Research Profiling of Standardization and Innovation Research

(2010 EURAS Conference in Lausanne, Switzerland)

2 July 2010

Choi, Donggeun (Senior Researcher, Korean Standards Association)
Lee, Heesang (Professor, Management of Technology, Sungkunkwan University)
Sung, Taekyung (Professor, School of Management, Jeonju University)
1. Background

- What is the relationship of SI-R?
- What strategy/policy should we develop?

**SI-R: Standardization and Innovation Research**
2-1. Community: Conferences and Journals

- Society
  - EURAS – All aspects
  - SIIT – SI-R oriented with ICT focus

- Journals – SCI(E)/SSCI indexed: **Engineering Focused**
  - Computer Standards and Interfaces (SCIE, engineering)
  - Journal of Research of the National Institute of Standards and Technology (SCI, engineering)

- Journals – Others
  - International Journal of IT Standards and Standardization Research (SI-R focus with ICT focus) * 10 papers a year, still young
  - International Journal of Services and Standards (IJSS)
    - SI-R related to Service; Less technology-based content

- Difficulty to capture the main issues/trenda of SI-R
2-2. Literature Review: Two Papers
Rillio (2009) and Gambler (2008)

A number of different journals, in different academic community discretely

- Yoo et al. 2005; Lemley 2002; Farrell and Saloner 1985; Allen and Sriram 2000; Blind and Hipp 2003; Gallagher 2007; Egyedi and Sherif 2008

Rillio (2009) *EURAS Conference

- Extensive literature review of 486 papers on SI-R
- Three dimensions: knowledge dimension, network dimension, and transactional cost dimension
- First important examination of wide scan of this theme
- ‘subjective three broad classifications’ not employing any scientific methodology such as bibliometrics.

Gamber et al. (2008) *Scientometrics

- Used bibliometric approaches, but his research objective is slightly different.
- In-depth analysis to depict the knowledge array of DIN standards, under the assumption that standards function as catalyst of technical knowledge diffusion, and therefore an important factor in Germany’s innovation system.

Still, there has been little research

- Few having provided macroscopic view of standardization and innovation research based on bibliometric approaches
3. Research Objectives

- Systematic Literature Review
- Exploratory Classification/Taxonomy

Research Problems

• There Exists Few Single Renowned Journal on SI-R
• We Find Difficulty to Identify the Currents of SI-R

Research Objectives

• What are the major Topics of SI-R?
• What are the major Trends/Pattems of SI-R?
• Who (Which community) pay attention to SI-R?
4. Research Design

- **Bibliometrics Analysis of WoS Papers**

**Source Data – Web of Science**
- Title, Keywords, Abstracts, Country, Subject Category, Year

**Analyzed Data – 532 Papers**
- Filtering Methods (Searching Options)
  - Title: ‘standard*’ or ‘innovat*’ / Topic: ‘standard*’ and ‘innovat*’
  - Resulted in 836 papers → Excluded 304 papers (e.g.: medical operation innovation)

**Analysis 1: Yearly, Citation, Subject, Subject Grouping**

**Analysis 2: Clustering Analysis → Research Profiling (Taxonomy)**
5. Results - Year

- Continuously increasing

• Leap in 2002: Environment and Economics areas
• Leap in 2006: Telecommunications, Economics, Management areas
5. Results – Citation

- Continuously increasing

<table>
<thead>
<tr>
<th>Year Blocks</th>
<th>Total Number publication</th>
<th>Total Number Citation</th>
<th>Citation per Paper</th>
<th>WoS H-index</th>
<th>Average Citation Per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-96</td>
<td>4+13+14=31</td>
<td>176</td>
<td>5.68</td>
<td>6</td>
<td>11.73</td>
</tr>
<tr>
<td>1997-99</td>
<td>22+20+24=66</td>
<td>866</td>
<td>13.12</td>
<td>14</td>
<td>66.62</td>
</tr>
<tr>
<td>2000-02</td>
<td>28+33+44=105</td>
<td>1022</td>
<td>9.73</td>
<td>15</td>
<td>92.91</td>
</tr>
<tr>
<td>2003-05</td>
<td>41+46+43=130</td>
<td>887</td>
<td>6.82</td>
<td>16</td>
<td>110.8</td>
</tr>
<tr>
<td>2006-08</td>
<td>69+63+68=200</td>
<td>520</td>
<td>2.60</td>
<td>12</td>
<td>130.0</td>
</tr>
<tr>
<td>Total</td>
<td>532</td>
<td>3,471</td>
<td>6.52</td>
<td>28</td>
<td>231.40</td>
</tr>
</tbody>
</table>
5. Results - Authors

- Few Prolific Authors

- Not many researchers solely working on SI-R
  - Few highly Prolific and Highly Cited Authors in This Area.
  - K. Blind (Fraunhof Institute, Germany) is Found as One of the Few Prolific Authors

Figure 3  Prolific Authors on Standards and innovation during 1995-2008
6. Results – Subject Domains

- Variety of 135 Domains: Management..
6. Results – Subject Domain Groupings

- CAGR in 1997-2008

<table>
<thead>
<tr>
<th>Year Block</th>
<th>1997-99</th>
<th>AGR1</th>
<th>2000-02</th>
<th>AGR2</th>
<th>2003-05</th>
<th>AGR3</th>
<th>2006-08</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Management Group</td>
<td>10</td>
<td>30.1%</td>
<td>22</td>
<td>15.6%</td>
<td>34</td>
<td>18.8%</td>
<td>57</td>
<td>21.3%</td>
</tr>
<tr>
<td>2. Environment Group</td>
<td>8</td>
<td>26.0%</td>
<td>16</td>
<td>7.7%</td>
<td>20</td>
<td>24.9%</td>
<td>39</td>
<td>19.2%</td>
</tr>
<tr>
<td>3. Economics Group</td>
<td>11</td>
<td>-3.1%</td>
<td>10</td>
<td>9.1%</td>
<td>13</td>
<td>13.5%</td>
<td>19</td>
<td>6.3%</td>
</tr>
<tr>
<td>4. Computer/Info Group</td>
<td>10</td>
<td>3.2%</td>
<td>11</td>
<td>-10.1%</td>
<td>8</td>
<td>53.6%</td>
<td>29</td>
<td>12.6%</td>
</tr>
<tr>
<td>5. Chemistry Group</td>
<td>2</td>
<td>35.7%</td>
<td>5</td>
<td>26.0%</td>
<td>10</td>
<td>21.6%</td>
<td>18</td>
<td>27.7%</td>
</tr>
<tr>
<td>6. Telecom/EE Group</td>
<td>4</td>
<td>40.1%</td>
<td>11</td>
<td>13.3%</td>
<td>16</td>
<td>-6.7%</td>
<td>13</td>
<td>14.0%</td>
</tr>
<tr>
<td>Six Group Total (354)</td>
<td>45</td>
<td>18.6%</td>
<td>75</td>
<td>10.4%</td>
<td>101</td>
<td>20.1%</td>
<td>175</td>
<td>16.3%</td>
</tr>
<tr>
<td>Total (532)</td>
<td>70</td>
<td>12.2%</td>
<td>99</td>
<td>10.3%</td>
<td>133</td>
<td>15.1%</td>
<td>203</td>
<td>12.6%</td>
</tr>
</tbody>
</table>
6. Results – Journals
- *published more than 5 papers*

<table>
<thead>
<tr>
<th>Source Title</th>
<th>Subject Group</th>
<th>Record Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research policy (RP)</td>
<td>1.Mgt *MOT</td>
<td>13</td>
</tr>
<tr>
<td>International journal of technology management (IJTM)</td>
<td>1.Mgt *MOT</td>
<td>7</td>
</tr>
<tr>
<td>Energy policy (EP)</td>
<td>1.Mgt, 2.Env, 3.Eco</td>
<td>6</td>
</tr>
<tr>
<td>Journal of environmental economics and management (JEEM)</td>
<td>1.Mgt</td>
<td>6</td>
</tr>
<tr>
<td>Journal of product innovation management (JPIM)</td>
<td>1.Mgt *MOT</td>
<td>6</td>
</tr>
<tr>
<td>Lecture notes in computer science (LNCS)</td>
<td>4.CS/IS</td>
<td>6</td>
</tr>
<tr>
<td>Technovation (TECH)</td>
<td>1.Mgt *MOT</td>
<td>6</td>
</tr>
<tr>
<td>IEEE transactions on engineering management (ITEM)</td>
<td>1.Mgt *MOT</td>
<td>5</td>
</tr>
<tr>
<td>Technological forecasting and social change (TFSC)</td>
<td>1.Mgt *MOT</td>
<td>5</td>
</tr>
<tr>
<td>Technology analysis &amp; strategic management (TASM)</td>
<td>1.Mgt *MOT</td>
<td>5</td>
</tr>
<tr>
<td>Telecommunications policy (TP)</td>
<td>4.CS/IS, 6.TEL/EE</td>
<td>5</td>
</tr>
<tr>
<td>Water Science and Technology (WST)</td>
<td>2.Env</td>
<td>5</td>
</tr>
<tr>
<td>Transportation research record (TRR)</td>
<td>Others</td>
<td>5</td>
</tr>
</tbody>
</table>
7. Results – Exploratory Taxonomy

- 4 Groups – 9 Clusters

A1) Inter-relationship (60)

A2) Impact/Strategy (181)

A3) Sector Case and Strategy - Technology/QMS/Service (184)

B1) Interrelationship (60)

B2) Technology/Knowledge Transfer/Diffusion (26)

B3) Regulatory/Integration (54)

B4) IPR & Law (26)

B5) Competitive Strategy (88)

B6) Business Performance (93)

B7) Technology (86)

B8) QMS (63)

B9) Service (35)
8. Discussion & Future Research

**Contribution**

- First Trial to Classify SI-R Employing Bibliometric Approach

**Limitation**

- Starting Point *Note: Impetuous taxonomies may mislead us into over-simplifying the multidisciplinary and complex research areas*
- Remarkable Mixture: Some degree of Exaggeration; Converging or Diverging?

**Future Research**

- To Crystallize the Role of Standardization in Innovation
- To Map Each Aspect of Standardization and Innovation
  - Regulatory Standards -- Technology Diffusion ➔ Develop SI Strategy