

Discover technology seeds and make a social impact



WIPO Conference, Dec. 14, 2017 Enabling Intellectual Property (IP) Environment for Technology Development, Management and Commercialization

Investment in Start-ups and early-stage ventures generated by University's researchers

Ryo Gonotsubo Investment Dept. Principal, Kyoto University Innovation Capital Co., Ltd. (KYOTO-iCAP)



Agenda



- Introduction Myself & KYOTO-iCAP
- Macro environment

- Case study
- ECC-iCAP
- Warp-up



Discover technology seeds and make a social impact



Introduction: Myself & KYOTO-iCAP



Ryosuke "Ryo" Gonotsubo



- ◆ 1994~2015: Kanematsu Corporation
 - ◆ 1994 2003 Credit / Legal Dept.:
 - Credit analyst / Bad debt collection / subsidiary & related companies :
 - ◆ 2003 2005 Business School:
 - ◆ Tepper School of Business, Carnegie Mellon University MBA, Class of 2005,
 - ◆ Enterprise Award for a business plan on SNS software
 - ◆ 2005 2015 Corporate Planning Dept.
 - ◆ M&A, venture financing, business planning, marketing, financing, etc.
 - ◆ New business creation:
 - ◆ Electric Vehicle battery charging network
 - ◆ EV taxi smartphone application
- Sept. 2015 present: Kyoto University Innovation Capital Co., Ltd., Principal, Investment Dept.

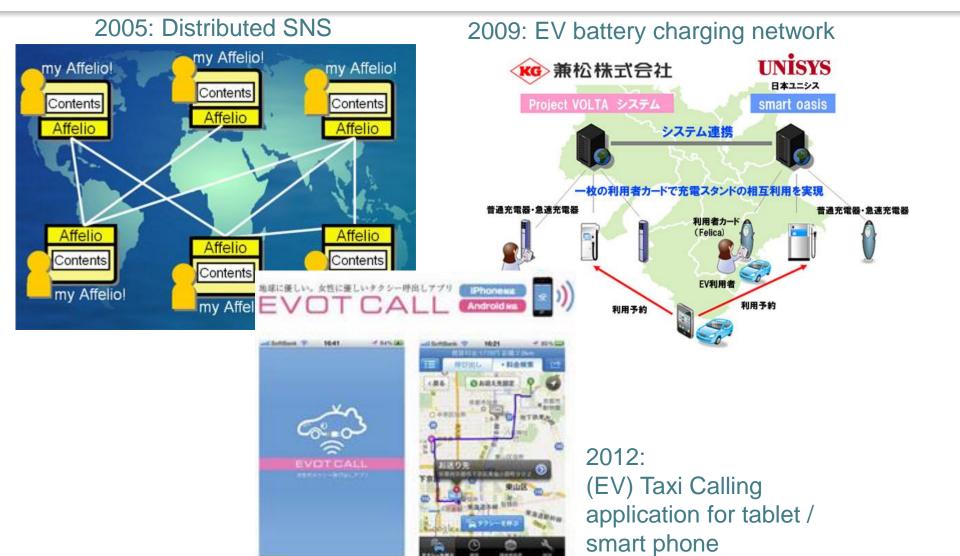


Did I have to be more "Patient"?

次世代タクシー呼び出しアブリ

TEVOT CALL





EVタクシーを捜して呼べる!

料金検索もできる!











Entrepreneurial Tradition in Kyoto





From Kyoto Chamber of Commerce and Industry Website

©Kyoto University 2016



Kyoto University: Novel Laureates, etc. 2



Nobel prize (9 laureates)



Hideki **Shinichiro** Yukawa Tomonaga 1949 1965



Kenichi Fukui 1981



Susumu **Tonegawa** 1987



Ryouji Noyori 2001



Makoto Kobavashi 2008



Toshihide Masukawa 2008



Isamu Shinya Akasaki Yamanaka 2014

Fields Medal (2)

Gauss prize (1)

Lasker Award (5)



Heisuke Hironaka 1970



Shigefumi Mori 1990



Kiyoshi Itoh 2006



Susumu **Tonegawa** 1987



Yasumi Nishizuka 1989



Yoshio Masui 1998

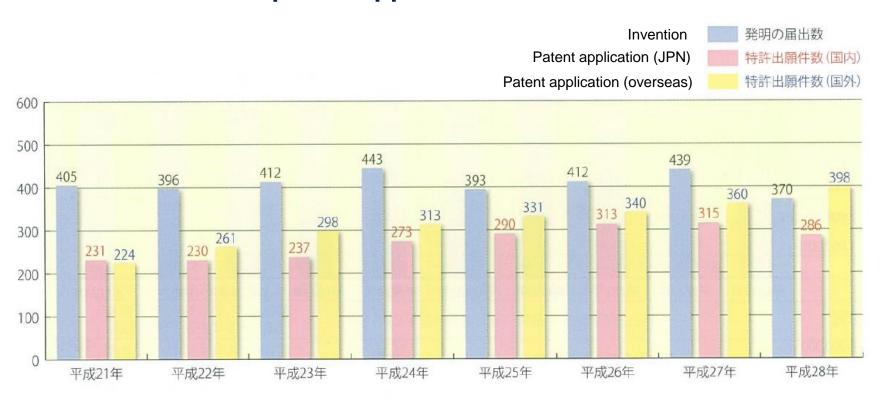
Shinva Yamanaka 2009

2012

Kyoto University - Intellectual Property



◆# of inventions / patent applications



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- î

Industrial Collaboration Track Record



Ranking in 2014	Institute	Amount (thousand JPY)	Amount (tousand USD, \$1.00=¥117)	Lanking in 2013
1	University of Tokyo	4,840,830	41,375	2
2	Kyoto University	4,792,490	40,961	1
3	Osaka University	3,215,597	27,484	4
4	Tohoku University	2,743,606	23,450	3
5	Kyushu University	1,901,041	16,248	5
6	Keio Gijuku University	1,585,213	13,549	6
7	Nagoya unviersity	1,431,172	12,232	7
8	Tokyo Institute of Technology	1,409,436	12,046	8
9	Hokkaido University	994,079	8,496	10
10	Waseda University	592,542	5,064	11

Source; "Research Report of Industry-Academia Collaborations, 2014" University-Industry Collaboration and Regional R&D Division, Science and Technology Policy Bureau

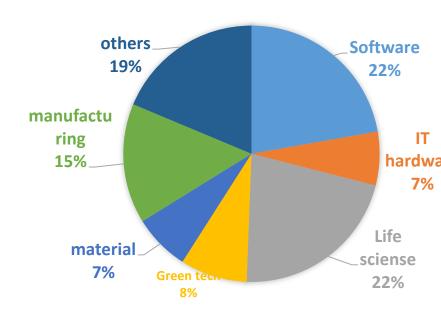




Venture creation by universities

Rank	Name of Univ.	Cumulative in FY2016
1	University of Tokyo	198
2	Kyoto University	86
3	Osaka University	77
4	Tsukuba University	73
5	Waseda University	65
6	kyushu University	63
7	Tokyo institute of Technology	53
8	Tohoku University	50
9	Hokkaido University	48
10	Kyushu institute of Technology	43

Type of Business



Public funding for startup creation from University



Budget for investment

(additional budget for grant support for Univ./Scientist)

Kyoto Univ.: ¥29.2 Bil	Univ. Tokyo : ¥41.7 Bil
(¥ 5.8 Bil)	(¥ 8.3 Bil)
Tohoku Univ. ¥12.5 Bil (¥ 2.5 Bil)	Osaka Univ.: ¥16.6 Bil (¥ 3.4 Bil)

¥120 Bil in total (¥100Bil and ¥20Bil for investment and grant support)

"support program for utilizing specified research results" approved by MEXT and METI based on the Industrial Competitiveness Enhancement Act.



Company overview



Company name Kyoto University Innovation Capital Co., Ltd. (KU-iCAP)

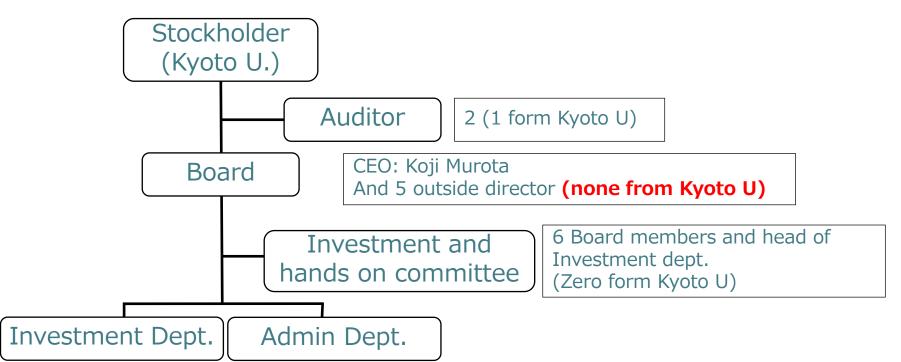
Address 36-1 Yoshidahonnmachi Sakyo-ward Kyoto JAPAN

CEO Koji Murota

Date of establish Dec. 22, 2014

Capital fund ¥ 35 mil

Stockholder Kyoto University (100%)





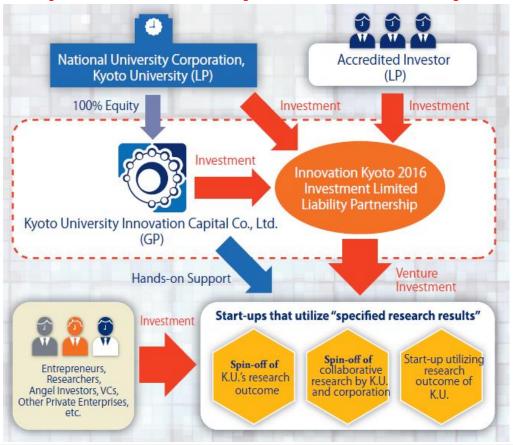
Fund Overview



Fund name: Innovation Kyoto2016 Investment limited partnership

Est of date: 2016.1.4 Fund size: ¥ 16 bil.

Fund period: 15years with five year's extension(max 20 yrs)





Investment destination



Private companies which commercialize Kyoto University's research outcomes

- 1) Collaboration research with Kyoto University
- 2) Licensed intellectual properties Kyoto University
 - a) Patent (including co-owned and /or pending)
 - b) Know-How, Data, Copy right
- 3) Contract with Kyoto University's researcher as scientific/technology advisor

Portfolio (Biotech)



AFI Technology

事業内容:電気計測とマイクロ流露回路技術を用いた細

胞・微生物の分離・精製機器の開発

本学研究者: 戸井雅和教授(医学研究科乳腺外科)

協調投資:みやこキャピタル(株)

大阪大学ベンチャーキャピタル(株)

みなとキャピタル(株)

投 資 額:14,000万円

投資開始日:平成28年4月28日



Kyoto Drug Discovery and Development

事 業 内 容: VCP調節薬を用いた眼難治疾患に対する新規治

療薬開発

本学研究者:垣塚彰教授(生命科学研究科)他

協調投資:みやこキャピタル(株)

SMBCベンチャーキャピタル(株)

三菱UFJキャピタル(株)

投 資 額:20,000万円

投資開始日:平成28年6月30日



SCAD

事業内容: 創薬における心毒性スクリーニング用の細胞

デバイスの開発

本学研究者:中辻憲夫特任教授(物質-細胞統合システム

拠点)他

協調投資:SMBCベンチャーキャピタル(株)

(株)ケイエスピー

ニッセイ・キャピタル(株)

投 資 額:14,000万円

16,000万円(追加)

投資開始日:平成28年6月15日

平成29年7月25日



Kinopharma

事業内容:タンパク質リン酸化酵素(キナーゼ)を標的と

した、新規低分子医薬品の研究開発・提供

本学研究者: 萩原正敏教授(医学研究科形態形成機構学)協調投資: エムビーエルベンチャーキャピタル(株)

投 資 額:15,000万円

投資開始日:平成28年12月26日





Portfolio (Biotech)



Thyas

事業内容: 再生T細胞 (T-iPS細胞) によるがん等の治療

法の開発

本学研究者:金子新准教授(iPS細胞研究所)

投 資 額:5,000万円

投資開始日:平成29年6月9日



CleanHearing Inc.

事業内容:大脳皮質電磁刺激と音響刺激による新しい

耳鳴治療システムの開発・製造・販売

本学研究者:中川隆之講師(医学部付属病院耳鼻咽喉科)

投 資 額:2,000万円

投資開始日:平成29年7月11日

CleanHearing

Oligogen

事業内容:神経疾患領域の新規治療薬開発本学研究者:藤淵航教授 (iPS細胞研究所)

協調投資: そーせいコーポレートベンチャーキャピタル(株)

ニッセイ・キャピタル(株)

SMBCベンチャーキャピタル㈱

投 資 額:1,995万円

投資開始日:平成29年8月10日



Chordia Therapeutics

事業内容:新規抗がん薬の研究開発 本学研究者:小川誠司教授(医学研究科)

協調投資:三菱UFJキャピタル(株)、SMBCベンチャーキャ

ピタル(株)、武田薬品工業(株)

投 資 額:25,000万円

投資開始日:平成29年11月29日





Portfolio (ICT/AI/IoT)



DOKI DOKI, INC.

事業内容:非同期・揮発性の音声コミュニケーション

アプリの開発

本学研究者:中村裕一教授(学術情報メディアセンター)

投 資 額:5,000万円

投資開始日:平成29年2月21日



PrediXT

事業内容:「関係性システム」を用いたネット広告事業等

本学研究者:新熊亮一准教授(情報学研究科)協調投資:ウエルインベストメント(株)

投 資 額:3,458万円

投資開始日:平成28年12月2日



MiraiSelf •

事業内容:人材と企業の価値観を、人工知能でマッチング

するプラットフォーム「mitsucari」の運営

本学研究者:田島敬史教授(情報学研究科)

投 資 額:7,000万円

投資開始日:平成28年12月27日

Lang-8

事業内容:語学学習Webサービス「Lang-8」と

「HiNative」の企画・開発・運営

本学研究者: 黒橋禎夫教授(情報学研究科)

協調投資: East Ventures、千葉功太郎氏、DeNA他

投 資 額:6,500万円

投資開始日:平成28年9月30日



Lang-8,Inc



Portfolio (Energy/Material)



CONNEXX SYSTEMS

事業内容:世代型蓄電池及び畜発電システムの開発、

販売、システム・インテグレーション

本学研究者:岩井裕准教授(工学研究科)

協調投資:大和企業投資(株)

フューチャーベンチャーキャピタル(株)

京銀リース・キャピタル(株)

投 資 額:30,000万円

投資開始日:平成29年3月10日



FLOSFIA

事業内容: ミストCVD成膜技術による酸化ガリウム・パワー

半導体の開発及び成膜ソリューション事業

本学研究者:藤田静雄教授(工学研究科)

協調投資:みやこキャピタル(株)、(株)環境エネルギー投資、

㈱東京大学エッジキャピタル、㈱安川電機、

フューチャーベンチャーキャピタル(株)、

ニッセイキャピタル(株)

投 資 額:10,000万円

投資開始日:平成29年3月2日

FLOSFIA

Tiem Factory

事業内容:エアロゲルを利用した透明断熱材の研究開発

本学研究者:中西和樹 准教授(理学研究科)

協 調 投 資: NECキャピタルソリューション(株)

合同会社テックアクセルベンチャーズ

投 資 額:5,000万円

投資開始日:平成29年2月17日







Discover technology seeds and make a social impact



Macro-environment (my understandings)



Macro-environment, Japan: Interplay between Knowledge creation and Value creation



- Disruptive Innovation, very difficult for big corporations in Japan
 - Innovators' dilemma
 - Yamaguchi's innovation theory
- University Ventures, the untapped arena:
 - where disruptive innovations can be given birth
 - where science people's role can be redefined

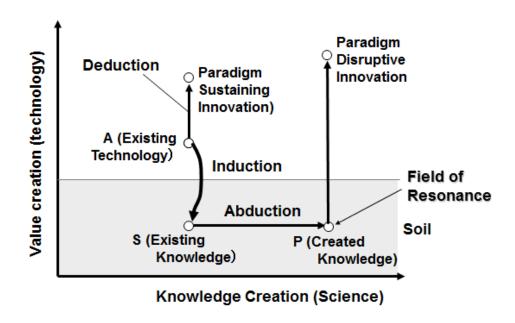


Fig. 1: Innovation diagram spanned by the axes of knowledge creation (science) and value creation (technology). All of the scientific activity is abduction, which paradigm disruptive innovation must go through. Reference="Innovation - Paradigm Disruption and Fields of Resonance" (E. Yamaguchi, 2006).

"Role of the Government in Promoting Small, Innovative Firms", Eiichi Yamaguchi, Kyoto University http://www.us-jpri.org/voice/usji-voice-vol-29



Macro-environment, world: The Rise of UVF and "Patient Capital"



- Many spinouts are based around technologies that require more time and resources to develop than a traditional startup born in the private sector. Consequently, regular venture capital, which expects to make a return in three to five years, may not be the right investment partner for a company looking at eight to ten years to get to market.
- Investors that take such a long-term strategy are known as patient capitalists. University venture funds have the same approach, but focus their investments on opportunities coming out of universities, and typically have some university cash behind them.
- Sometimes needed to get a university technology to market, these new "patient capital" models that can invest for 20+ years are replacing the traditional 10-year life venture capital funds. Patient capital is now overtaking venture capital as the dominant source of technology investment in the UK, where around 20 universities have tied investment funds with over \$1 billion of combined capital under management.

"University venture funds must reach beyond the Golden Triangle" OXFORD TODAY, Sept. 17, 2017: http://www.oxfordtoday.ox.ac.uk/opinion/university-venture-funds-must-reach-beyond-golden%C2%A0triangle



Macro-environment, USA: Based on my incomprehensive WWW. search



The Start:

In <u>1986</u>, <u>Arch Venture Partners</u>, one of the largest sciencefocused funds in the US. was spun out from <u>the University of</u> <u>Chicago</u>'s TTO





Recent:

<u>Dec. 2015</u>, <u>The University of California</u> says it will be investing <u>\$250 million</u> in startups "emerging from the University of California system."



http://www.oxfordtoday.ox.ac.uk/opinion/university-venture-funds-must-reach-beyond-golden%C2%A0triangle



Macro-environment, UK: Based on my incomprehensive WWW. search



• In <u>2000</u>, <u>Oxford University</u> and Beeson Gregory signed a deal of equity invest in chemistry spinouts, the start of <u>IP Group</u>, now a backer of a number of university funds.



 In <u>2006 Imperial College London</u> took the bold step of floating its technology transfer office, <u>Imperial Innovations</u> (now known as Touchstone Innovations), with <u>£300m</u> fund



 Manchester University launched its <u>UMIP Premier Fund</u> with £32m in 2008,



In <u>2013</u> <u>Cambridge Innovation Capital</u> was founded, now has <u>£125m</u> under management; its supporters include <u>Cambridge</u> <u>University</u> and one its most successful spinouts, the chip manufacturer <u>ARM</u>.



 In <u>2015</u> Oxford Science Innovations was established as a <u>\$500 million</u> fund to invest in spin outs from the <u>University of Oxford</u>



http://www.oxfordtoday.ox.ac.uk/opinion/university-venture-funds-must-reach-beyond-golden%C2%A0triangle



Macro-environment, ASPAC: Based on my incomprehensive WWW. search



- ANU Connect Ventures manages \$30 million funds; The Discovery Translation Fund 2.0, which aims to support research with commercial potential from **The Australian** National University, the University of Canberra and **Charles Sturt University** in undertaking crucial proof-ofconcept work; and the \$27 million Seed Investment fund for the ANU-MTAA Super Venture Capital Partnership. http://www.anuconnectventures.com.au/about-us/
- **Protege Ventures** is the first student venture fund in Southeast Asia. A joint initiative by **Kairos ASEAN** and the Singapore Management University (SMU), it leverages Kairos network in the regional startup ecosystem as well as SMU's expertise in entrepreneurial know-how to prepare university students for real world success in venture capitalism and entrepreneurship. **Q** protégé

http://protege.vc/



Macro-environment, JAPAN: the Rise of UVF (government and privately-funded)



- Nippon Venture Capital Co., Ltd. ("NVCC") (1996)
- WERU Investment (1998)
- The University of Tokyo Edge Capital (UTEC) (2004)
- Miyako Capital (2013)
- Innovations and Future Creation Inc. (MIRAI SOUZOU)(2014)
- Beyond Next ventures (2014)
- KEIO Innovation Initiative (2015)
- QB Capital (2015)





UTokyo IPC



- Four national universities
 - Osaka University Venture Capital (2015)
 - Tohoku University Venture Partners (2015)
 - Kyoto University Innovation Capital (KYOTO-iCAP) (2015)
 - Utokyo Innovation Platform (2016)
- KYOTO-iCAP is (one of a few?) real patient capitals focusing on preseed – seed science startups.

Based on each company's websites



More Comprehensive picture from "Global University Venturing"



UNIVERSITY-FOCUSED VENTURE FUNDS (Top-20)

Institution	Total (\$m)	Fund Name	Region
1 Tsinghua University	1,670	Tsinghua Holdings Capital, Redbud, TUS Holdings, Tsinghua Technology Transfer Fund	China
2University of Oxford	700	Oxford Sciences Innovation	UK
3 Imperial College London	615	Imperial Innovations (Apollo), Touchstone Innovations	UK
4Chinese Academy of Sciences	322	CASH Capital	China
5 Peking University	300	Founder Securities	China
6University of California (UC)	250	UC Ventures	USA
7King's College London	159	Epidarex Capital	UK
8University of Tokyo	157	University of Tokyo Edge Capital (UTEC), Utokyo Innovation Platform	Japan
9Kyoto University	150	Kyoto University Innovation Capital	Japan
9 Commonwealth Scientific and Industrial Research Organization (CSIRO)	150	CSIRO Innovation Fund	Australia
9 Massachusetts Institute of Technology (MIT)	150	Engine, MIT Campaign for a Better World	USA
9 Indian Institute of Management (IIM), Ahmedabad	150	Bharat Innovations Fund	India
13 Delft University of Technology	112	Chrysalix robotics fund	Netherlands
14Oregon Health and Science University	100	OHSU Innovation & Seed Fund	USA
15University of Cambridge	90	Cambridge Innovation Capital, University of Cambridge Enterprise Fund	UK
16 Osaka University	80	Osaka University Venture Capital	Japan
16 Keio University	80	Keio Innovation Initiative	Japan
16 Tohoku University	80	Tohoku University Venture Partners	Japan
19Harvard University	73	Xfund, Yard Ventures	USA
20 University College London (UCL)	70	UCL Technology Fund	UK
20 Cancer Research Technology	70	CRT Pioneer Fund	UK

^{*} Global University Venturing : Funds, Analysis & Awards May 2017





Discover technology seeds and make a social impact



Case-study: A Technology Co., Ltd.

Case – A-Tech KK : Transition from University Research to a real biotech :



- A-Tech KK (a fictitious startup I create from my experiences)
- History (mixture of my difficult experiences)
 - Founded in 201X as a university startup to commercialize Kyoto University's research.
 - Through DD several problems found, and K-CAP (fictitious version. of KYOTO-iCAP) once declined their funding request.
 - After the series of discussions, K-CAP offered a term sheet with deeply devalued price and condition to change the whole members of the management board, and invested in it as restructuring-round.
 - K-CAP capitalist newly invited Mr. X to the restructured A-Tech.
 Mr. X is a Japanese, ex-VP of R&D from a U.S. company, which was once a U.S. university startup and now listed on NASDAQ. He had roller coaster experience of the U.S. startup for 18 years from foundation to post-IPO.
 - The capitalist from K-CAP, as an investor director, provide hands-on supports from strategy, corporate design, contracts, hiring, R&D planning, even creation of patent (as one of the inventors), to the next fund-raising etc.
 - Now A-Tech is one of the most promising ventures of K-CAP's portfolio! ☺



Case – What Mr. X did;



- Mr. X is not only entrepreneurial, but is a scientist himself
- First established good relationship with the researcher and existing members through discussions on deep science and corporate strategies
- Rented a large laboratory space near the researcher's lab in the university
- Hired a few new assistant researchers
- Lend his own money to the company and bought minimum equipment for company's own experiments
- Filed a new patent
- Created company's own lab and independent culture quickly (all the above done in four months)

Mr. X talked;



- "I came back to Japan because not only I believed the researcher's technology, but I wanted to provide my humble experience to help creating Japanese deep-tech ventures eco-system, which is still ways to improve."
- The terms and conditions (of invitation letter) from K-CAP included;

"KYOTO-iCAP shall cooperate with Mr. X to create the infrastructure of venture incubation in Japan"



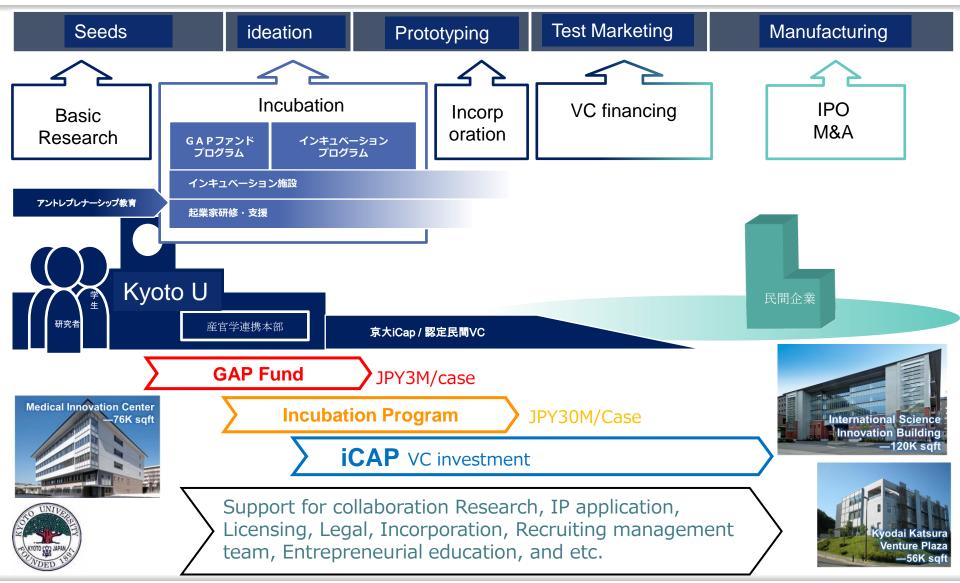
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ECC-iCAP: Efforts to create entrepreneurial environment

Venture Incubation of Kyoto University

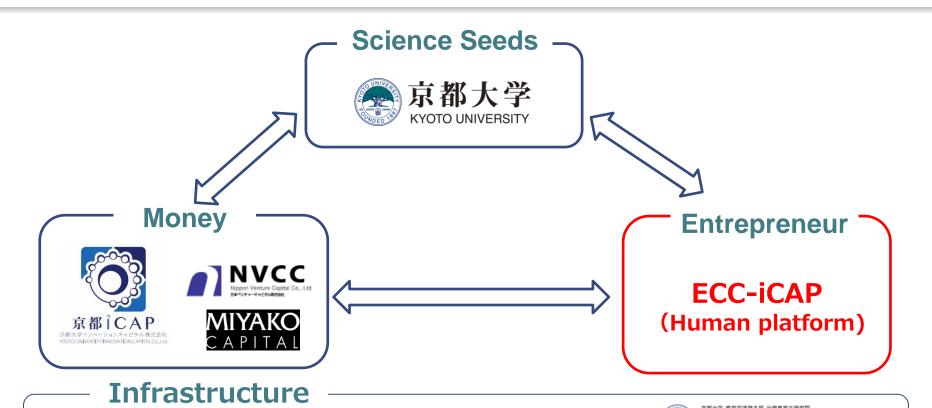






ECC-iCAP: Human Platform





 Kyoto University, Office of Society-academia collaboration for innovation -Fund, Co-working space, IP, Legal, etc.



Municipal government

-Subsidies for SME, Office space, Mentoring, etc. STE





Entrepreneur Candidate Club (ECC-iCAP)



Kyoto University Innovation Capital Co., Ltd.

Entrepreneur Candidate Club (ECC-iCAP)

大学発スタートアップ企業の経営層となる研究者とビジネスパーソンを求めています。

京都大学では、再生医療、人工知能、素材、エネルギーなどの分野で、新しい発明が日々生まれています。ECC-iCAP はこれらの発明を事業化すべく誕生した、スタートアップ創造のプラットフォームです。京都大学の研究者と、理系技術者、ビジネスパーソンを結びつけ、世界を変える企業を京都から次々に生み出してゆきます。

あなたも、ECC-iCAP のメンバーとして、事業創造にトライ してみませんか?



ECC-iCAP Overview



Who :

- Following individuals willing to participate in startups and has experiences in;
 - academic research in doctoral course
 - R&D or product development in big corporation
 - Business development, corporate/strategic planning, IP planning, consulting, etc. (business side)

What we do:

- Pitch event by Kyoto University's researchers
- Introduction and Matching of science/technology seeds to club members
- Acceleration (Mentoring and support from business planning to incorporation)
- ※Job placement is out-of-scope of this club

ECC-iCAP – From enrollment to seed funding



Enroll

Come to ECC event

Send Matching requests

- Application
- Consent to the membership terms and privacy policy
- Matching event
- Drink
- Like! Facebook page

- Request for matching to scientists
- Selection
- Interview
- Participation in the project

Acceleration (Part-time)

Incorporation (Full-time)

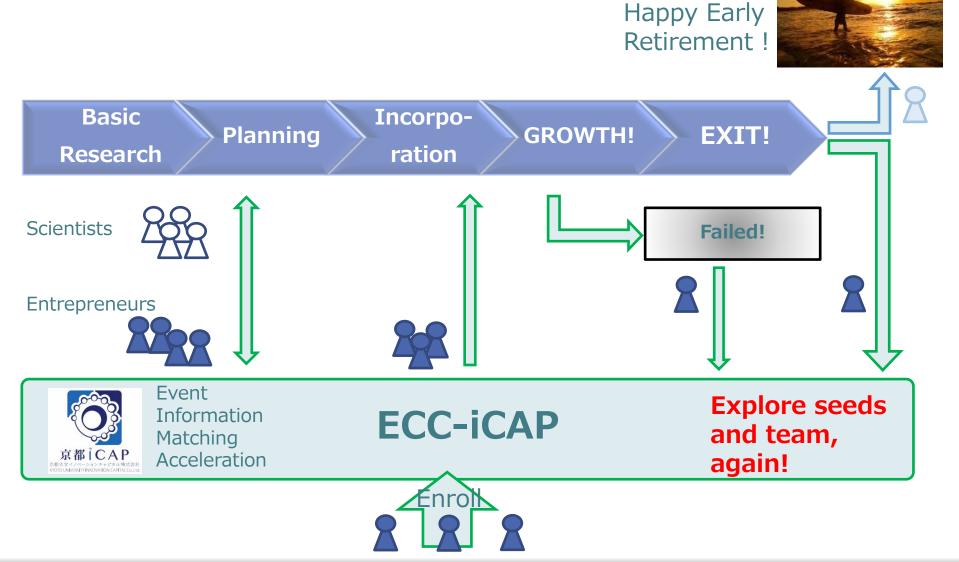
Financing Seed Money

- Business planning sessions
- Application to GAP fund/Incubation Program
- Incorporation with small money
- Value-up thru IP licensing and establishment of POC
- Seed funding from KYOTO-iCAP and other private VCs



ECC-iCAP - KYOTO ECO-SYSTEM





ECC-iCAP 1st event, Aug. 9. in Tokyo



- Place : Kyoto Academia Forum (Tokyo)
- Participants: 80
- Speakers:
 - Atsushi Wakamiya, Associate Prof. Institute for Chemical Research "Development of printable, film-type solar panel"
 - Haruhisa Inoue, Prof. Center for iPS Cell Research and Application (CiRA)
 - "Find new drug for intractable neurocyte diseases"
 - Naoki Shinohara, Prof. Research Institute for Sustainable Humanosphere "Wireless power aoki Shinohara, transmission by microwave, its future and challenges for commercialization"
 - Hirohide Saito, Prof. Center for iPS Cell Research and Application (CiRA)
 "RNA switch, controlling cell selection and fate of cells"
 - Kazuyuki Hirao, Prof. Center for Nano-Technology hub
 "The impact of solid source of hydrogen, cylinder is no more needed towards the future of hydrogen society"
- Four matchings achieved







ECC-iCAP, 2nd event, Nov. 17 in Kyoto



- Place: Kyoto University, International Science Innovation Building
- Participants: 74
- Speakers:
 - Fumitoshi Matsuno, Prof. School of Engineering
 "Safety for society that robot system for tough environment can bring"
 - Toru Tanimori, Prof. School of Science
 "Potential for new industry that visibility of gamma-ray can create"
 - Masato Kinoshit, Assistant Prof. School of Agriculture
 "Efficient breeding of fish through genome editing technology"
 - Easan Sivaniah, Prof. Institute for Advanced Study
 "Start-up Investment Opportunities for State-of-the-art Membrane Technologies"
 - Shin Kaneko, Assistant Prof. Center for iPS Cell Research and Application (CiRA)
 "Immuno-therapy by regenerated killer-T-Cell"









Discover technology seeds and make a social impact



Warp-up:



Challenges of academic "Science-Out" approach



- To cross the "Devil River" and "Valley of Death" (You cannot even see the "Darwinian Sea")
- Long path of transition from science to technology
 - Invention (Science) > Ideation (into the base of Product or Service) > Prototyping > Production > Marketing > Sales > Delivery
 - All require different expertise
- Challenges:
 - Gap b/w Science and Technology
 - Different language b/w researchers and business people
 - Gap b/w the sources of fund for academic research and commercialization
 - Little understanding of scientists about venture finance (need education)
 - Patents are different b/w academic purpose and corporate strategy
- Catalysts = Science communicator plays important role



Summery



- Patient capital will play significant role in university technology commercialization (outside of USA).
- Independent governance (individual investment decision) is crucial for UVF
- University startups needs to be independent from academic arena, while maintaining good relationship with them.
- Entrepreneurs are the last and most important component for the success. ECC-iCAP can be the one of the key efforts.
- So may challenges b/w science and business;
 Real success has to wait for 10-20 yrs. We need to be "Patient."

THANK YOU!

