University Based Innovation in Japan

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U-I Policies of Japan

Consistent Supports for U-I collaborations

- 1998: TLO promotion law
- 1999: Japanese Bayh-Dole Act
- 2001: 1000 university spin-outs plan (Hiranuma Plan)
  Subsidy to university startups, incubation facility
- 2005- : Supports to university IP offices

Decentralization of strategy implementation

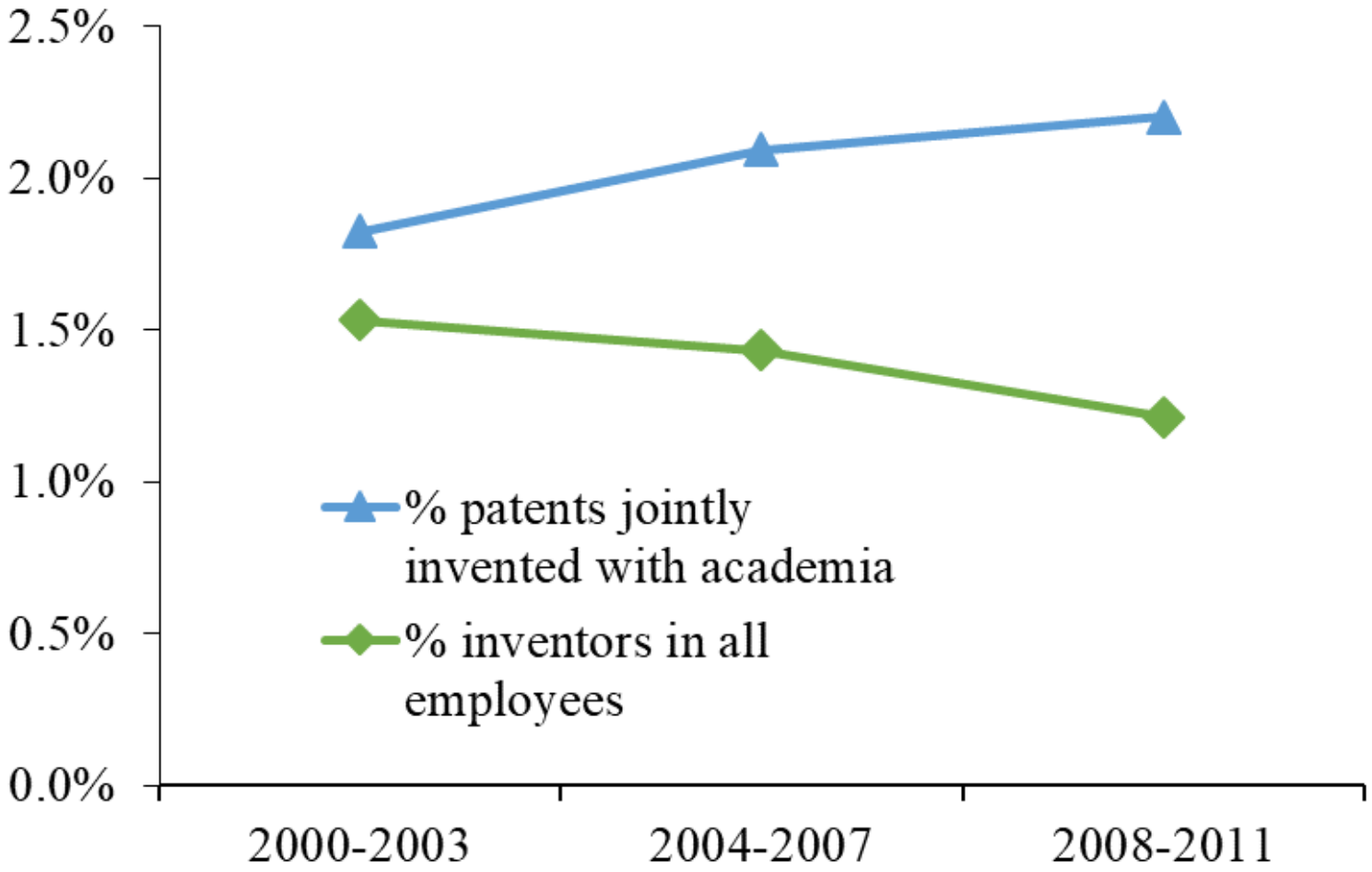
- 2001: Incorporation of national research laboratories (PRIs)
- 2004: Incorporation of national universities

⇒ Active patenting and startups from (national) university

NISTEP-RIETI Innovation Process DB for Systematic understanding of co-occurrence of science and innovation

- All disambiguated Japanese inventor records: Identified Academic Inventors (HEIs and PRIs, 53K)+Industry Inventors (1.23M) in 2000-2011 JPO application patents
- Linked with SCOPUS author data for academic inventors（26K linked)
- Linking applicants in JPO data with Economic Census of Japan at firm level

Important role of university in patenting



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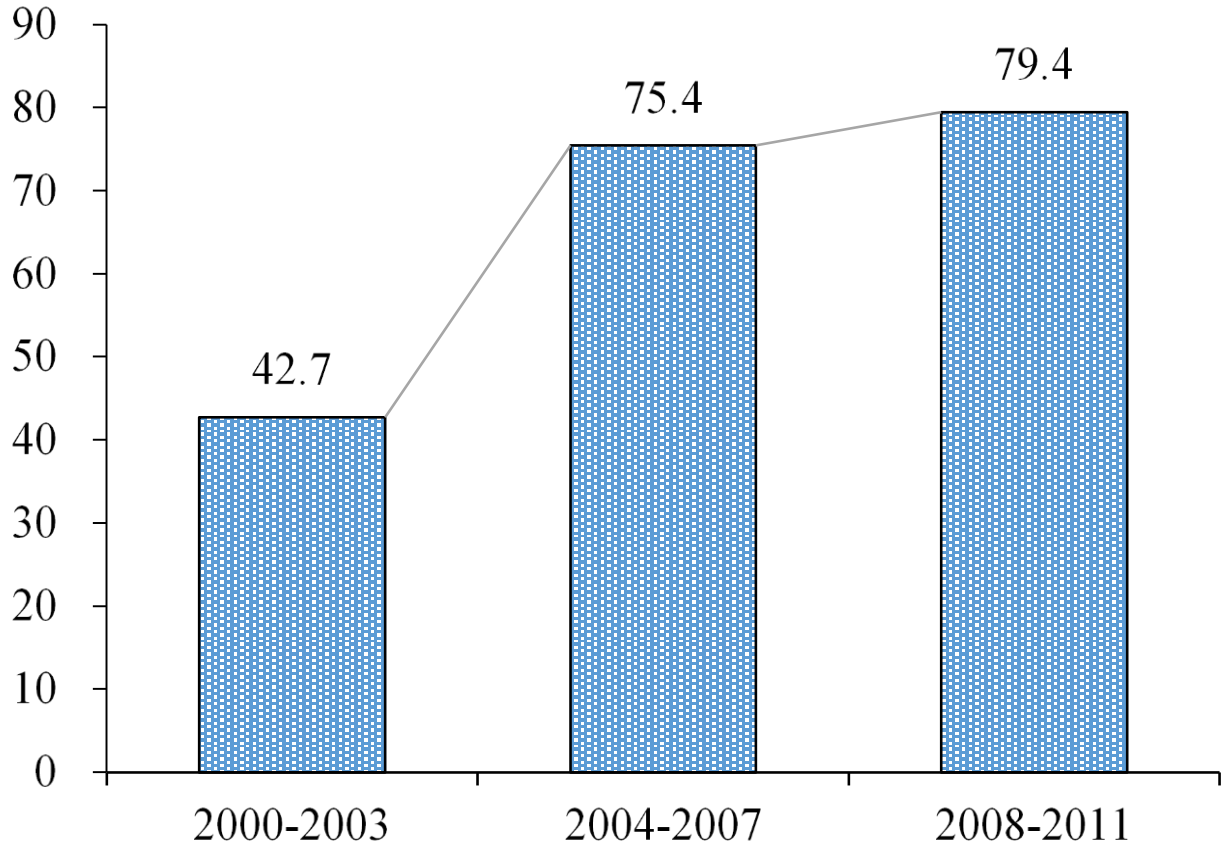
Growing contribution of author-inventor at university

(Avg. number of linked academic publications per 10 0 inventors)



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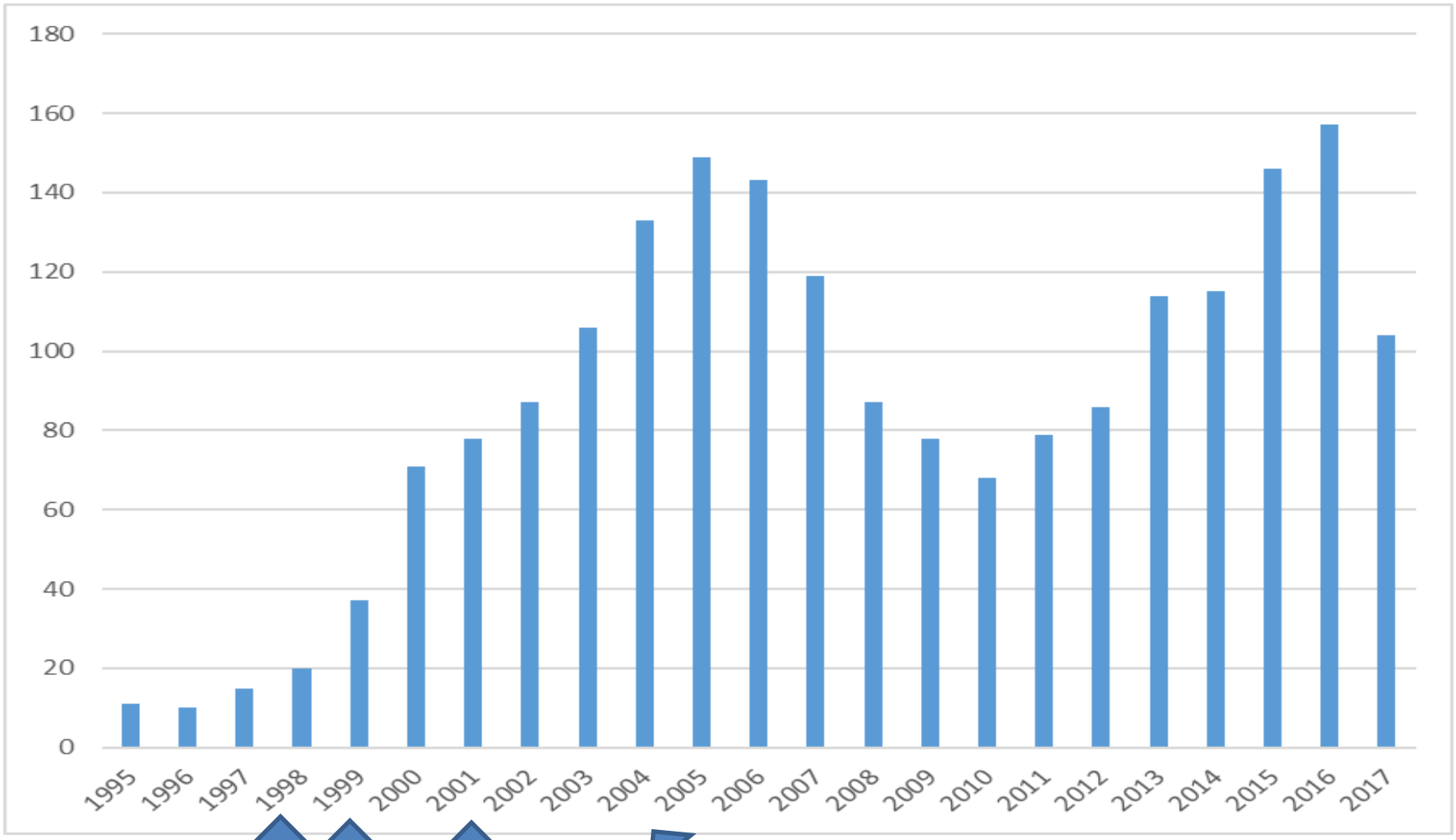
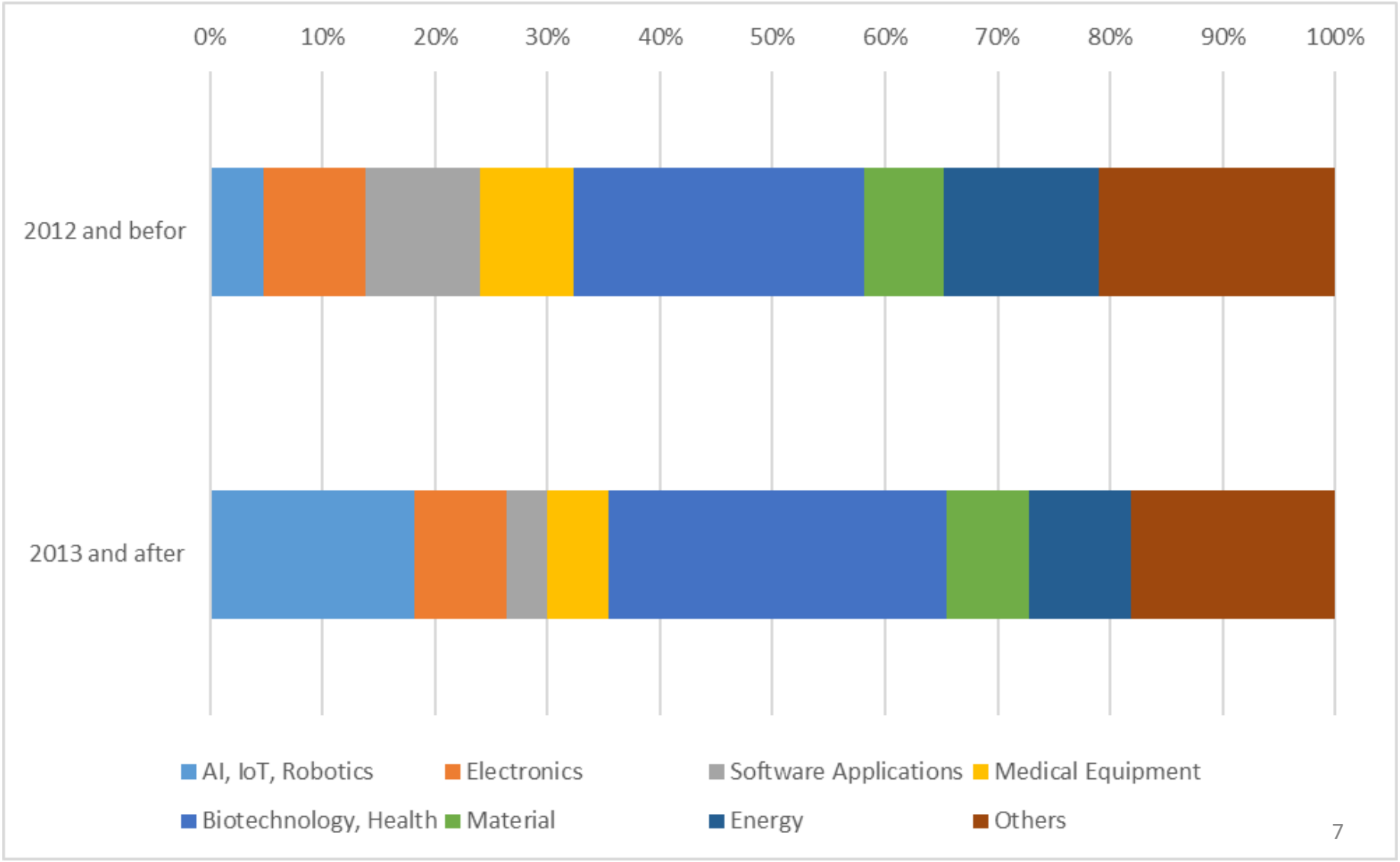
University Based Startups



Type of Business : Old vs New Ones



Dominant role of national universities (shaded ones)

Tokyo U	245	11.7%
Kyoto U	140	6.7%
Tsukuba U	98	4.7%
Osaka U	93	4.4%
Kyushu U	81	3.9%
Waseda	74	3.5%
Nagoya U	69	3.3%
Tohoku U	56	2.7%
TIT	53	2.5%
DigiralHolleywood	52	2.5%
Keio	51	2.4%
Hokkaido U	49	2.3%
Ryokoku	43	2.1%
Hiroshima U	43	2.1%
Kyushu IT	39	1.9%

Comparing USO to CSO
(Ikeuchi and Motohashi, 2018)

- University startups are better in performance in employment growth and patent indicators, but no significant difference in survival rate.
- 2001 samples (before Hiranuma plan) shows better performance in employment growth in national university, but not in 2006 samples (again, selection story works here)
- National university USO is better in employment performance in 2001 sample, and in patent (quantity and quality) performance for all period
- Scientist involvement in firm activities : no effect (potentially both positive and negative effects)

In a nutshell…

Pro innovation policies for universities (particularly for national universities) leads to

- Growing number of patenting activities at scientists (author-inventors) leads to more contribution to industrial innovation
- Growing number of university startups : average quality falls (by lowering startup hurdles at public scientists)
- But still its quality is higher than similar non-university related startups

Public Policy Dominant System?

- Division of labor between national universities (research) and private ones (education)
  - Incorporation of national universities in 2004, but no substantial changes in allocation of institutional funding (difficulty in performance matrix)
  - Institutional Funding (performance based but no changes so far) -> Competitive funding (recent ratio is 2:1) -> increased transaction costs (a large portion of temporary research positions)
- Complex and multiple sources of financial supports to technology based startups (incl. university spin offs)
  - Variety of financial support scheme is available from METI, MEXT, government agencies, local governments
  - 73% of university startups have some public financial supports (vs 23% of them have Angel/VC finance)

A sign of indigenous movements emerged (after 20 years of transitory period)

- Example of University of Tokyo ecosystem
  - Self sustained (independent) TTO function (Todai TLO, private entity)
  - About 15 exited firms affiliated Todai (some of them were invested by Edge Capital LLC, Todai VC)
  - Hongo Valley (Bynkyo-ku, Tokyo around headquarter of U of Tokyo)
  - Benefited by expanding technology opportunities (AI/IoT, robotics, gene editing, new materials…)
- Substantial regional gaps
  - Entrepreneurship activities : quite narrow regional proximity is needed (say 10 km) : U of Tokyo headquarter vs its branch in Chiba)
  - Concentrated in Tokyo metropolitan area (about 30 million population) : limited role of local governments