development Roadmap) per industries in Chungbuk region, and establishment of fostering strategy per industries have proven to be critical foundation for the regional development. Construction of industrial conditions through the phase-by-phase infrastructure development plans has also been a cornerstone for proposing futuristic visions for development of Chungbuk. The task of policy production for Chungbuk Technopark led to 17.7% increase of regional innovation index, which was recorded as the highest increase rate in the nation. 29% of industrial plans proposed by Chungbuk region were accepted for provincial policies, which named Chungbuk region as the new brain of industrial policies. (Chungbuk technopark 2012)

In addition, Chungbuk Technopark has developed a network of approximately 350 organization, and has served as the hub for the regional innovation through establishment of technology innovation cluster and open innovation.

Moreover, to achieve the balanced development for the region, it has stimulated convergence/integration among industry, technology, and knowledge. Chungbuk Technopark has executed various tasks to enlarge its image as a global organization. Furthermore, it has solidified the enterprise support service system by creating a new model that provides one-stop enterprise support for fostering small-but-strong enterprises. Eventually, the new model of comprehensive enterprise support service system was suggested to all technoparks nationwide and interagency organizations. Utilization of the Total Care service of enterprise fostering led to the development of various industries, and active support in product commercialization and new national/international market pioneering allowed production of excellent small but strong enterprises of Korea.

745 equipment (100 billion KRW worth), which are essential for enterprise fostering in various industries, is secured at Chungbuk Technopark. 40 engineers are hired to provide assistance in test analysis, failure analysis, reliability assessment, pilot product production, and technology development. The highest quality of technology support and consulting are provided for every level of enterprises.

Table 1. Annual status of equipment building (total 745)

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment building (Aggregate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>558</td>
<td>619</td>
<td>633</td>
<td>668</td>
<td>745</td>
</tr>
<tr>
<td>Price</td>
<td>67,858</td>
<td>75,567</td>
<td>77,423</td>
<td>95,307</td>
<td>100,491</td>
</tr>
<tr>
<td>Equipment purchase (The year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>83</td>
<td>61</td>
<td>14</td>
<td>35</td>
<td>77</td>
</tr>
<tr>
<td>Price</td>
<td>19,287</td>
<td>7,709</td>
<td>1,856</td>
<td>17,884</td>
<td>5,184</td>
</tr>
</tbody>
</table>
In addition, Chungbuk Technopark is active in providing information for exchange and utilization among interagency organizations through the establishment of manpower cultivation DB, joint equipment DB, and enterprise fostering DB.

In order to support in fostering excellent manpower (Over 30,000 hours of education for every year) practical for enterprise tasks and creating employment opportunities, all capabilities of organizations are called to solve the global issue of employment mismatch phenomenon.

Since the establishment in 2003, the number of governmental businesses secured by Chungbuk Technopark was 5 businesses (18.2 billion KRW) in 2004, which has increased to 102 businesses (58.4 billion KRW) in 2014. Considering the majority of businesses in 2004 were infrastructure businesses that included the cost of construction, when compared to the current businesses that are mostly enterprise supporting soft businesses, the increase is an enormous change. In addition, 82 of current businesses were secured through the competitive selection process among other organizations. Compared to all of 18 Technoparks nationwide, the amount of secured businesses of Chungbuk Technopark is ranked at the upper tier. By securing great number of businesses over 10 years, it has markedly contributed in enterprise fostering in the region.

### 3.3 Quantitative Achievements of Strategic Industry Fostering

Chungbuk has selected strategic industries and fostered regional industries in between 2004 and 2012. The strategic industries of Chungbuk are consisted of 4 fields of industries, i.e. Bio industry, Semiconductor industry, Electric-Electronic convergence parts industry, and next-generation batteries industry. The achievements of the growth of industries during the time period are illustrated in the Table 2.

**Table 2. Growth of regional strategic industries of Chungbuk province from 2003 to 2012**

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>Rate of increase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bio industry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of businesses</td>
<td>110</td>
<td>112</td>
<td>115</td>
<td>122</td>
<td>142</td>
<td>139</td>
<td>136</td>
<td>166</td>
<td>156</td>
<td>154</td>
<td>3.8%</td>
</tr>
<tr>
<td>No. of workers</td>
<td>6,961</td>
<td>6,454</td>
<td>6,724</td>
<td>7,839</td>
<td>8,873</td>
<td>8,702</td>
<td>9,459</td>
<td>10,474</td>
<td>9,529</td>
<td>9,922</td>
<td>4.0%</td>
</tr>
<tr>
<td>Production</td>
<td>2,404</td>
<td>2,186</td>
<td>2,400</td>
<td>2,842</td>
<td>3,243</td>
<td>3,668</td>
<td>3,980</td>
<td>5,177</td>
<td>5,179</td>
<td>5,477</td>
<td>9.6%</td>
</tr>
<tr>
<td><strong>Semiconductor industry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of businesses</td>
<td>152</td>
<td>159</td>
<td>187</td>
<td>199</td>
<td>220</td>
<td>222</td>
<td>220</td>
<td>234</td>
<td>238</td>
<td>222</td>
<td>4.3%</td>
</tr>
<tr>
<td>No. of workers</td>
<td>15,655</td>
<td>19,784</td>
<td>20,276</td>
<td>21,895</td>
<td>24,425</td>
<td>26,360</td>
<td>25,785</td>
<td>26,450</td>
<td>26,125</td>
<td>25,560</td>
<td>5.6%</td>
</tr>
<tr>
<td>Production</td>
<td>4,673</td>
<td>8,705</td>
<td>5,883</td>
<td>7,022</td>
<td>6,807</td>
<td>9,200</td>
<td>10,794</td>
<td>13,690</td>
<td>12,969</td>
<td>13,417</td>
<td>12.4%</td>
</tr>
<tr>
<td><strong>Next-generation cell industry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of businesses</td>
<td>157</td>
<td>145</td>
<td>152</td>
<td>166</td>
<td>166</td>
<td>166</td>
<td>162</td>
<td>169</td>
<td>177</td>
<td>174</td>
<td>1.1%</td>
</tr>
<tr>
<td>No. of workers</td>
<td>18,498</td>
<td>19,532</td>
<td>18,551</td>
<td>19,855</td>
<td>21,296</td>
<td>21,280</td>
<td>18,724</td>
<td>18,089</td>
<td>17,756</td>
<td>18,904</td>
<td>0.2%</td>
</tr>
<tr>
<td>Production</td>
<td>5,125</td>
<td>7,895</td>
<td>5,420</td>
<td>6,412</td>
<td>6,205</td>
<td>6,183</td>
<td>5,035</td>
<td>6,574</td>
<td>7,439</td>
<td>8,968</td>
<td>6.4%</td>
</tr>
<tr>
<td><strong>Electrical and electronic convergence components industry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of businesses</td>
<td>192</td>
<td>193</td>
<td>226</td>
<td>236</td>
<td>239</td>
<td>237</td>
<td>227</td>
<td>259</td>
<td>286</td>
<td>279</td>
<td>4.2%</td>
</tr>
<tr>
<td>No. of workers</td>
<td>22,113</td>
<td>25,701</td>
<td>27,617</td>
<td>28,904</td>
<td>31,143</td>
<td>32,803</td>
<td>31,327</td>
<td>32,767</td>
<td>33,986</td>
<td>34,930</td>
<td>5.2%</td>
</tr>
<tr>
<td>Production</td>
<td>5,824</td>
<td>9,987</td>
<td>7,333</td>
<td>8,990</td>
<td>9,058</td>
<td>11,509</td>
<td>12,428</td>
<td>16,324</td>
<td>16,141</td>
<td>18,089</td>
<td>13.4%</td>
</tr>
</tbody>
</table>

Notice: The rate of increase means annual average of rate of increase
Source: Statistics Korea (http://kostat.go.kr/survey/mm/index.action)
The Electric-Electronic convergence parts industry has integrated the most number of businesses, 279 businesses, in 2012, compared among all 4 fields of strategic industries in Chungbuk province. The rate of change in comparison to 2003, the Semiconductor industry (4.3%) and the Electric-Electronic convergence parts industry (4.2%) exhibited remarkable increase. In addition, the Electric-Electronic convergence parts industry showed the highest number of employees, 34,930 employees, compared among all 4 fields of strategic industries. The industry that exhibited the most significant increase of employment creation was the Semiconductor industry (5.6%).

In addition, the Electric-Electronic convergence parts industry (13.4%) and the Semiconductor industry (12.4%) displayed the outstanding rate of increase in the yield of production.

In summary, the ‘yearly increase rate’ of the ‘industrial index’, e.g. the number of businesses, the number of employees, and the yield of production, for all 4 strategic industries, have gradually increased since 2003.

With the current change in the paradigm of regional enterprise fostering by the central government (Ministry of Industry and Trade) in 2015, the fostered regional strategic industries are replaced with regional major industries (Semiconductor, Biopharmaceutical, Electric-Electronic parts, Solar energy, Power mechanical components), economy cooperative industries (Beauty cosmetics, Rechargeable battery, Medical equipment), and regional based industries (Traditional businesses). After analysis of the goals of achievement, directions of industries, and operation plans, Chungbuk region and Chungbuk Technopark established the new ‘Chungbuk Industry Development Plan’ as the stepping stone of reform for Chungbuk industries for the next decade.

Chungbuk Technopark will continue to systematically develop strategic plans for the regional issues by responding to the keynote policies of central-regional governments and the internal and external environmental changes. Furthermore, it will develop a specific, selective, and specialized strategy based on the regional conditions and distinct characteristics.

4. STRATEGY FOR DEVELOPMENT OF SOLAR ENERGY INDUSTRY

4.1 Policy for Development of Solar Energy Industry in Chungbuk region
Since 2010 (5th Presidential Election), Chungbuk region has been leading the regional economic growth by suggesting and practicing various policies, with the vision of ‘Land of Life and Sun’ and the goal to build the ‘Chungbuk, the Solar Valley in Asia’.

With the increasing global interest in the fostering of renewable energy industry since early 2000, Chungbuk region and Chungbuk Technopark have established the Chungbuk 2020 strategic policy for next-generation energy in 2008. Specifically focusing on the “Fostering Policy for the Solar Energy Components and Materials”, which is one of the fields in the renewable energy industry, 8 implementation assignments were selected for the development plans corresponding to the provincial policies of Chungbuk region.

Chungbuk region and Chungbuk Technopark are the only organizations nationwide that have selected the Semiconductor industry and the next-generation battery industry to concentrate its manpower and financial investment for the establishment of enterprise infrastructure and activation of the industries.

Recently, a number of enterprises have relocated to Chungbuk region to invest in the solar energy industry. As a result, Chungbuk region has the largest scale of infrastructure for the solar energy components and materials production nationwide. According to the latest government statistics, more than 60% of production in the national fields of cell/module is occupied by Chungbuk region.

The related enterprises include the largest national solar energy enterprises, such as Hyundai Heavy Industries, Shinsung Solar Energy, Hansol Technics, Daeyu SE, Hanhwa Q Cells, and etc.

The value model of enterprises is consisted of numerous enterprises in the fields of cell-module-system components and materials. These enterprises have strong points especially in the ‘middle stream’ and ‘down stream’ fields of industry.

4.2 Establishment of ‘Solar Energy Technology Support Center’ Infra for Development of Solar Energy Industry
Chungbuk region, together with Chungbuk Technopark, has been accumulating fundamentals for development of the solar energy industry through various tasks such as securing a title of ‘Chungbuk, Specialized Zone for Solar Energy Industry’ and hosting ‘Solar Energy Test Bed Establishment Business’.

As a result, the construction of the ‘Solar Energy Support Center’ in Jinchun, Chungbuk have completed in May 2015, and a number of related industries and enterprises are currently under intensive development process.

The ‘Solar Energy Support Center’ is a two-storey building,
with total space area of 4,936 m², located at Jinchun Innovation City in Chungbuk region constructed with 20.8 billion KRW funding. It has achieved to establish the win-win cooperation system with enterprises by securing 70 test assessment dedicated equipment and 16 startup incubator spaces for technology support. The ‘Solar Energy Support Center’ has become the largest test dedicated space nationwide for performing the comprehensive preliminary qualification test, various reliability test, and long-term durability test for cell, modules, and component materials according to the international standards, IEC 61215, IEC 61646, IEC 61730. It is currently leading the growth of the solar energy industry of Korea.

In addition, the ‘Solar Energy Support Center’ is mentioned as an exemplary case for eco-friendly renewable energy by using the solar energy generation system to produce 115kWp and to use for its electric energy consumption.

4.3 Functions and Role of Solar Energy Technology Support Center

The Solar Energy Technology Support Center of Chungbuk Technopark currently manages various package businesses to enhance the global competitiveness of the national solar energy industry. The various businesses, which is promoted by the established academia-industry consortium, concentrate its support for R&D of solar energy related enterprises, technical difficulties, product commercialization, industrial manpower fostering, and etc. The goals are to raise the competitiveness of national enterprises up to the global standards.

In detailed explanation, 1) Technology support, e.g. technology support for test analysis, performance assessment, reliability test for commercialization of the solar cell, modules, and etc., 2) Technology development, e.g. academia-industry cooperative joint research development for fostering of the solar energy industry, 3) Manpower fostering, e.g. individualized educational support for manpower demanded by enterprises, 4) Startup incubator and Commercialization assistance, e.g. support for strengthening of enterprise competitiveness and commercialization for industry activation, 5) Cooperative Network Establishment, e.g. operation of the academia-industry cooperation for activation of the national solar energy industry. In addition, The Solar Energy Technology Support Center provides the ‘Total Care Service Support’ for the solar energy industry through policy development to execute the aforementioned main roles, and it serves as the central agent of the national solar energy cluster.

Furthermore, the Solar Energy Technology Support Center is improving its status by establishing connection/cooperation with the Energy Technology Engineering Center and the Thermal Environment Experimental Center at Korea Environment & Merchandise Testing Institute located in Jinchun Innovation city, and also serving the central role in the field of hybrid renewable energy, such as BIPV, BAPV, and zero-energy houses.

In order to secure the future value and to establish the direction of the globally acclaimed issue, the energy conservation, the Solar Energy Technology Support Center, in cooperation with the local government, strives to create exemplary demonstration cases of the renewable energy convergence complex, e.g. establishment of the Eco-friendly Energy Town and the Zero-Energy Houses. Once accomplished, it may contribute in development of the standardized business model for distribution of the Eco-friendly Energy Town. Furthermore, it will provide continuous technology support and policy support to assist the research and enterprises in the field of renewable energy convergence to enter the global market in the future.
5. CONCLUSION

5.1 Mission and Achievements of Establishment of Chungbuk Technopark

The purposes of establishment of Chungbuk Technopark, as the innovation branching point organization for Chungbuk region, are to 1) to restructure connection among the regional innovation enterprises through the establishment of academia-industry cooperation system, 2) to advance the technology of regional strategic enterprises and to stimulate startup of technology-intensive enterprises, and 3) to vitalize the regional economy and to contribute in national economic growth. In order to accomplish the goals, Chungbuk Technopark, through cooperation with Chungbuk region, invested its utmost effort in regional industry policy planning, discovery and fostering of new growth industries, technology transfer, product commercialization, industrial manpower fostering, and employment creation. Moreover, in steady cooperative relationship with the central government and Chungbuk region, Chungbuk Technopark has contributed in the employment creation, innovative technology development, and sustainable regional economic vitalization through the promotion of regional enterprises and the development of enterprises.

5 success factors of Chungbuk Technopark on the vitalization of regional economy are summarized in the following.

First, its praised abilities, for the expertise and service quality, on the policy planning and the enterprise support for development of regional strategic industry.

Second, it has achieved in establishment of the joint infrastructure for high-technology support based on the trend of industry and technology and the demand of enterprises.

Third, it has developed the enterprise support program customized for various growth phases, which has been adopted by all TPs nationwide and considered as exemplary program for the enterprise growth and the employment creation.

Fourth, it has contributed in formation of the strong cluster for strategic industries, such as bio, semiconductor, electric-electronic convergence components, rechargeable battery, solar energy, and etc. It is considered as the central hub of the academia-industry network.

Fifth, by finding a balance between publicity and independence, it has become a pioneering organization of regional innovation for establishing a successful model of regional development.

The aforementioned core competencies are considered as essential factors for the regional industry development and the technology advancement, and regarded as the powerful energy for promoting sustainable change and innovation. Due to the policy creation by Chungbuk Technopark, the number of regional innovation index showed a growth rate of 17.7%, which was the highest record nationwide.

As a result, Chungbuk Technopark has been named the best organization three times in the business performance evaluation, which is conducted by the Ministry of Industry and Trade, of all 18 TPs nationwide. It is considered as the best organization for industry improvement and enterprise development.

5.2 Regional Industrial Policies and Role of Chungbuk Technopark for the Regional Industry

For the next decade, Chungbuk Technopark hopes to make an advancement with a vision ‘To be the creative leader that pioneers the production of future value for the region’ and a mission ‘To contribute in economic growth in Chungbuk region through the regional enterprise fostering and technology advancement’. The core values that are required to achieve advancement are regional-centered thinking, value of communication and openness, culture of cooperation and win-win situations, and ability to practice creative actions. Chungbuk Technopark aims to improve quality of life for residents and to activate regional economy by fulfilling its purposes of establishment, which are to create tangible regional employment and to produce new growth power.
By combining the accumulated know-hows with the core capabilities, e.g., knowledge management, future value design management, integrated system management, creative manpower management, will lead to the establishment of regional management convergence ecosystem, which is an convergence of economy, society, and culture. It will ultimately improve the life convenience and contribute in making a more livable place for residents. In order to accomplish such tasks, the necessary 5 key points are explained below.

First key point is to create a healthy regional economy ecosystem that can execute the leading, proactive policymaking process for creating future values. The ecosystem should also provide the advanced enterprise support with a focus on the new-growth convergence/integration industry.

Second key point is to create an innovative cultural infrastructure for improvement of eco-friendly and life convenience, and to lead the technology innovation, which is an integration of humanities-technology-soft industry.

Third key point is to become the convergence/integration knowledge exchange system for the creation of new additional values with balanced views on technology-industry-arts through a network of academia-industry cooperation groups in the region.

Fourth key point is to become the central agent of the industry convergence governance that spreads the win-win values through various convergence network activities, e.g., economy, politics, society, culture, arts, and etc. Chungbuk Technopark will share and participate in the common goals of various industry convergence governance entities, such as government, local government, enterprises, schools, media, NGO, and etc. It will actively promote the balanced initiative strategy, which views the pursuit of individual value and the social issues as essential goals to reach regional development.

Fifth key point is to become the leader with the utmost regional ethics and to obey the social duties. It will become an exemplary organization that promotes integrity of individuals and fairness in society by staying close to various NGOs that voice the opinions of people worldwide.

5.3 Strategy of Chungbuk Technopark for Development of New Growth Industry in the Future

The strategy for development of new growth industry in Chungbuk region is summarized below.

First of all, the development strategy includes creation of the ecosystem for key industries, formation of the cooperative network system among regional industries (pioneering-specialized-cooperative-regional), establishment of the specialized complex per key industries, and development of the cluster of key branching sites. In addition, it involves promotion of systematic development between key industries and future growth-engine industries (Organic products, Flight MRO) selected by local government. Furthermore, the strategy will plan for policymaking that can maximize the creation of employment through strengthening of technology innovative manpower from each key industry.

The development strategy for economy cooperative industries will strengthen the competitiveness of the industries through formation of the economy cooperation network, development of regional innovation convergence/integration technology, and stimulation of connection between industries and industrialization.

The task of connecting growing branching points aims to create cooperative network among regional enterprises, universities, and 11 public institutions, which are relocating to Chungbuk Innovation city. It attempts to improve the true function of the public institutions, which is to develop regional industries. For example, Korea Gas Safety Corporation will be connected with the smart safety industry related technology development, technology commercialization, and networking. In the future, collaborative business will be available for the National Institute of Technology and Standards and the Korea Information and Communications Industry Promotion Institute.

In addition, the organic product industry, one of the local industries selected by Chungbuk region, has developed a connection with a regional (traditional) industry, SuperFood. SuperFood will develop global competitiveness and grow as the center of the organic product industry. Moreover, in regards to the Flight MRO industry, convergence technology development is being planned to develop Chungju International Airport as the new hub of flight MRO. Establishment of connections with the regional research institutes and the international enterprise investment groups seems important for accomplishing the goal.

REFERENCES
2. Chungbuk technopark (2012) The report on comprehensive analysis of fostering project for strategy industry in...
Chungbuk province. [written in Korean]

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